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Taxation – an instrument for achieving carbon dioxide emission reductions?

Thesis Presented for the Degree of
DOCTOR OF PHILOSOPHY
in the Department of Public Law
UNIVERSITY OF CAPE TOWN

February 2011

by

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List of Abbreviations and Acronyms

AAIS: American Association of Insurance Services

AD: Anno Domini

AFP: Agence France Presse

ASCM: Agreement on Subsidies and Countervailing Measures

AUD: Australian Dollar

BC: British Columbia

BAFU: Bundesamt für Umwelt

BAT: Best Available Technology

BBC: British Broadcasting Corporation

BMF: Bundesministerium der Finanzen

BTA: Border Tax Adjustment

BTU: British Thermal Unit

CAD: Canadian Dollar

CBO: Congressional Budget Office

CCA: Climate Change Agreement

CCAP: Climate Change Action Plan

CCAs: Climate Change Agreement scheme

CCL: Climate Change Levy

CDM: Clean Development Mechanism

CEO: Chief Executives Organization

CFC: Chlorofluorocarbon

CFR: Council on Foreign Relations

CH₄: Methane

CHF: Swiss Franc

CISDL: Centre for International Sustainable Development Law

CNY: Chinese Yuan

CO₂: Carbon Dioxide

COM: Commission of the European Communities

CPRS: Carbon Pollution Reduction Scheme

CTE: Committee of Trade and Environment

CTS: Cap and Trade System

DECC: Department of Energy and Climate Change
DEFRA: Department for Environment, Food, and Rural Affairs
DKK: Danish Krone
DNA: Desoxyribonucleic Acid
EC: Council of the European Union
EEC: European Economic Community
EIA: Energy Information Administration
EnAW: Energy Agency of Economy
EPA: Environmental Protection Agency
Eskom: Electricity Supply Commission
ETR: Ecological Tax Reform
ETS: Emission Trading System
EU: European Union
EUR: Euro
FIM: Finnish Markka
GATT: General Agreement on Tariffs and Trade
GBP: Great British Pound
GDP: Gross Domestic Product
GECF: Gas Exporting Countries Forum
GHG: Greenhouse Gas
GJ: Gigajoule
GNI: Gross National Income
GNP: Gross National Product
IBRD: International Bank for Reconstruction and Development
IDA: International Development Association
IEA: International Energy Agency
ILSR: Institute for Local-Selfreliance
IMF: International Monetary Fund
INR: Indian Rupee
IPCC: Intergovernmental Panel on Climate Change
IRIN: Integrated Regional Information Network
ISO: International Organisation for Standardization
ITO: International Trade Organisation

IUED: Israel Union for Environmental Defence

JI: Joint Implementation

JPY: Japanese Yen

kg: Kilogram

kWh: Kilowatt Hours

l: litre

LPG: Liquefied Petroleum Gas

LTMS: Long-term Mitigation Scenario

LULUCF: Land Use, Land-Use Change and Forestry

MAR: Mid-Atlantic Region

MEA: Multilateral Environmental Agreement

MFN: Most-Favoured-Nation

mt: metric tonne

MtCe: million tonnes of carbon

MWh: Megawatt Hours

N₂O: Nitrous Oxide

NASA: National Aeronautics and Space Administration

NASDAQ: National Association of Securities Dealers Automated Quotation

NCDC: National Climate Data Center

NESDIS: National Environmental Satellite, Data, and Information Service

NGA: Negotiated Greenhouse Agreements

NGO: Non-governmental Organisation

NIS: New Israeli Shekel

NOAA: National Oceanic and Atmospheric Administration

NO_x: Nitrogen Oxides

NRC: National Research Council

NTD: New Taiwan Dollar

NZD: New Zealand Dollar

ODC: Ozone-Depleting Chemicals

OECD: Organisation for Economic Cooperation and Development

OPEC: Organization of the Petroleum Exporting Countries

PCG: Polyvinyl Alcohol, Cellulose, and Glass

PE: Pollution-equivalent

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PEDN: Programa del Estado de la Nacion

PertE: Productivity and Environmental Tax Reform in Europe

ppm: Parts Per Million

PSCI: Prior-stage Cumulative Indirect

RECOPE: Costa Rican Petroleum Refinery Incorporated

RET: Regulatory Energy Tax

SASOL: South Africa Synthetic Oil Limited

SEPA: State Environmental Protection Administration

SO₂: Sulphur

SO_x: Sulphur oxides

tCO₂: Tonne of CO₂

US: United States

UNDP: United Nation Development Programme

UNEP: United Nations Environment Programme

UNFCCC: United Nations Framework Convention on Climate Change

USC: United States Code

USCA: United States Code Annotated

USCIB: United States Council for International Business

USD: US-Dollar

USGS: United States Geological Survey

VAIE: Voluntary Agreements – Implementation and Efficiency Project Programme

VAT: Value Added Tax

WTO: World Trade Organization

ZAR: South African Rand

Abstract

The aim of this research project is to examine the adaptation of taxation systems as an instrument for achieving carbon dioxide (CO₂) emission reductions. It therefore analyses the effect of CO₂ taxes at both national and multinational levels. In this respect the study explains the expected aftermath of global warming and seeks to find an international tool to reduce carbon emissions. The research is divided into seven parts.

In general, taxation is a possible steering mechanism towards changing the behaviour of people. Nonetheless, the discussion of increased taxation always brings the fear of financial strictures among a wide section of the population and accordingly the fear to politicians of losing the next election. This thesis explains the effect of carbon taxation and shows that the fear of financial hardship and a failure to be re-elected are not necessary concomitants of the introduction of a carbon tax. Moreover, it demonstrates that a carbon tax could be a cost-effective solution in changing behaviour which would then bring about a change in the use of fossil fuels and/or better technology to help reduce carbon emissions while working for an after-fossil fuel era.

This thesis also examines a selection of carbon taxes that have already been implemented worldwide and illustrates their advantages and disadvantages. It explains that in order to achieve CO₂ emission reduction the implementation of an international tax would be necessary. Furthermore, it shows that border tax adjustment is justified under international trade law. This would be a great help in the worldwide introduction of a carbon tax since it would give nations the option of either paying the carbon taxes of other countries or introducing such a tax themselves, which would have the advantage that the revenue would be used to the benefit of their own countries. In this context the thesis discusses different possibilities for the use of revenues from CO₂ taxes.

Finally, it tries to develop a theoretical approach in order to show the essential factors necessary for designing a fair, global CO₂ tax framework.

The thesis is suitable for people who have knowledge of tax law, but little or none in the field of energy taxation. The topic of global warming, and with it the issue of taxation as an

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economic measure, has been an issue for the last 20 years and will remain so as long as the carbon emissions worldwide continue at the 1990 level or even higher.

After the disappointing outcome of the Copenhagen Climate Conference in December 2009, followed by the promising outcome of the Cancún Climate Conference in December 2010, the need to demonstrate the existence of current economic measures that can halt global warming and reduce carbon emissions became even clearer; measures that could be used and implemented immediately without deeply curtailing the finances of the population or of industry. If this is understood, the next Climate Conference in Durban in December 2011 might lead to a binding international agreement.

There is hope for further progress in the worldwide recognition of the problem, particularly since the UN Security Council, in July 2011, made the statement that: ‘The Security Council expresses its concern that possible adverse effects of climate change may, in the long run, aggravate certain existing threats to international peace and security.’¹ The upcoming international awareness gives hope for far-reaching solutions in Durban in December.

¹ United Nation Security Council SC/10332 [Online] <http://www.un.org/News/Press/docs/2011/sc10332.doc.htm> accessed on 28 July 2011.

I Introduction

As will be shown, humankind has sent more and more carbon into the atmosphere since the industrial revolution began, which is the main reason for global warming. By 2004 the approximate CO₂ emissions by human beings were eight billion tonnes of CO₂ with an upward tendency. These emissions will stay in the atmosphere for decades or even longer. This leads to changes in the energy balance of our climate system and influences changes *inter alia* in temperature, precipitation, storms, sea levels and biodiversity around the world. It has already had negative effects on mankind and the economy globally. In the past, the need for climate change mitigation measures was not as important as it is today. Because climate change does not stop at borders it is an international problem, which calls for an international approach. The questions which have to be answered are: how can global warming be stopped or at least be mitigated? Can taxation be an instrument for achieving CO₂ emission reductions? The thesis will provide a comprehensive survey of the theory of carbon taxation, the use of carbon taxes around the world, and the potential for an international carbon taxation regime as a measure to address climate change on a global basis.

The aim of the thesis is to examine the adaptation of taxation systems as an instrument for achieving CO₂ emission reductions, especially concerning the problem of competitiveness. In this respect the paper starts by introducing the problem of climate change and the reasons why governments should consider policies to address global warming. For this it will provide an overview of the short and long term effects of global warming in Chapter Two.

In Chapter Three the thesis will focus on economic instruments. Therefore, it presents a general idea of the three most common instruments used in the fight against environmental issues such as global warming. Then, it will deal with CO₂ in particular, as it is the main theme of the thesis. It will explain the economic aspects of the adoption of a carbon tax system in theory, especially in the light of competitiveness. In this context it will consider the range of policy approaches and the policy rationales for exploring carbon taxes in particular.

It is followed in Chapter Four by presenting the CO₂ levy and CO₂ and energy tax law implementation statutes implemented by a selection of countries and the European Union. The countries were chosen for different reasons, particularly to give an overall picture. For

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achieving this, countries which have already implemented such taxes had to be included as well as countries which are moving towards implementing either a carbon tax or an emission trading system. Another reason for the choice of countries was to provide an overall picture by selecting both developed and developing countries, with their different commitments and demands. The selection of Costa Rica, for instance is an example which could motivate other developing countries. It is commendable for a developing country, which has implemented measures to reduce carbon emissions and other environmental damage risks, to have also accomplished an improvement in its economy. The analysis will demonstrate the national and international legitimacy and the advantages and disadvantages of the selected CO₂ taxation models. The results will be collected and used for the design of an international tax framework. The general idea of the thesis looking at the impact of carbon taxes concerning issues of competitiveness for industries in tax imposing countries, with the risk that those industries will relocate to jurisdictions that do not entail a price on carbon will also be analysed.

Chapter Five identifies GATT and WTO laws that affect the ability of countries to introduce border tax adjustments on their carbon taxes. The aim of border tax adjustment is to levy taxes on imports but not on exports. If border tax adjustments are justified they can serve as a measure to protect competitiveness issues. Its conformity to GATT and WTO laws will be assessed. Additionally, the implementation of competitive effects will be critical analysed to demonstrate the need for a good design to produce politically acceptable carbon taxes.

Chapter Six deals with the possibility of international carbon taxation and arguments for and against its introduction. The chapter attempts to suggest an adequate solution for further discussions. Of course it cannot integrate all aspects but it will attempt to give answers to specific questions which the author thought would be indispensable, such as: who should the targeted person be, what would be the best targeted activity, which tax system would be the right one? In particular there are questions concerning the conceptual differences between national and international measures: would a treaty or a framework be the better solution; would a single carbon tax be best or should an entire ecological tax reform be implemented? Furthermore, the chapter will consider when the right time might be and the amount of tax paid, in the context of an international carbon tax framework. It will investigate the utilisation of exemptions and explain why their use should be avoided if possible. In addition the thesis

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will evaluate feasible implementation measures for the administration of the tax, as well as for monitoring and compliance; recommending for defaulters possible enforcement and penalty measures. How the revenue might be used in a worthwhile manner, will be suggested; for instance, ecological projects, balancing budget deficits or in supporting environmental projects. Then, this chapter will consider a range of possibilities to face fiscal reality and changes of the agreement if necessary. Last, but not least, the coexistence of different mitigation measures, especially those already implemented, will be discussed.

Chapter Seven will summarise the results of the other chapters, and try to address the lessons, the challenges and areas for future research.

II The problem of climate change - reasons for the need to consider policies

Chapter Two will outline the definition of global warming and the short- and long-term effects of it.

1 Time to change

Carbon is the building block of life.² It is found in all organic substances, from fossil fuel to DNA. The global carbon cycle happens in a biological, also known as physical, period which can be days or thousands of years; or in a geological time period, which operates over millions of years.³ The biological period is better known as photosynthesis and respiration. Photosynthesis is the production of sugar from solar energy and CO₂ which occurs in accordance with the metabolism of those sugars to produce the chemical energy necessary for growth and reproduction.⁴ To produce carbohydrates (sugars) in the photosynthesis process, green plants, for example, absorb solar energy and remove CO₂ from the atmosphere.⁵ These sugars are then used by plants and animals in the process of respiration (metabolism).⁶ Accordingly a cycle of production and absorption occurs. In the ocean, as another example, some of the carbon is absorbed by phytoplankton to produce shells formed of calcium carbonate.⁷ This process removes CO₂ from the atmosphere and stores it in geological sediments and to complete the cycle, animals, microbes and plants give the CO₂ back to the atmosphere by consuming the plankton. Since this cycle is necessary for almost all life forms we need carbon for living but it has to be in balance.

Through fire, for example, biomasses and organic matter change into CO₂. According to this principle, by burning fossil fuels for transportation, heating, cooking, electricity and manufacturing we send carbon into the atmosphere again. Since the industrial revolution began, humankind has sent more and more carbon into the atmosphere. This is the main reason for global warming.

² NASA *The carbon cycle* [Online] <http://earthobservatory.nasa.gov/Library/CarbonCycle/printall.php> accessed on 25 February 2010.

³ *Ibid.*

⁴ *Ibid.*

⁵ *Ibid.*

⁶ *Ibid.*

⁷ *Ibid.*

1.1 What is global warming?

Global warming starts with the sunshine which reaches our planet. Through reflective ground surfaces, clouds, ocean surf and atmospheric particles, approximately 30% of sunlight is reflected back into space; whereas the residual 70% is absorbed by land, oceans and air which heats our planet's surface and atmosphere.⁸ The absorbed solar energy is emitted again as thermal radiation or infrared heat. The majority of this thermal radiation is transmitted directly through the atmosphere.⁹ This transmission cools down the Earth. Part of the non-transmitted radiation is re-absorbed by water vapour, CO₂ and other gases in the atmosphere and makes its way again to the Earth's surface. In principle this process is good: it warms the Earth up to an average of 15°C. Otherwise, without clouds and greenhouse gases, the average temperature would be -18°C.¹⁰

1.2 The historic development of global warming

Throughout history the Earth's climate has continuously changed. There have been interglacial periods when ice melted and glacial periods when ice covered major parts of the Earth.¹¹ Through research and current techniques, scientists are able to follow the climate patterns up to millions of years ago. As a result of this investigative research, the correlation between glacial cycles and CO₂ levels over the past 650,000 years has been established.¹² During interglacial periods, CO₂ levels have been high and during glacial periods, CO₂ levels have been low (*see Figure 1.1*).

⁸ NASA *Global Warming* [Online]

http://earthobservatory.nasa.gov/Library/GlobalWarmingUpdate/global_warming_update2.html accessed on 25 February 2010.

⁹ *Ibid.*

¹⁰ NASA *What is Global Warming?* [Online]

<http://earthobservatory.nasa.gov/Features/GlobalWarming/page2.php> accessed on 7 October 2010.

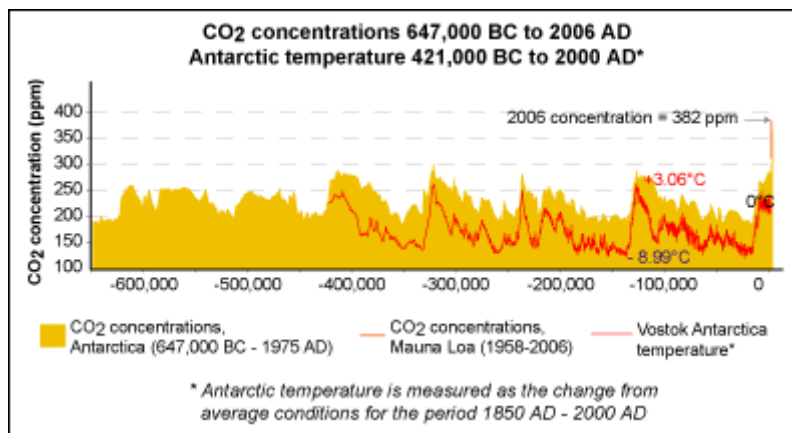
¹¹ EPA *Past Climate Change* [Online] <http://www.epa.gov/climatechange/science/pastcc.html> accessed on 25 February 2010.

¹² *Ibid.*

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Figure 1.1:



Source: <http://www.epa.gov/climatechange/science/pastcc.htm> accessed on 25 February 2010.

The red line demonstrates the fluctuations in temperature and in the atmospheric concentration of CO₂ (yellow) over the past 649,000 years. The vertical red bar at the end shows the increase in CO₂ levels in the atmosphere over the past two centuries and before 2007.

Within the last two millennia, the climate has been comparatively steady. There have been only three variations, which were called the Medieval Climate Anomaly (also referred to as the Medieval Warm Period), the Little Ice Age and the Industrial Era. For example, the Medieval Climate Anomaly in the years between 900 and 1300 AD produced comparatively warm weather in Europe, Greenland and Asia.¹³ This seems to have had a similar effect on the western part of America where conditions were very dry around this period. In comparison, throughout the Little Ice Age, roughly between 1500 and 1850, the average temperatures were circa -16°C colder than they are today.¹⁴

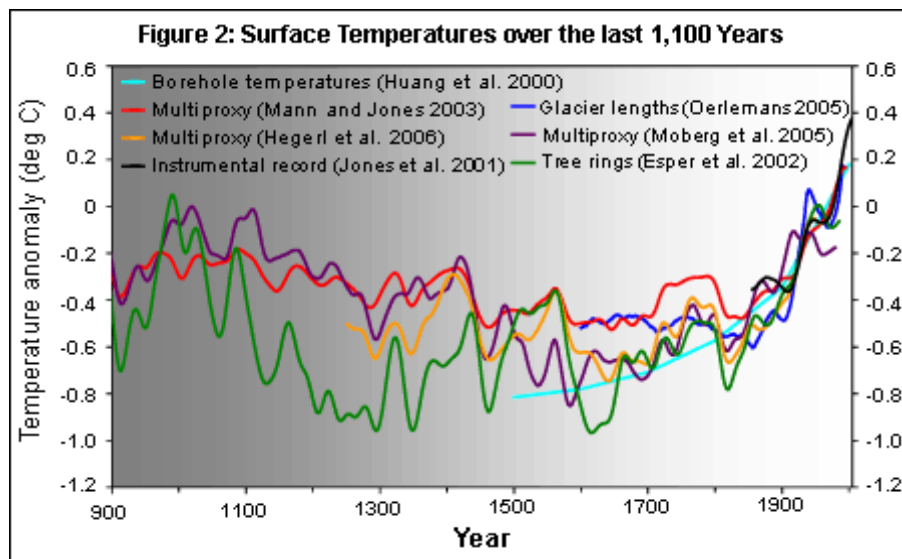
¹³ *Ibid.*

¹⁴ *Ibid.*

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Figure 1.2:



Source: <http://www.epa.gov/climatechange/science/pastcc.htm> accessed on 25 February 2010

This figure is a reconstruction of (northern hemisphere average or global average) surface temperature variations from six research teams (in different colour shades) along with the instrumental record of global average surface temperature (in black). Each curve demonstrates a somewhat different history of temperature changes, with a range of uncertainties that tend to increase backwards in time (as indicated by the shading) but lead to a similar result. Reference: [National Research Council, 2006](#).

In the Industrial Era (approximately the last 100 years) an additional warm period has emerged, corresponding to considerably increasing emissions of greenhouse gases¹⁵ from human activities. In 2004 humans emitted over eight billion tonnes of CO₂ per year, which will stay in the atmosphere for decades or longer.¹⁶ This means that since the beginning of the industrial revolution (approximately 1750), the CO₂ levels had risen by up to 38% in 2009 whereas the increase was “only” 35% in 2004.¹⁷

¹⁵ The six major greenhouse gases which contribute to global warming/climate change are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride. CO₂, methane and nitrous oxide are emitted during the combustion of fossil fuels and solid waste. The fluorinated gases are synthetic and emitted by a diversity of industrial processes. This thesis has focused on CO₂ as an example of the greenhouse gases, since it is one of the most important gases of the natural greenhouse gas effect and as such well researched and documented. Since the fluorinated gases are emitted by different activities they need to be reduced by different measures.

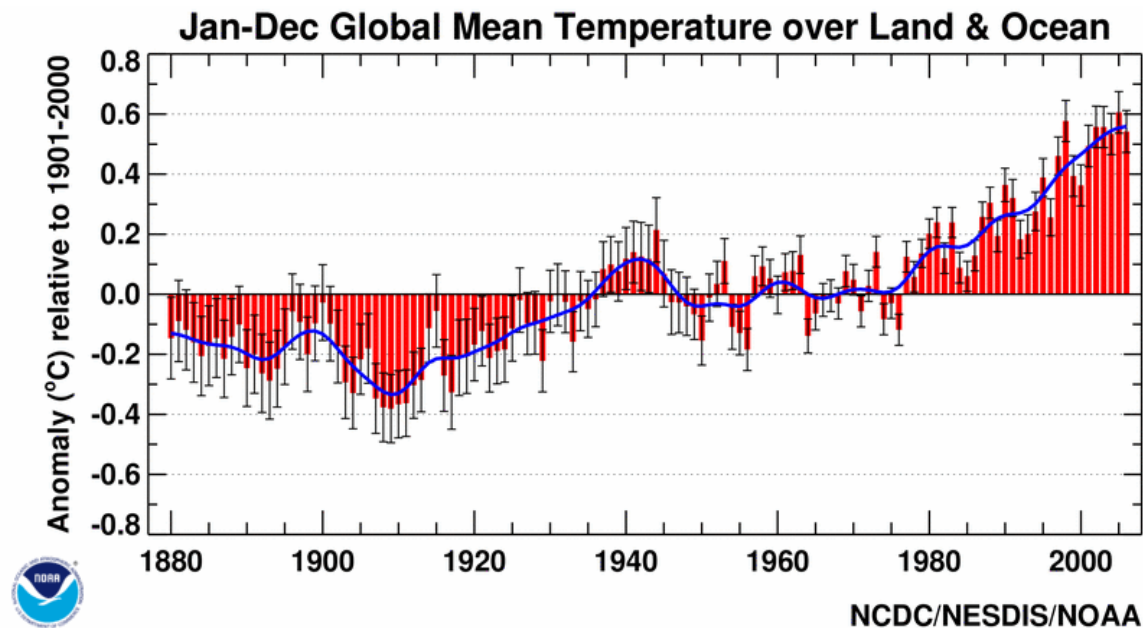
¹⁶ *Op cit*, Fn. 10.

¹⁷ *Ibid*.

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Figure 1.3:



Source: http://epa.gov/climatechange/science/recenttc_triad.html

Annual Average Global Surface Temperature Anomalies 1880-2006. (Surface temperature records such as the one shown here have been quality controlled to remove the effects of urbanisation at observing stations in and around cities).

In a National Research Council (NRC) report in 2006¹⁸ it was noted that the global average temperature during the past few decades was higher than in any comparable period in the last 400 years. Furthermore, the temperatures in most regions over the past 25 years had been higher than in any other period for the last 1200 years.¹⁹

A study²⁰ of the Earth's climate shows that there have always been periods of stability as well as periods of rapid change. According to studies, an interglacial climate, such as we have currently, is inclined to be steadier than a cooler climate, especially an Ice Age. For example, the Last Glacial Maximum, a recent glacial period, consisted of a long string of widespread, large and constant climate changes,²¹ in contrast to abrupt or rapid climate changes induced by transitions between glacial and interglacial periods and vice versa. Within the last five

¹⁸ National Research Council (NRC) *Surface Temperature Reconstructions for the Last 2,000 Years* Washington 2006 National Academy Press Washington DC [Online] http://nap.edu/openbook.php?record_id=11676&page=3 accessed on 7 October 2010.

¹⁹ *Ibid.*

²⁰ NRC *Abrupt Climate Change, Inevitable Surprises* report 2002 [Online] http://www.nap.edu/openbook.php?record_id=10136&page=11 accessed on 10 October 2010.

²¹ *Op cit*, Fn. 11.

millennia the global average temperature rose between 4 to 7 °C.²² In this context it can be noted that human civilisation developed during relative climate stability.

1.3 Reasons for Global Warming

The most common causes are mentioned below.

1.3.1 Changes in the Earth's orbit

The amount of sunlight that reaches the Earth's surface is influenced by changes in the shape of the Earth's orbit as well as the Earth's tilt and precession effect.²³ The US Environmental Protection Agency (EPA) has pointed out that according to the theory of Milankovitch²⁴ the orbital processes occur in cycles of 100,000 (eccentricity), 41,000 (tilt), and 19,000 to 23,000 (precession) years and are thought to be the most significant drivers of Ice Ages.²⁵ The information of the National Oceanic and Atmospheric Administration (NOAA)²⁶ matches Milankovitch's theory.

1.3.2 Changes in the sun's intensity

The intensity of sunlight which reaches the Earth's surface can be affected by changes of the sun's surface or core. These changes have a direct effect, which results in the climate cooling (weaker solar intensity) or heating up (stronger solar intensity). For instance, a minor Ice Age was the result of less sunlight reaching the planet between the 14th and 17th centuries, which led to a cooling of Europe and North America.²⁷

²² NASA *How is Today's Warming Different from the Past?*

<http://earthobservatory.nasa.gov/Features/GlobalWarming/page3.php> accessed 10 October 2010.

²³ *Ibid.*

²⁴ Milutin Milankovitch was a Serbian civil engineer and geophysicist, best known for his theory on Ice Ages relating to variations of the Earth's orbit and long-term climate change, now known as Milankovitch cycles.

²⁵ *Op cit*, Fn. 22.

²⁶ National Oceanic and Atmospheric Administration (NOAA) *Astronomical Theory of Climate Change* [Online] <http://www.ncdc.noaa.gov/paleo/milankovitch.html> accessed on 22 February 2010.

²⁷ NASA *The sun's chilly impact on earth* [Online] <http://www.gsfc.nasa.gov/topstory/20011207iceage.html> accessed 22 February 2010.

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1.3.3 Volcanic eruptions

Volcanic eruptions, which release aerosols²⁸ and CO₂ into the atmosphere, can affect the climate.²⁹ Aerosols evaporate in the atmosphere rather quickly (three to four years).³⁰ But as they block sunlight reaching the planet, they contribute to short-term cooling of the Earth.³¹ The effect of eruption of the Volcano Tambora in Indonesia in 1815 is a good example. Ash in the atmosphere resulted in temperatures cooling by 13 °C; the effects of which were felt in New England even a year later, which became known as ‘the year without a summer’.³²

On the other hand the CO₂ emissions from volcanoes raised prior CO₂ levels and temperatures. The emissions of the modern world greatly exceed volcano emissions. Human activities release more than 150 times the amount of CO₂ compared to volcanoes, bearing in mind that earlier eruptions were far more intense than recent ones.³³

1.3.4 Changes in greenhouse gas concentration

The energy balance of the climate system changes through alterations in the atmospheric concentration of greenhouse gases³⁴ and aerosols, land cover and solar radiation. The amount of greenhouse gases in the atmosphere can change through the heating or cooling of the Earth's surface. The release or absorption of CO₂ is directly connected to warmer or cooler temperatures, releasing more CO₂ into the atmosphere when it is warmer, and being absorbed by oceans and vegetation when it is cooler (thus accelerating the cooling process). Warming decreases terrestrial and ocean absorption of atmospheric CO₂, increasing the fraction of anthropogenic emissions remaining in the atmosphere.³⁵

Because of human activities the amount of greenhouse gases has grown, especially since the industrial revolution, by the burning of fossil fuels and biomasses (living matter such as

²⁸ An aerosol is a suspension of fine solid particles or liquid droplets in a gas.

²⁹ *Op cit*, Fn. 22.

³⁰ NASA *Volcanoes & Climate Change* [Online] <http://earthobservatory.nasa.gov/Study/Volcano/> accessed on 25 March 2010.

³¹ *Op cit*, Fn. 22.

³² USGS *Volcanoes and the Weather* [Online]

http://vulcan.wr.usgs.gov/Glossary/VolcWeather/description_volcanoes_and_weather.html accessed on 10 April 2010.

³³ *Op cit*, Fn. 22.

³⁴ Such as CO₂ methane (CH₄) and nitrous oxide (N₂O).

³⁵ *The habitable planet* <http://www.learner.org/courses/envsci/unit/pdfs/unit2.pdf> p.9 accessed on 20 October 2010.

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vegetation). Therefore, the most important anthropogenic greenhouse gas is CO₂. The Climate Change 2007 Synthesis Report of the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment stated that emissions increased by about 80% between 1970 and 2004.³⁶ Even if the report is questionable because of the sources used, emissions increased rapidly within the last century. This has led to changes in the atmosphere, which have probably influenced changes in temperature, precipitation, storms and sea levels.

2 Effects of Global Warming in Nature

There are many different effects of global warming. They all have one thing in common: natural systems are being globally affected by regional climate changes.

Global warming will cause sea levels to rise as a result of melting mountain glaciers and small ice caps. Coastal wetland ecosystems, which provide habitats for many species and play a key role in the nutrient chain, are vulnerable to rising sea levels because they are generally within a few feet of them.³⁷ These wetland ecosystems also protect local areas from flooding. Rising sea levels will cause flooding of coastal areas during storms. Furthermore, an increase in the intensity of tropical storms is expected, which is likely to increase flood and wind damage. Rising sea levels will increase salinity *inter alia* in river mouths, but also of ground water and surface water. Many cities, like New York and Philadelphia are reliant on fresh water that is marginally upstream of the place where water is salty in droughts.³⁸ The existing water in these rivers might become increasingly saline during dry periods if the rise in sea levels pushes sea water upstream. This can infect sensitive aquatic plants and animals with a low tolerance to high salinity.

As mentioned above, Polar Regions are affected by global warming. The Arctic is home to almost four million people and covers a large, mostly frozen ocean surrounded by land.³⁹ In contrast Antarctica is an ice-covered continent surrounded by ocean and is generally

³⁶ Intergovernmental Panel on Climate Change (IPCC) *Climate Change 2007: Synthesis Report Assessment of the Intergovernmental Panel on Climate Change* Allali, Bojariu, Diaz, Elgizouli, Griggs, Hawkins, Hohmeyer, Jallow, Kajfez-Bogataj, Leary, Lee and Wratt (eds.) Cambridge University Press Cambridge and New York 2007 p. 14.

³⁷ EPA *Coastal Zone and Sea Level Rise* [Online] <http://www.epa.gov/climatechange/effects/coastal/index.html> accessed on 25 March 2010.

³⁸ *Ibid.*

³⁹ EPA *Polar Regions* [Online] <http://www.epa.gov/climatechange/effects/polarregions.html> accessed on 25 March 2010.

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uninhabited. Apart from the melting of glaciers and the corresponding rise in sea levels, global warming in the Arctic will also impact negatively on polar bears, some species of seals and the indigenous people as a result of the reduction in sea ice. The Arctic Climate Impact Assessment (ACIA) pointed out in its 2004 report that over the last few decades the average temperature in the Arctic has risen twice as much as the temperature in the rest of the world.⁴⁰ This is likely to influence biodiversity around the world because many migratory species currently depend on breeding and feeding grounds in the Arctic.⁴¹ Antarctica as the counterpart to the Arctic in the Southern Hemisphere has also been affected by global warming. In the decade between 1996 and 2006 Antarctica's ice loss resulted in a global sea level rise of 0.3 millimetres/year in 1996 to 0.5 millimetres/year in 2006.⁴²

Forests also respond to climate variability and pollution.⁴³ Climate change will affect forests, depending on management, deforestation and the utilisation of timber, as well as brush clearance and fire control, which influences their health, geographic range and survival.⁴⁴ This in turn will have an impact on certain tree species, which directly influences the use of timber, outdoor recreational activities, water quality, wildlife and the rate of carbon storage.

Climatic factors are changing and are projected to continue changing, owing to human activities, which affect forest health, temperature, rainfall, atmospheric levels of CO₂ and other greenhouse gases, extreme weather and fire events.

Storms, which are a likely product of global warming, will also affect the world's forests. For example hurricane Kyrill in January 2007, which gusted with wind speeds in excess of 200 km/h resulted in the felling of 60 million trees in Europe.⁴⁵ To avoid these effects the forest structure in Europe has to be adapted to climate change and its aftermath. In this context it needs to be considered that a tree, for example in Germany, needs to live for at least 60 years before it starts to reduce atmospheric CO₂.⁴⁶ The reason for this is that a tree – especially

⁴⁰ ACIA *Impacts of a Warming Arctic Executive Summary* Cambridge University Press 2004 p. 14.

⁴¹ *Ibid.*

⁴² Science Daily *Antarctic Ice Loss Speeds Up, Nearly Matches Greenland Loss* [Online] <http://www.sciencedaily.com/releases/2008/01/080123181952.htm> accessed on 25 March 2010.

⁴³ EPA *Forests* [Online] <http://www.epa.gov/climatechange/effects/forests.html> accessed on 25 March 2010.

⁴⁴ *Ibid.*

⁴⁵ Bölsche 'Palmen im Alpenland' *Spiegel Special* Nr. 1/2007 p. 50 (50).

⁴⁶ Traufetter 'Büßen mit Bäumen' *Spiegel Special* Nr. 1/2007 p. 122 (123).

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when it is young - absorbs CO₂ from the air but at the same time it releases the soil's CO₂ by the taking up of nutrients.⁴⁷

The increase in average temperatures will have direct effects on human health. Heat waves during summer and less cold periods in the winter will affect parts of the population, especially those with heart problems, asthma, the weak, old, very young and the homeless who are most vulnerable to extreme heat.

Climate change will increase the spread of diseases which occur in warm regions. Malaria, dengue fever, yellow fever and encephalitis are carrier-borne diseases occurring in warm climates. As warming takes place the areas where they are to be found will increase significantly. Fresh water resources will be affected by floods, resulting in an increase of diarrhoeic diseases as water quality becomes harder to control.⁴⁸

High temperatures and a significant decrease in rainfall might make certain areas season-less. This leads to the problem that disease carriers like ticks (carrying Lyme disease) need a certain humidity level and a wide temperature range, which currently gives them a reduced life span.⁴⁹

A reduction in air quality will increase respiratory diseases, exacerbated by an increase of smog and other air pollutants. It is well known that smog can damage lung tissue and is especially unhealthy for asthma sufferers and those with other lung diseases.⁵⁰ Smog levels will rise through a combination of sunlight, high temperatures and other pollutants such as nitrogen oxides and volatile organic compounds.⁵¹

3 Effects on the Economy

'Future energy infrastructure investment decisions, expected to exceed USD 20 trillion between 2005 and 2030, will have long-term impacts on greenhouse gas (GHG) emissions,

⁴⁷ *Ibid.*

⁴⁸ EPA Health [Online] <http://www.epa.gov/climatechange/effects/health.html> accessed on 25 March 2010.

⁴⁹ *Ibid.*

⁵⁰ *Ibid.*

⁵¹ *Ibid.*

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because of the long lifetimes of energy plants and other infrastructure capital stock'.⁵² The use and spread of low carbon techniques could take decades, even if early investments in these technologies are funded.⁵³ Nevertheless, the change has to come now, before it is too late. Current projections indicate that a 1% increase in annual precipitation would increase the effect of catastrophic storms by 2.8%.⁵⁴ Since fossil fuel resources are limited the change will come automatically but precautionary measures for a post-fossil fuel era should be introduced as soon as possible and as much as possible.

The former Chief Economist and Senior Vice-President of the World Bank, Nicholas Stern, forecast in 2006 that 1% of global Gross Domestic Product (GDP) was required to be invested in order to mitigate the effects of climate change at that time.⁵⁵ If no action were taken the risk of a recession would be immediate and threaten up to 20% of the global GDP.⁵⁶ In his report Stern determined that climate change threatened to lead to the greatest and widest-ranging market failure ever seen.⁵⁷

3.1 Agriculture

In some regions, for example Iceland, rising temperatures have made it possible to grow barley, which was unimaginable 20 years ago. This positive effect in a few regions is overshadowed by the negative effects globally. The rising of the average temperature and longer droughts, combined with the side effects of both, are likely to bring a substantial reduction in crop yields in the coming decades.

Africa is the region that is expected to be most affected. The reason for this is that existing high temperatures are likely to increase in the next few decades coupled with 70% of the population relying on rain-fed livelihoods.⁵⁸ According to climate change forecasts for areas

⁵² *Op cit*, Fn 36 p. 58.

⁵³ *Ibid*.

⁵⁴ Choi and Fisher 'The Impacts of Socioeconomic Development and Climate Change on Severe Weather Catastrophe Losses: Mid-Atlantic Region (MAR) and the U.S.' *Climate Change* 2003 Vol. 58 No. 1-2 pp. 149-170.

⁵⁵ Tole and Yohe 'A Review of the Stern Review' *World Economics* 2006 Vol. 7 issue 4 pp. 233-250 (235).

⁵⁶ BBC News 'At a glance: The Stern Review BBC News' *BBC News* published 30 October 2006 [Online] <http://news.bbc.co.uk/2/hi/business/6098362.stm> accessed on 4 March 2010.

⁵⁷ Stern *Stern Review executive summary* New Economics Foundation p. 1 [Online] http://www.hm-treasury.gov.uk/media/4/3/Executive_Summary.pdf accessed on 25 March 2010.

⁵⁸ GLOBAL WARMING: *Early Warning Signs: The impact of global warming in Africa* at [Online] <http://www.climatehotmap.org/africa.html> accessed on 22 February 2010].

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of Tanzania, which usually have two rainy seasons a year, they will probably have more rain, and those that have only one rainy season will get far less.⁵⁹ This leads to the estimate that 33% less maize, which is the country's basic food, will be grown.⁶⁰

Hunger, thirst and malnutrition are the consequences, which can lead to criminal acts, violence and war. That is, among others, an estimated reason for the civil war in Darfur.

'The scale of historical climate change, as recorded in Northern Darfur, is almost unprecedented: the reduction in rainfall has turned millions of hectares of already marginal semi-desert grazing land into desert. The impact of climate change is considered to be directly related to the conflict in the region, as desertification has added significantly to the stress on the livelihoods of pastoralist societies, forcing them to move south to find pasture'.⁶¹

Natural catastrophes, overpopulation and higher incentives for farmers to grow non-food biofuel crops were the cause of food shortages in Asia, the Middle East, Africa and South America in 2007 and were a worldwide theme at the 1st May demonstrations (International Workers' Day in many countries which is accompanied by political demonstrations) in 2008.

3.2 Transport

As a result of higher temperature variations, it is projected that roads, plane runways, railway lines and pipelines will need more frequent renewal. This and the fact that transport is one of the major producers of CO₂ should lead to a change to non-fossil energy for the transport sector.

⁵⁹ Vidal *In the land where life is on hold* in The Guardian 30 June 2005 [Online] <http://www.guardian.co.uk/environment/2005/jun/30/climatechange.climatechangeenvironment> accessed on 25 March 2010.

⁶⁰ *Ibid.*

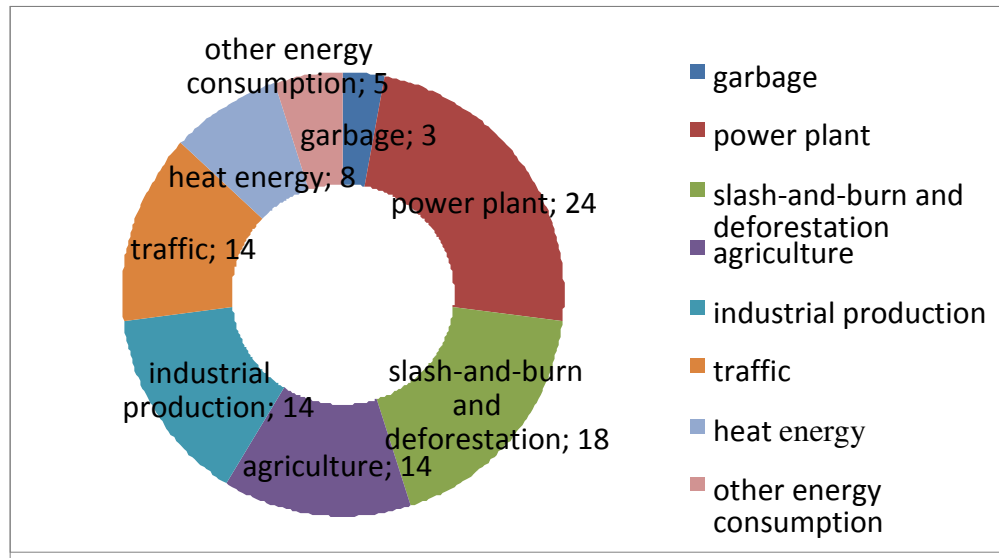
⁶¹ IRIN *Climate change – only one cause among many for Darfur conflict* UNEP report of 28 June 2007 [Online] <http://www.irinnews.org/Report.aspx?ReportId=72985> accessed 25 March 2010.

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Figure 1.4:

The figure demonstrates the emissions in percentage by different emitters. Source: Spiegel Special 1/2007 p. 20.



Accordingly, the adaptation strategy of the IPCC in 2007 was realignment/relocation, design standards and planning for roads, railways and other infrastructure to cope with warming and drainage.⁶²

3.3 Insurance

The insurance industry is directly influenced by climate change and its effects. Since the 1960s the number of major natural catastrophes has risen significantly.⁶³ In the last 30 years weather-related disasters increased from 2% in 1975 to 4% in 2001.⁶⁴

Compared to the period 1993-1997, claims for storm and flood damages in the United Kingdom had doubled to over GBP 6 billion during the period 1998-2003.⁶⁵ These changes

⁶² *Op cit*, Fn. 36 p. 57.

⁶³ American Association of Insurance Services (AAIS) *Viewpoint American Association of Insurance Services* 2005 p. 10 [Online] <http://www.aaionline.com/viewpoint/AAISviewpointSp05.pdf> accessed on 25 March 2010.

⁶⁴ Müller *Equity in Climate Change: The great divide Executive Summary* Oxford Institute for Energy Studies and Shell Foundation 2002 p. 4 [Online] http://www.oxfordclimatepolicy.org/publications/documents/The_Great_Divide-Executive_Summary.pdf accessed on 10 April 2010.

⁶⁵ House of Lords Select Committee on Economic Affairs *The Economics of Climate Change Volume II: Evidence* 2nd Report of Session 2005-06 Authority of the House of Lords 2005 p. 119.

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will cause rising insurance premiums and the risk that in some areas insurances will become too expensive.

Estimates in 2002 expected that the increase in climate events, combined with social trends, could cost approximately USD 150 billion each year in this decade.⁶⁶

3.4 Erosion control and flood defence

Because of historic trade development, most of the world's largest wealthy cities are on the coast or next to rivers. As a result of rising sea levels and increased flooding the costs of erosion control will increase. Low lying countries like the Netherlands and Bangladesh will have to invest more than others.

The IPCC report of 2007 suggested that relocation, seawalls and storm surge barriers as well as dune reinforcement, land acquisition and the creation of marshlands/wetlands as a buffer should be initiated against sea level rise and flooding.⁶⁷

3.5 Tourism and Migration

For the populations that live closest to the shore, especially in island nations, a consequence of global warming could be evacuation to higher lying areas, as flood defences may become economically unviable. Tuvalu, for example, already has a phased relocation agreement with New Zealand in the event of serious flooding.⁶⁸

Global warming will have a serious effect on countries that rely on tourism. For example the snow line of the Alps is likely to rise. As a result, skiing seasons will be shorter. On the other hand, extreme heat and problems with tap water supplies could stop or reduce tourism in Greece, Turkey, Spain and Portugal. Wildlife-related tourism in Africa could be disrupted by droughts. Also, less rainfall could damage the rainforests and stop tourism in this region.

⁶⁶ UNEP *Climate Risk to global economy* Key findings of UNEP's Finance Initiatives study CEO briefing 2002 p. 1 [Online] http://www.unepfi.org/fileadmin/documents/CEO_briefing_climate_change_2002_en.pdf accessed on 25 March 2010.

⁶⁷ *Op cit*, Fn. 36 p. 57.

⁶⁸ Simms *Unnatural disasters* in The Guardian 15 October 2003 [Online] <http://www.guardian.co.uk/environment/2003/oct/15/guardiananalysispage.climatechange> accessed on 25 March 2010.

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Air travel is a contributor to global warming and as such it is going to become more expensive. Ticket prices are expected to rise because of increased fuel prices. The proposal of the European Commission, which aims to force all airlines flying into the European Union to meet emissions quotas by 2012, may add EUR 40 to each long-haul return flight by 2020, which could reduce tourism.⁶⁹

Coming back from the economic impact of adaptation to the current mitigation scenario: it is clear that the CO₂ level in the atmosphere will increase during the next century unless the CO₂ emissions decrease significantly from their current levels. It is thus likely that the Earth's average temperature will rise. The 2000 IPCC Special Report on Emissions Scenarios estimated the growth of global GHG emissions as 25%-90% between 2000 and 2030.⁷⁰ This would lead to a warming for the next two decades of about 0.2°C per decade.⁷¹ The intensity and frequency of climate change will depend on the increase or decrease of GHGs and aerosols released into the atmosphere, as well as natural occurrences like sun intensity and volcanic activities.⁷²

⁶⁹ Salgado *In a warming world, where can you go for the snow?* Business Report 5 June 2008 [Online] <http://www.busrep.co.za/index.php?fSectionId=561&fArticleId=4438540> accessed on 10 March 2010.

⁷⁰ *Op cit*, Fn. 36 p. 7.

⁷¹ *Ibid*, p.12.

⁷² EPA *Future climate change* [Online] <http://www.epa.gov/climatechange/science/futurecc.html> accessed on 22 February 2010.

III The use of taxation as a measure to stop the projected impacts of climate change

Chapter Three will explain what CO₂ taxes can be and the purpose of CO₂ taxation when focused on the issue of climate change. The fears and doubts created by CO₂ taxation will also be covered.

Furthermore, this chapter determines that CO₂ taxation has to become the main goal of governments in order to avoid the unprecedented threats posed by climate change. In order to achieve the aim of protecting the environment from CO₂ and achieve its reduction, there are different possible methods to consider and use, *inter alia*:

- precautionary rules which try to avoid foreseeable harm to the environment
- prohibition of activities as preventative measures
- elimination of catastrophic pollution events and other existing causes of pollution.

Pursuant to principle 16 of the Rio de Janeiro Declaration on Environment and Development, ‘national authorities should endeavour to promote the internalisation of environmental costs and the use of economic instruments’.

The use of economic instruments follows the idea that the economy can be used to guide individual behaviour.

‘If environmental resources are properly valued, the costs of using the environment will be taken fully into account in private economic decision-making. This implies that environmental resources are used in “sustainable” quantities, provided that their prices are based on their scarcity and place an appropriate value on non-renewable resources. Economic instruments are meant to correct current market prices by internalising environmental costs which are treated by the market mechanisms as external’.⁷³

The 1991 Council Recommendation of the Organization for Economic Cooperation and Development (OECD) on the ‘Use of Economic Instruments in Environmental Policy’

⁷³ ‘Report of the Working Group of Experts from the Member States on the Use of Economic and Fiscal Instruments in EC Environmental Policy’ *Boston College International and Comparative Law Review* Vol. 14 issue 2 1991 pp. 447-480 (453-454).

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provided in its Annexure a variety of economic instruments. These included charges and taxes, marketable permits, deposit-refund systems and financial assistance.⁷⁴ Other conceivable possibilities were enforcement incentives, administrative charges, liability and compensation for damage, trade measures and consumer information incentives, non-compliance fees and performance bonds.⁷⁵

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC). The goal of the Kyoto Protocol is the reduction of six greenhouse gas emissions, *inter alia* CO₂. The Protocol has 194 signatories including the European Union.⁷⁶ The United States of America is the only signatory that has not ratified the protocol. The major characteristic of the Protocol is that it binds 37 developed countries and the European Union to reduce an average of 5% of their GHG emissions against the 1990 level, over the period 2008 - 2012.⁷⁷ To fulfil their individual targets, countries may develop their own national measures. In addition, the protocol offers them three market-based mechanisms to assist them to meet their targets:

- emission trading – known as the ‘carbon market’
- the clean development mechanism (CDM)
- joint implementation (JI).

These mechanisms should help to stimulate green investment as well as assisting parties to meet their emission targets in a cost-effective way. Currently, there is considerable discussion on emission limits for the post 2012 Kyoto Protocol period. It will thus be necessary for national practical strategies and carbon budgets to remain on target for 2012.

⁷⁴ Sands *Principles of International Environmental Law* (2 ed.) Cambridge University Press 2003 p. 160.

⁷⁵ *Ibid.*

⁷⁶ UNFCCC *Kyoto Protocol Status of Ratification Last modified on 3 December 2009* [Online] http://unfccc.int/files/kyoto_protocol/status_of_ratification/application/pdf/kp_ratification_20091203.pdf accessed on 22 February 2010.

⁷⁷ UNFCCC *Kyoto Protocol* [Online] http://unfccc.int/kyoto_protocol/items/2830.php accessed on 22 February 2010.

1 The three most popular current instruments for reducing CO₂ emissions

This section will briefly discuss the main three instruments currently in use: namely, regulations, emission trading and taxation.

1.1 Regulations

Regulations are one of the oldest measures used to prevent the pollution of the environment. It was thought that the best way of cleaning up was to tell people and companies how to do this. Regulations are now being referred to as ‘complex’, ‘perverse’ and a ‘waste of companies’ money’. It is no secret that governments have misused regulations in the past, through over-extending them. But regulations have proved to be useful and should not be made defunct, simply because of past misuse. They certainly encourage companies to use environmentally friendly principles. The following will show briefly what has been achieved, amongst other things, by regulations.

Between 1970 and 1993 regulations reduced 47% of sulphur emissions in Western Europe through norms that required scrubbers in coal plants.⁷⁸ In the same period, the tailpipe emissions standards for new cars and light trucks in the United States made catalytic converters universal and cut down nitrogen oxide emissions by 6%, carbon monoxide by 33% and volatile organic compounds by 54%, despite a 44% increase in driving.⁷⁹

Many empirical analyses have tested the effectiveness of regulations but have been unable to find evidence of harm.⁸⁰ Additionally, research has shown that modern advances in regulations minimise costs, both for industry and business. They also create venues for environmental goods and services. They are the driving force behind modernisation. This in turn reduces the business risk, while increasing the confidence of insurers and investors. In addition, the implementation of regulations creates and sustains jobs and competitive markets, at the same time improving public health and sustaining the natural resources upon which life

⁷⁸ Roodman *Getting the Signals Right: Tax Reform to Protect the Environment and the Economy* Worldwatch Paper#134 Worldwatch Institute Washington 1997 p. 26.

⁷⁹ French *Clearing the Air: A Global Agenda* Paper#94 Worldwatch Institute Washington 1990 p. 10ff.

⁸⁰ Repetto *Jobs, Competitiveness, and Environmental Regulations: What are the real issues?* World Resources Institute Washington DC 1995 with further references.

depends.⁸¹ Regulations can be used in different ways to help mitigate climate change. They are transparent, can be used for monitoring and for penalty purposes as well as playing a role in addressing matters which are beyond the capabilities of a fiscal or market instrument.

1.2 Emission trading

Emission trading systems look as if they offer all the advantages of regulations without their negative effects. They allow governments to set goals for reducing environmental damages and let the market find the cheapest ways to get there. But what does emission trading mean? Parties who agreed to the Kyoto Protocol have committed to reduce GHG emissions and have defined individual targets for the commitment period 2008 - 2012. Article 17 of the Kyoto Protocol allows countries to participate in emission trading so that those industries which have too many emission units (emission permits which are not used by those enterprises) may sell these to industries in countries which are above their targets. This is called the 'carbon market'. Other units, which might be traded under the emission scheme are:

- an emission reduction unit on the basis of a joint implementation project,⁸²
- a certified emission reduction created by a clean development mechanism project activity, and
- a removal unit, which should be based on land-use, land-use change and forestry activities.

Countries that have put the emission trade into action are the northern members of the OECD and central and eastern European countries, as well as a handful of the heritor states of the former Soviet Union. Those signatories of the Kyoto Protocol who do not as yet have legally binding emission reduction and limitation objectives under the Protocol, are not eligible to take part in emission trading. This affects developing countries as well as industrialised nations who have not ratified the Kyoto Protocol, as well as those countries that are included in Annex B of the Protocol.⁸³

⁸¹ Network of Heads of European Environment Protection Agencies *The Contribution of Good Environmental Regulation to Competitiveness* Prague Nov. 2005 p. 1.

⁸² See Article 3 (10) and (11), 6 of the Kyoto Protocol.

⁸³ Ott 'Emissions Trading in the Kyoto Protocol – Finished and Unfinished Business' in *Linkages Journal* Vol. 3 No. 4 Oct. 1998 [Online] <http://www.iisd.ca/journal/ott.html> accessed on 4 March 2010.

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Emission trading schemes can be established at the domestic or local level, as a part of unions, or globally. The biggest emission trading scheme is that of the European Union. The United States debated an emission trading system (the American Clean Energy and Security Act of 2009 H.R. 2545). The debate included the advantages of trade, which set an overall limit on emissions each year, with auctioned tradable permits to allow outputs only up to that level. The consequences would be that the companies responsible would either have to cut their emissions or compete to buy a steadily shrinking number of permits. Members of Congress feared that this sort of cap and trade scheme might increase the price of energy, which would compound the current recession and in July 2010 they did not vote in favour of the Act.⁸⁴

1.3 Taxation

This section will briefly examine the definition of taxation and its purpose. Furthermore, it will illustrate the advantages of carbon taxation compared to the emission trading system and regulations.

1.3.1 Purpose of environmental taxation

Taxes are defined as ‘a compulsory levy imposed by an organ of government for public purposes’.⁸⁵ Environmental taxes are defined as ‘a tax whose tax base is a physical unit (or a proxy of it) that has a proven specific negative impact on the environment. Four subsets of environmental taxes are distinguished: energy taxes, transport taxes, pollution taxes and resources taxes’.⁸⁶

⁸⁴ ‘Whom the cap fits’ United States *The Economist* 7 March 2009 pp. 44-45 (44).

⁸⁵ Williams with Morse, Salter and Davies *Davies Principles of Tax Law* (3 ed.) Thomson Sweet & Maxwell London 1996 p. 3.

⁸⁶ OECD *Glossary of Statistical Terms* [Online] <http://stats.oecd.org/glossary/detail.asp?ID=6437> accessed on 25 July 2011.

Environmental taxes have three functions:

- to discourage the consumption of goods and services that create environmental costs,
- to encourage the producer to develop alternative production methods and products that are less harmful to the environment, and
- to implement the ‘polluter pays’ principle.⁸⁷

Taxation appears to promote environmental protection in a cost effective way. The creation of financial incentives to reduce pollution, and the raising of revenue that can be used for environmental protection or other social aims, provides environmental taxation as an interesting mechanism.

1.3.2 Abstract thoughts about environmental taxation in general and CO₂ taxation in particular

Taxes have been used in many countries in order to protect the environment. There are taxes for motor fuels and other vehicle related taxation, as well as taxation on other energy products such as batteries, plastic carrier bags, tyres, disposable razors and cameras. Also air transport charges, water charges, waste disposal and management charges are in force.

When the discussion about climate change caused by man-made CO₂ emissions first began in the late 1980s and early 1990s, it resulted in a corresponding debate on energy and CO₂ taxation as an emission reduction measure.

Carbon taxes are defined as taxes imposed on the carbon content of the fuel whereas energy taxes are defined as taxes imposed on the production of fossil fuels and carbon energy sources according to their energy content.⁸⁸ CO₂ taxation forces domestic emitters to pay a tax for their release of CO₂. The aim of this tax is to promote a reduction in emissions through an increase in prices but without increasing the living costs of community members. If there are

⁸⁷ Birnie and Boyle *International Law & the Environment* (2 ed.) Oxford University Press 2002 p. 728. The ‘polluter pays principle’ is an environmental policy principle which imposes the costs of environmental damages to the person who determined the damage.

⁸⁸ It is helpful to know that a tonne of carbon corresponds to 3.67 tonnes of CO₂.

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less expensive measures than paying the tax, for example by using less polluting cars or through using public transport, then there is the possibility of an emission reduction.

This tax would have the aim of reducing emissions and thereby environmental damage. With today's techniques it is not possible to stop the polluting behaviour which arises from the use of carbon. There might be the possibility of capturing CO₂ from the air and storing it somewhere. But this technique is still in the developmental stages. It would work like air which would bring into contact a 'sorbent' material, which would chemically bind the CO₂.⁸⁹ Even if the technique worked there are still arguments that speak against it as a CO₂ reduction solution. These are:

- the process has to remove high amounts of carbon without producing much on its own,
- the costs of removing each tonne of CO₂ have to be less than the alternatives,
- the possibility of capturing CO₂ could be used as an excuse to delay other actions to reduce emissions, and
- the storage facilities could be attacked by criminals.

Carbon taxation allows individuals to weigh up the costs and benefits of their behaviour on a case by case basis and has, accordingly, a controlling effect. This effect can be seen in the context of the function of taxes. Carbon taxes are measures which reflect the true economic costs of goods, but they are also a potential revenue source. This point should be not underestimated, but used as an advantage. The environmental tax revenues could be used to reduce taxes, for example, on labour. This has been suggested by Pearce as the 'double dividend' concept⁹⁰ (cleaner environment and increasing employment). To use environmental taxation to reduce other existing taxes or charges is an economic and competitive step into a cleaner and fairer world, as will be shown later in this chapter.

Gilbert Metcalf, an economics professor at Tufts University, has shown that 'revenue from a carbon tax could be used to reduce payroll taxes in a way that would leave the distribution of

⁸⁹ 'Scrubbing the skies' *The Economist Technology Quarterly* 7 March 2009 p. 16.

⁹⁰ Kratena *Environmental Tax Reform and the Labour Market – The Double Dividend in Different Labour Market Regimes* Edward Elgar Ltd. Cheltenham 2002 p. 5.

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the total tax burden approximately unchanged'.⁹¹ In his calculation he estimated a tax of USD 15 per metric tonne of CO₂, together with a rebate of a federal payroll tax on the first USD 3,660 of earnings for each worker. This would compensate the workers for their environmental tax and is therefore a good point of departure.

There are still several questions related to the use of the revenue and its fairness: for example, how would this affect taxpayers such as unemployed persons, pensioners or persons who own and manage their own companies? Where is their compensation? Even if this solution invites other questions it does show the possibility of environmental taxation being used as tax shifting which should abolish the fear of competitive disadvantages.

On the other hand there are proponents who call the connection between environmental taxation and employment policy a 'spurious coalition'.⁹² They explain their opinion on the grounds that environmental taxes should be introduced primarily for environmental reasons, and not be used to fund other non-environmental-related policy issues.⁹³ Taxes are defined as, 'a charge imposed by the government on people, entities, or on property, in order to raise revenue'.⁹⁴ Thus, it is not necessary that a tax must be used for the purpose for which it is levied. Moreover, it can be used to raise revenue. That does not mean that the tax can be levied *ad infinitum* but it can be levied within the framework of several rules. This framework is included in many constitutions, or more or less similar laws, in most countries. In Germany, for instance, the legislation is based on capability as a characteristic of the principle of equal treatment,⁹⁵ the principle of the welfare state,⁹⁶ the rule of law principle, the principle of prohibition of the excess of taxation or dispossession,⁹⁷ the principle of free career choice and career practice⁹⁸ and the prohibition to discriminate regarding marriage and family.⁹⁹ Furthermore, taxes serve as guidance in relation to social, environmental and economic aspects.

⁹¹ Mankiw 'One Answer to Global Warming: A New Tax' *New York Times* 16 September 2007.

⁹² OECD *Implementation Strategies for Environmental Taxes* Paris and Washington 1996 p. 66.

⁹³ *Ibid.*

⁹⁴ *Tax definitions* [Online] <http://www.tax-definition.org/> accessed on 25 July 2011.

⁹⁵ Article 3 para 1 Grundgesetz.

⁹⁶ Article 20 para 2 and 14.

⁹⁷ Article 14.

⁹⁸ Article 12.

⁹⁹ Art. 6.

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There are many possible ways in which to use the revenue from a CO₂ tax. The first question that arises is who is going to use the revenue? Would every state have the right to use it for itself or, when we are thinking about an international CO₂ tax, would it be an authorised taxation, with strict rules for dividing the revenue among the different participating countries, through using an allocation formula?

Politicians, ecologists and economists have discussed the concept for many years. Although the call for environmental taxation has increased in the last 30 years, this has not yet been realised. There have been attempts by the European Commission, in 1992 and 1995, to develop a European CO₂ taxation. Another attempt was made with the guidelines of the European Assembly on 12 March 1997 but was only passed with considerable amendments in 2003. None of these endeavours has helped to find a global solution. Other countries have become nervous about their possible competitive disadvantages and thus have never enforced a CO₂ tax.

As well as international tax guidelines, certain states, mostly European ones, have developed their own national energy taxation. In 1993 Denmark, for example, amended its energy act of 1977 to include a new CO₂ component, which formed the 'Danish Energy Package'.¹⁰⁰ The result led to a major change in the use of energy. But this led to a competitive disadvantage and was followed by an ecological tax reformation (Green Tax Package) which came into force on 1 January 1996.¹⁰¹ (That short period shows the strength of the interaction between the economy, politics and legislation, especially in the sensitive area of taxation).

Finland had already developed separate CO₂ taxation by January 1990. More country details are discussed in Chapter Four.

1.3.3 Carbon taxes versus regulations

Carbon taxes, in contrast to regulations, allow individuals to weigh up costs and benefits of their behaviour and, as such, give them choices as to whether they still want to emit CO₂,

¹⁰⁰ EUROPA *The Commission approves aid under the new Danish 'Green Taxes' Package* [Online] <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/95/777&format=HTML&aged=1&language=EN&guiLanguage=en> accessed on 10 March 2010.

¹⁰¹ IEA *Green Tax Package 1995* [Online] <http://www.iea.org/Textbase/pm/?mode=pm&action=detail&id=1573> accessed on 10 March 2010.

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which regulations do not. Since not all companies and industries have the financial or technological ability to change their polluting behaviour, more flexibility seems to be necessary. Regulations are less flexible than carbon trading or taxes, by only giving parameters for the consumers and/or producers as emitters. This inflexible way of reducing emissions is difficult to achieve, since it leads to financial cuts by reducing emissions immediately.

In contrast using carbon taxes and regulations hand in hand would be a great advantage since regulations can help by implementing transparency, monitoring measures as well as penalties.

1.3.4 Carbon tax versus carbon emission trading

What the carbon emission trading system (ETS) (with its most common form: cap and trade system (CTS)) and carbon taxes have in common is that both manipulate the price and quantity of releasing carbon from human activities into the atmosphere. On the one hand trading emissions guarantee a certain level of emissions, which cannot be guaranteed through taxation. On the other hand a tax limits the costs of emission reduction if the costs rise unexpectedly. Accordingly, both possibilities create a price on carbon. This leads to an increase in the price of fossil fuel, especially for intensive users, which again leads to a lower demand for fossil fuels and a higher price for consumers. (A comparison in table form can be found in Appendix 1).

At first sight the advantage of carbon trading seems to be limited, as a certain amount of carbon can be emitted which leads to a certain impact on the environment. However, some economists¹⁰² support it because of its incentive to recipients of carbon credits, and the difficulty in removing a carbon system because of entrenched special interest groups.¹⁰³

On the other hand it can be argued that a trading system, because of these certain levels of carbon emissions, 'is less efficient than a tax, since these quotas do not allow production

¹⁰² Warwick with McKibbin and Wilcoxon *Climate Change after Kyoto: A Blueprint for a Realistic Approach* Brookings Spring 2002 [Online] <http://www.brookings.edu/press/REVIEW/spring2002/mckibbin.htm> accessed on 4 March 2010; Warwick McKibbin and Wilcoxon 'A Credible Foundation for Long Term International Cooperation on Climate Change' Working Papers *International Economics* issued 1 June 2006 p. 3-4 [Online] <http://www.lowyinstitute.org/Publication.asp?pid=408> accessed on 4 March 2010.

¹⁰³ Humphreys *Exploring a Carbon Tax for Australia Perspectives on Tax Reform* CIS Policy Monograph Perspective on Tax reform no.#14 St. Leonards October 2007 pp. 2-3.

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decisions which can adjust to changing circumstances', and also that fluctuating carbon prices would create uncertainty.¹⁰⁴

Other arguments in favour of a tax are that it is easier to implement on a more cost efficient basis (given that the trading system would bring additional costs; among others, costs for negotiations, approvals and insurance) and it is more flexible since it can cater more easily for market changes by using other resources. Furthermore, the trading system is focused on carbon-intensive industries and does not include all contaminators. In addition, the trading system is not as transparent as a tax since the tax is easier for everybody to understand and not as complex as the trading system.

Another, and in my opinion, the most important, argument in support of a carbon tax instead of the trading system, is that taxation is accompanied by revenue which can be used to reduce other taxes or other charges, in order to hold the costs of the consumer at the same level.

The trading system is different since the money goes to organisations and enterprises that receive money from selling their carbon credits. This will not benefit the consumer who is, in the end, paying indirectly for the innovations as a result of increasing product prices.

Accordingly, a carbon tax would lead to a positive or at least not to a negative economic effect compared to the trading system, which has to be subsidised.

From a global perspective the introduction of CTS worldwide seems to be problematic since successful negotiations for effective emission limits does not look likely. The reason for this, from a developing country's point of view, is that the ceiling must be high enough not limit its economic growth. But if developing countries do not agree to some cuts then the developed countries will not reduce their emissions enough to achieve the goal of reducing emissions and with that, increasing the global temperature by just 2°C. Furthermore, the allocation of permits would probably lead to corruption in several countries.

The notes of the Productivity Commission in Australia in 2007 state that 'most countries find it easier and administratively less challenging to implement environmental taxes than

¹⁰⁴ *Ibid*, p. 3.

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emissions trading’ and ‘the administrative costs of an emissions tax are likely to be relatively low’.¹⁰⁵

Environmentally the best option might be to use all three reduction tools in parallel, but this would be cost intensive. For example regulations could be used for the realisation of transparency and monitoring rules as well as penalties in an international carbon framework.

However, this thesis will focus on the economic instrument of taxes: more particularly CO₂ taxation, its national and international legitimacy and the advantages and disadvantages of current CO₂ taxation models, in order to show that it is possible to fulfil the targets of individual countries and to use that knowledge to design an international tax framework.

The intention of a carbon tax is to steer individuals and industries to make solid decisions for the environment by decreasing the use of fossil fuels. This is supported by the incentive of reducing costs for everyone.

2 Classification of carbon and energy taxes

This section will look at the different classifications of energy and carbon taxes or charges.

As seen above, different measures are available to mitigate GHG emissions. One broadly discussed and in my opinion the most effective measure¹⁰⁶ is the use of taxation to put a price on the release of carbon into the atmosphere.

There are different tax objects possible. One option would be to tax the combustion-related carbon emission of fossil fuel (carbon tax). Here the carbon content of fossil fuel is the tax object, which is directly proportional to the sum of CO₂ that is produced during combustion.¹⁰⁷ The tax rate should match the amount of carbon content in the fuel; accordingly coal and oil would be taxed more highly than, for example, natural gas. Another

¹⁰⁵ Australian Government Productivity Commission *Productivity Commission Submission to the Prime Ministerial Task Group on Emissions Trading* Productivity Commission Melbourne 2007 pp. 65–66 [Online] http://www.pc.gov.au/data/assets/pdf_file/0012/61104/emissionstrading.pdf accessed on 10 March 2010.

¹⁰⁶ It can stabilise the oil price, is more flexible than the ETS, is clearly defined and its aim is certain.

¹⁰⁷ Fossil fuels contain carbon atoms, which are converted to CO₂ when they are burned. Burning 1 tonne of carbon creates 3.67 tonnes of CO₂.

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possibility would be a tax based on measured emissions.¹⁰⁸ However, a tax, on the emission of carbon during the manufacturing process of products, is difficult to realise (for more details see Chapters Four and Six).

Logically it is assumed that the producer as well as the consumer of the good will be taxed; however most countries (who have implemented the tax) are passing it straight onto the consumer, by, for example, taxing fuel ‘at the pump’, whilst certain sectors and products are completely exempt from the tax.¹⁰⁹ As will be shown later, national carbon taxes are used in some countries¹¹⁰ and not in others.¹¹¹ Spain, the United States and Canada, for example, have implemented carbon taxes at a regional or local level.¹¹² As will be shown later, governments often utilise a mixed tax based on carbon emissions and energy use. The difference between a carbon tax and an energy tax is that a carbon tax is based on its carbon content whereas an energy tax is based on the energy content of the energy source. Of course energy taxes can be levied against fossil and renewable fuel, but the effect on carbon emissions is *de facto* and hence is recognised as ‘implicit carbon taxes’.¹¹³ Curiously carbon tax is levied on coal, rather than gas and oil, since the former has a higher carbon discharge. However energy tax is levied against oil and gas since these have higher energy content than coal.¹¹⁴

¹⁰⁸ See for instance, Estonia’s CO₂ levy. European Environment Agency *Market-based instruments for environmental policy in Europe* EEA Technical Report 8/2005 Copenhagen 2005 p. 54.

¹⁰⁹ OECD *Environmentally Related Taxes in OECD Countries, Issues and Strategies* OECD Paris 2001 p. 72.

¹¹⁰ Finland levies its carbon tax on the carbon content of fuels used for heating and transportation. See Ministry of the Environment *Environmentally related energy taxation in Finland* [Online] <http://www.environment.fi/default.asp?contentid=147208&lan=en> accessed on 10 March 2010. Since 1991, in Sweden, the CO₂ tax has been levied on petrol, oil, liquefied petroleum gas, natural gas, coal and coke, and on fossil carbon in household refuse; see Swedish Tax Agency *Facts about Swedish Excise duties* 2008 p. 3 [Online] <http://www.skatteverket.se/download/18.233f91f71260075abe8800097301/10409.pdf?posid=1&sv.search.query.allwords=fact%20about%20swedish%20excise%20duties%202008> accessed on 10 March 2010. In 1991 Norway introduced its carbon tax levied on mineral oil, petrol and production of oil and natural gas on the continental shelf; see website of Norway’s Ministry of Finance on *The history of green taxes in Norway* [Online] <http://www.regjeringen.no/en/dep/fin/Selected-topics/taxes-and-duties/The-history-of-green-taxes-in-Norway.html?id=418097&epslanguage=en-GB> accessed on 10 March 2010. See Slovenia *Fourth National Communication under UNFCCC* 2006 p. 73 [Online] <http://unfccc.int/resource/docs/natc/svnnc4.pdf> accessed on 10 March 2010. Estonia implemented the CO₂ levy in 2000 only on the emissions of large combustion plants (thermal input exceeding 50 MW) and based on measured emissions. *Op cit*, Fn. 108.

¹¹¹ New Zealand was considering introducing a carbon tax but decided against it. Japan has discussed a proposal for a carbon tax since 2003 but has not adopted it yet. See e.g. Shimizu, Kaho ‘War on Greenhouse gas emissions – Carbon tax proposal short on specifics – but not on sceptics’ 28 August 2003 *The Japan Times Online* [Online] <http://search.japantimes.co.jp/cgi-bin/nn20030828b3.html> accessed 10 March 2010.

¹¹² As an example Canada can be mentioned. British Columbia introduced a carbon tax in July 2008 and Quebec in 2007.

¹¹³ *Op cit*, Fn. 109 pp. 116-117.

¹¹⁴ Zhang and Baranzini ‘What Do We Know about Carbon Taxes? An Inquiry into their Impacts on Competitiveness and Distribution of Income’ *Energy Policy* 2004 Vol. 32 No. 4 pp. 507-518 (508).

3 Effect of CO₂ taxation on trade

This section will briefly examine the effect that CO₂ taxation would have on trade as well as showing the reality of implementing the idea of CO₂ taxation in an economic environment. Then, it will consider the fears associated with CO₂ taxation and the impact it would have on competitiveness. In this context, it will demonstrate the potential effect of CO₂ taxation on global trade and production in countries which have no, or less stringent CO₂ taxation. Furthermore, it will explain the use of CO₂ tax revenues, which could help to reduce or compensate for the impact on competitiveness and trade (just as an overview).

3.1 Principles of energy taxation

First, this section briefly describes terminological definitions of the possible theoretical connecting factors, classifications and subject matter of CO₂ taxation.

3.1.1 Theoretical connecting factors and classifications

The legislator has plenty of theoretical alternatives in the creation of CO₂ taxation regarding the connecting factors of taxation. But the various connecting factors can be completely different in their economic and ecological effects. Depending on the configuration of the elements, the discussion can be fiscal, ecological or social. This variety is good on the one hand but it also leads to the possible danger that the realisation of the aim to save nature and diversity ultimately fails, and the levied tax just goes into the state budget as another source of income. Thus the connecting factor and a means-ends analysis are necessary for the understanding of CO₂ taxation and its juridical, ecological and economic significance.

The life cycle of energy is important for the discovery and classification of the connecting factor.¹¹⁵ The natural energy source is subject to a complex change and transformation system until it is used as an end product. These working and manufacturing processes of energy provide a variety of possible connecting factors for taxation. Depending on the ecological problem the tax is aimed at, and its ecological goal, the optimal ecological and economic points for connecting the tax in the life cycle of energy could be different. It is necessary to find the connecting factor that gives the highest correlation with the environmental

¹¹⁵ Köppl with Kratena, Pichl, Schebeck, Schleicher and Wüger *Makroökonomische und sektorale Auswirkungen einer umweltorientierten Energiebesteuerung in Österreich* Österreichisches Institut für Wirtschaftsforschung Wien 1995 p. 46.

interference. Two different models for the ecological and the economic representation are emphasised in the transformation process of energy: the primary and the secondary energy sources.

The starting point is to look at the composition of energy and its natural product. Fossil burning elements, uranium and regenerative sources of energy (wave, wind, sun) are subsumed under primary energy. These primary sources will be changed through a transforming process into heat, mechanical work or electrical energy. Thus, electricity, heat, coal products and fuel, for example, are secondary energy sources.

The second possibility for a connecting factor is based on the steps of production in energy use. The difference is between the emergence of energy and the consumption stage, in the sense of the final consumption of energy.¹¹⁶ For this, it does not make a difference whether the energy carrier used is a primary energy carrier or a transformed one. The opposite of this classification is non-energy consumption which occurs in the use of rare, supporting or working material in the manufacturing or basic industries.

3.1.2 Indirect energy taxation

The connecting factor for energy taxation should be the most efficient and the closest to the goal as possible. Isolating the main goal, the reduction of air pollution and global warming from potential other goals, such as revenue collection, it would appear most sensible to levy the tax on the emissions (tax object). However, this ideal of a measured emission tax does not work in many cases because of its impracticability and the difficulties of administration (see Chapters Four and Six for more details). This leads to the conclusion that when taxing the emissions directly is not an option, an indirect approach should be considered.

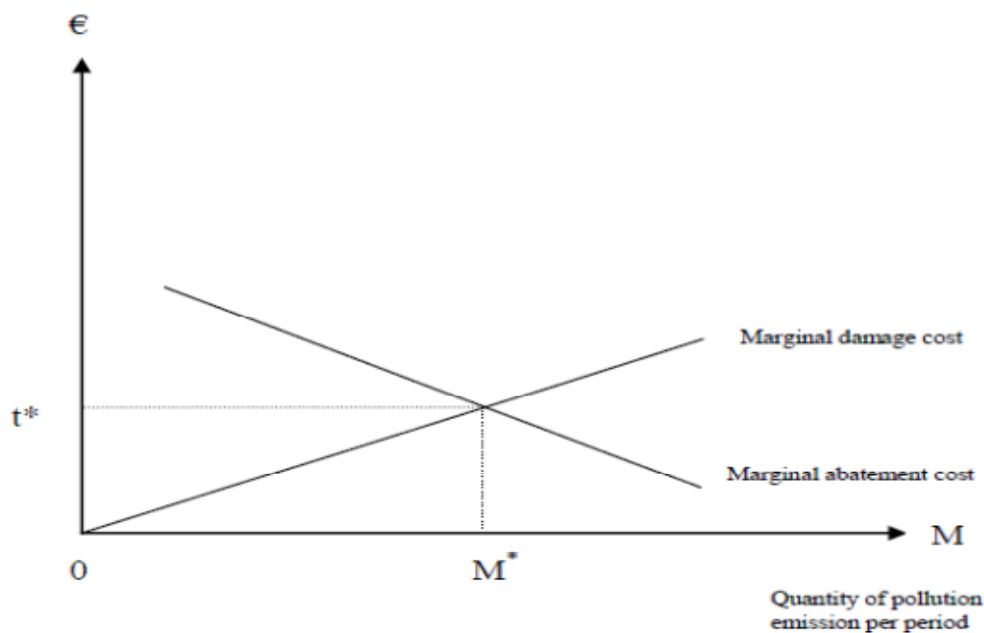
Since indirect taxation is better than no taxation, it should not be considered as a second best solution. The principle of indirect taxes, taxing input, has the advantage that the tax could be levied on the input factor, which could influence different contaminating emissions in the production process.

¹¹⁶ *Ibid.*

3.2 Translation of the CO₂ taxation idea

The concept of supporting CO₂ taxation is one of allocative efficiency. In order to establish this 'efficiency' the economically efficient level of emissions abatement needs to be established first. This is done by ascertaining an efficient level of pollution which reduces the total cost of abatement and damage.¹¹⁷ Here abatement refers to the cost society incurs in order to reduce pollution. Damage refers to the cost to the company's value as a result of its effect on, or damage to, the environment.¹¹⁸ To summarise: the total cost is reduced when minimal damage and minimal abatement costs are equal;¹¹⁹ thus allowing for efficiency. This is shown in Figure 2.1.

Figure 2.1:



Source: Common and Stagl *Ecological Economics: An Introduction* Cambridge University Press 2005 p. 416

Figure 2.1. shows the marginal damage costs which increase with every tonne of CO₂ and the marginal abatement costs, which are high when CO₂ emissions are high and which decrease when emissions decrease. It becomes clear that a small reduction of emissions can be managed easily and cheaply but it becomes more expensive the cleaner the environment.

¹¹⁷ Common and Stagl *Ecological Economics: An introduction* Cambridge University Press 2005 p. 415.

¹¹⁸ *Ibid.*

¹¹⁹ *Ibid.*

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Here the problem arises concerning the causes of marginal damage and abatement in individual companies. This information is not freely available to the authorities and although it could be provided, it would be impossible to use/implement, since the resources, for processing each company on a case by case basis, would be too expensive.¹²⁰ Thus authorities are forced to work according to an 'arbitrary standard'.

This does not mean that these taxes would then be adopted or levied in a thoughtless or erratic way, but that they would need to be developed through research and political consensus so as to establish an average which is not reliant on the precise balancing of the marginal costs and benefits.¹²¹ Accordingly, a sustainable level at the least cost has to be found. This means that the costs of monitoring and enforcement of taxation on fossil fuels would be lower if some other input, apart from emissions alone, was used to determine the level of taxes needed¹²².

The problem here is that taxing the originator of the CO₂ emissions (input) would result in an increase in production costs, which in turn would have an impact on the supply function.¹²³ The following figure shows the impact of input taxation.

¹²⁰ *Ibid*, p. 417.

¹²¹ *Ibid*.

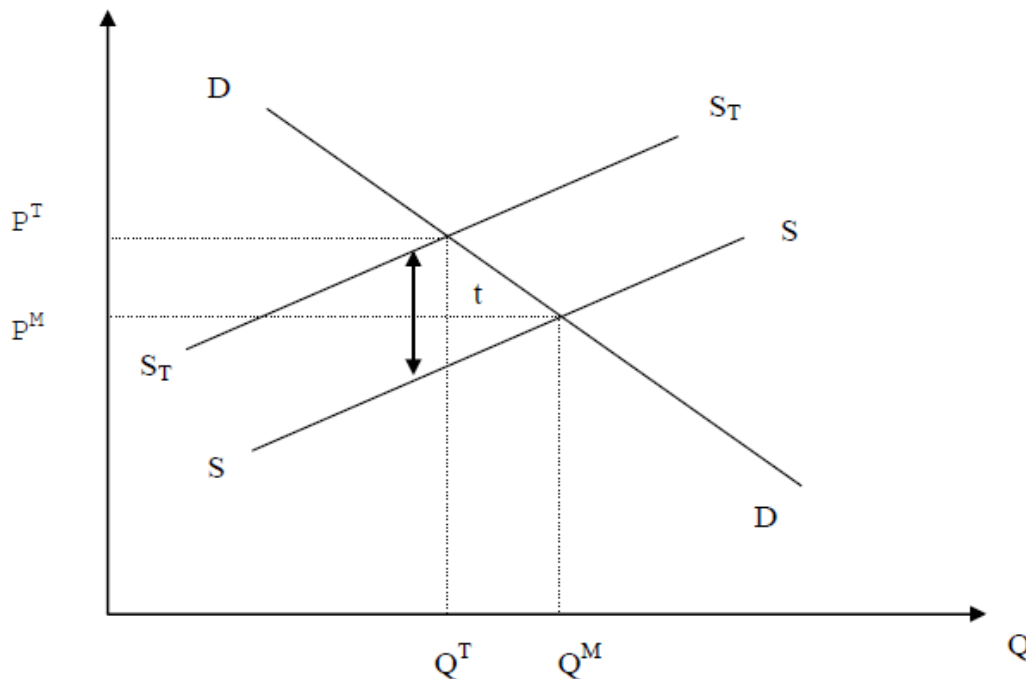
¹²² *Ibid*, p. 418.

¹²³ *Ibid*.

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Figure 2.2:



Source: Common and Stagl *Ecological Economics: An introduction* Cambridge University Press 2005 p. 419

In the above diagram the SS curve represents the supply function for said commodity before the imposition of the tax in comparison to $S_T S_T$. While the $S_T S_T$ shows the supply function with taxation. DD being the demand for said commodity. Thus, resulting from the tax the equilibrium quantity falls from Q^M to Q^T while the equilibrium price suffers an increase from P^M to P^T .

As outlined earlier, the purpose of carbon taxation is aimed at reducing CO₂ emissions and the cost to society at large. Currently, over 80% of the CO₂ emissions worldwide are derived from fossil fuel combustion,¹²⁴ which means that the CO₂ tax should be levied on all fossil fuels. This would be possible if a product charge was placed on fossil fuel in proportion to its carbon content. This would mean that coal would be taxed more as it has a higher carbon content than oil and natural gas.¹²⁵ The implementation of such a CO₂ tax would raise the price of fossil fuels and induce people to use oil and gas instead of coal, or to use renewable energy sources in the place of fossil fuels if possible and financially feasible. To achieve the result that energy in general is used more efficiently, substitutions would have to be made financially feasible and available in abundant supply.

¹²⁴ *Ibid*, p. 419.

¹²⁵ *Op cit*, Fn. 117 p. 419.

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The consequences would be that on the one hand, fossil fuel is still a by-product of the manufacturing of other goods and services which would lead to the result that everybody would have to pay a higher price especially for oil, and this would raise the price of all products, depending on what amount of fossil fuel was used in their production and delivery. According to this, the price of goods and services would increase for all consumers.

On the other hand levying such a tax would enable the country to reduce its level of CO₂ emissions at the lowest overall cost. Furthermore, a carbon tax is attractive to governments as it can raise significant amounts of revenue, which could be used to finance environmental projects or to reduce other taxes, for example income taxes or other labour costs (as shown in Chapter Three, Section 5 and in Chapter Six).

The disadvantage of this configuration concept in the ecological cause-effect connection is somewhat similar to that concerning air pollution. Here the use of atomic energy must be mentioned. The air pollution caused by nuclear energy is small, but cooling sewage is causing a questionable rise in temperature in the abutting rivers, the end storage of the nuclear waste is not safe, and remaining nuclear risks make the population nervous.

According to this section, CO₂ taxation is a CO₂ specific version of energy taxation. Since it is not considered here as a tax levied on CO₂ emissions themselves, it does not belong to the emissions taxation group but to the group where the energy source is used for a specific duty. Nonetheless, in general, both terms will be used further on as having the same meaning.

3.3 Competitiveness and the concern of its effect on trade

The use of environmental taxes has both supporters and opponents and has been under discussion for many years. Those opposed to the tax point out that environmentally friendly behaviour, technologies, or products do not result from these taxes.¹²⁶

A reason why environmental taxes are not yet widespread is that some of them would be regressive and most heavily burden the poor.¹²⁷ The reason for this is because they generally

¹²⁶ *Op cit*, Fn. 74 p. 159.

¹²⁷ *Op cit*, Fn. 87.

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only have access to antiquated technology when buying cars or fridges, for example, which emit a high amount of CO₂. (This is discussed in Chapter Three Section 5.2).

Another reason why states are reluctant to implement these taxes is because they fear that they would drop out of the competitive trade market¹²⁸ by losing the competitive advantage to the industries of countries that have not employed such taxes. There are numerous empirical studies available which demonstrate the effects of environmental taxes. The point in this context is that environmental taxes, like every other form of taxation, affect numbers of agents. A CO₂ tax will not only affect resource and capital owners, but workers and consumers alike. Thus, creating a fall in demand would lead to a reduction in the value of resources, thereby causing a drop in the rate of returns for investors, which would lead to a decrease in demand for labour and finally to the risk of higher unemployment rates and drops in salary.¹²⁹ These fears are, amongst other reasons, the same fear the US government faced during the draft of the Kyoto Protocol, which it has not yet signed. But, for example, as Al Gore showed in his movie, *An Inconvenient Truth*, there is a boom in the Asian car industry, which actually produces cars that need less fuel. These cars meet the environmental requirements *inter alia* of the European Union, and accordingly, will continue to have a stable and profitable growth rate and return on investment.

Furthermore, according to a recent estimate¹³⁰ only 1% of the world's GNP per annum is necessary to prevent the world from releasing CO₂ emissions that are too high and would protect the world against climate change with its consequences (the numbers vary up to 10% currently). This aim could be achieved by global taxation or voluntary benefits or subsidies.

As we have seen, the aim of a CO₂ tax is the reduction of CO₂ emissions to a corresponding level of allocative efficiency, in the most efficient manner possible.¹³¹ By levying a tax at the price of the social costs,¹³² (New Zealand can be mentioned as an example, which estimated the effective tax rate at USD 25 per tonne of CO₂.¹³³) the tax would ensure that the polluters

¹²⁸ *Op cit*, Fn. 87.

¹²⁹ *Op cit*, Fn. 92 p. 66.

¹³⁰ Aitkenhead 'We're the first generation that has had the power to destroy the planet. Ignoring that risk can only be described as reckless' in *The Guardian* 30 March 2009.

¹³¹ Pigou *Economics of Welfare* 1920.

¹³² Social costs mean the costs that would be paid by society to eliminate the damage.

¹³³ Creedy and Sleeman *The Distributional Effects of Indirect Taxes: Models and Applications from New Zealand* Edward Elgar Publishing Ltd. Cheltenham and Northampton 2006 p. 76.

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took responsibility for the costs of their actions. This however could be a problem for competitiveness and could cause fears that trade would be affected; especially if there were no exception rules.

When we focus on the major environmental threats, and threats to our sustainability, we have to take a global perspective, especially when dealing with the concentration of CO₂ emissions. It does not matter where in the world the emission occurs as the effect is global. According to that, it is not possible for just one nation to deal with the greenhouse effect; it is not even possible for a group of nations, such as the European Union. Because of this the following aspects have to be seen within the context of a closed¹³⁴ global economy.

As discussed earlier, the purpose of a tax to reduce CO₂ emissions addresses a negative externality. It is levied in most cases on the burning of fossil fuels – gas, coal, oil – in proportion to their carbon content. On the one hand CO₂ taxation is a favourable possibility because little new administrative bureaucracy would be required to administer and levy a CO₂ tax. On the other hand different fears come along with the taxation.

National carbon taxes might affect the international competitiveness of enterprises in the global market and thereby the individual country. It is sufficient to say that a company that does not act competitively is likely to lose market shares and might go out of business. This could be reduced by conferring a competitive advantage through taxation upon the home country's industry at the expense of competitive disadvantages abroad. This would be possible, for example, by taxing imported goods more highly than domestic goods. (The legality of this will be discussed later, see Border Tax Adjustments in Chapter Five). Nonetheless, the home country's industry would still have to pay the taxation itself, which would increase the costs of production.

An additional possibility might be to recycle the revenue and pay it back to the industry without increasing its overall tax burden. Even though, this may lead to good results in terms of dividend and returns to shareholders in the short-term; long-term results may discourage or actually slow the process of exiting industries from the pollution sector and create a global

¹³⁴ 'Closed' in this context means that there is an exchange on goods, energy, etc. between individual countries, but not between the rest of the world, which closes it.

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disadvantage.¹³⁵ Alternatively, it may lead to a genuine understanding of environmental importance, causing a reduction in taxes through the investment in technology that advances emissions reduction.

Furthermore, tax revenues are usually not returned to taxpayers in a form that would totally compensate every taxpayer for his tax payments. Moreover, the competitiveness within a country is unequal because not all taxpayers will be affected in the same way. For instance older production capacities or cars may be less energy efficient than more recently built plants or new cars, and may be more affected by CO₂ taxation. In this context, the problem is that most of these people and companies would not have easy access to fewer carbon emitting sources. Doing this would automatically result in problems, such as, workers who live far away would have to move closer to their places of work or could not come to work in their own old cars and environmentally ‘dirty’ industries might migrate to lower income countries where environmental standards were weaker or non-existent.¹³⁶ The same mobility could occur even if all countries imposed CO₂ taxation as a part of an international agreement: manifested by some countries transferring to the taxation more quickly, or by having higher tax rates than other countries. But when implementing a global energy tax this effect would only lead to a temporary migration problem, which would not be worth it at least in most cases since the relocation itself would be expensive. In this case the worst affected sectors could move to countries without such policies yet, or to places or countries with lower tax rates in the future (so called carbon leakage). It is therefore extremely important to have an international agreement, at least for the worst polluting industries, which could promote international action and reduce competitive impacts for individual countries.¹³⁷

Then again it seems to be an idea to place levies just on products from abroad. Doing this would result in a country supporting its own industry, but would do very little for an international fair trade agreement. Furthermore it could result in problems with the regulations of the World Trade Organisation. (This issue will be discussed in Chapter Five).

¹³⁵ Stern *The Economics of Climate Change – The Stern Review* Cambridge University Press 2007 p. 363.

¹³⁶ This can be avoided by investment assistance in the countries of origin.

¹³⁷ *Op cit*, Fn. 135 p. 282.

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An additional issue that would need to be addressed is the level of interaction between countries which depend on their levels of CO₂ emissions in certain industries with the corresponding advantages this gives them and other countries. Some countries, which are mostly less developed, already have an accumulation of CO₂ intensive industries. For less developed countries it would be a major problem to cut their emissions to the levels of industrially developed countries or countries with better regulated CO₂ emissions. In this context the question arises whether treating countries differently could be justified? Such different treatment is already in use and regulated by the ‘common but differentiated responsibility’ principle.

The principle of ‘common but differentiated responsibility’ grew out of the idea of the ‘common heritage of mankind’ and is part of the general principles of equity in international law.¹³⁸ The principle recognised past inequalities with regards to the contributions of developing and developed nations towards global environmental problems.¹³⁹ Additionally, it covered differences in their respective economic and technical capacities to tackle these problems. Its first formulation can be found in Article 7 of the *Rio Declaration* which states:

‘In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.’

It was also included in Article 3(1) of the United Nations Framework Convention on Climate Change. Therefore, states should act to prevent climate change ‘on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities’. The principle is based on two essential elements. The first looks at the shared responsibility among nations to protect the environment on regional, domestic and global levels. The second appreciates that each state is different in terms of its production of environmental problems and its capacity to prevent, reduce and control the damage.¹⁴⁰

¹³⁸ CISDL *The Principle of Common But Differentiated Responsibilities: Origins and Scope* a CISDL Legal Brief for the World Summit on Sustainable Development Johannesburg 2002 p. 1 [Online] http://www.cisd.org/pdf/brief_common.pdf accessed on 25 March 2010.

¹³⁹ *Ibid.*

¹⁴⁰ *Ibid.*

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The implementation of this principle in the tax system is necessary and should be possible by including a steadily increasing tax rate, especially in poor countries. This slowly growing tax rate would help countries change their behaviour and deliberate about whether the carbon emissions which come as a result of the use of fossil fuels are necessary. Although it is fact that poverty and environmental problems are interrelated, poor countries are less able and less prepared to act for the global environment since they need to solve other problems first such as fresh water and an electricity supply for everybody. Nonetheless, poor countries should take part, maybe with a longer adjustment period and a different tax rate, in thinking about and implementing renewable energy facilities as soon as possible.

A cause of concern is the question of who is going to pay these taxes? Based on the ‘polluter pays principle’ the question arises whether emissions occur more on the production or consumption side. If it is on the side of production, then production should be taxed and if it arises during consumption then consumption as the emitting source should be charged. The problem with taxing emissions directly is that practicable tax objects would have to be found and taxation has to be affordable. Taking this into consideration means that it might be easier to levy the CO₂ tax as an indirect tax, which means a tax on the transaction (This will be illustrated in Chapter Four by analysing individual national taxes).

Another aspect of CO₂ taxation could be that if it is only levied in one small country it might have no influence on the world market prices of certain products; but by levying CO₂ taxation in a larger country, especially in a country that both produces and manufactures, and which exports a lot of goods, this would influence world market prices. A good example for that could be found in the world market price of steel, which would increase if the European Union uniformly imposed CO₂ taxation,¹⁴¹ which is difficult, especially in times of recession and global economic crises.

An additional viewpoint which has to be taken into consideration is that the impact of CO₂ emission taxation would be felt by the market immediately, even if the tax started low and increased over time in order to have a cost-effective reduction of accumulated CO₂ emissions.

¹⁴¹ The European Union is the second largest steel producer worldwide, see: Worldsteel Association *Steel Statistical Yearbook 2009* Worldsteel Committee on Economic Studies Brussels 2010 [Online] <http://www.worldsteel.org/pictures/publicationfiles/Steel%20Statistical%20Yearbook%202009.pdf> pp. 3-5 accessed on 10 March 2010.

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This could put critical constraints on companies, which would in turn affect shareholders and the available money of the population.

The effects of climate change measures such as carbon or energy taxation on the competitiveness of sectors would depend on a number of factors.¹⁴² (See also Chapter Five).

- i. These would incorporate particular aspects of the sector, its trade exposure, the intensity of CO₂ emissions or energy intensity in general; direct and indirect carbon costs,¹⁴³ and the potential to work towards cleaner production technologies and processes. The ability to reduce emissions and consumption, along with the capacity to impart rising costs through prices, market structure and transport costs would also be a factor.
- ii. Further factors would include the format of the regulations, the quantity of carbon levy, how strict the regulations were, as well as the possibility of abatement and exemptions.
- iii. Energy and climate policies implemented by other countries would also need to be taken into account in terms of policy considerations.¹⁴⁴

That said, as every economy will be faced with constant changes, the most successful economies are those that are adaptable, enterprising and able to manage these changes.¹⁴⁵

As the major fossil fuel users, refined petrol, electricity, gas distribution and fossil fuel extraction industries would be affected in the biggest way.¹⁴⁶ Secondary industries include

¹⁴² Tamiotti with Teh, Kulaçoğlu, Olhoff, Simmons and Abaza *Trade and Climate Change WTO-UNEP Report* Geneva 2009 p. 98.

¹⁴³ 'Direct carbon costs depend on the carbon intensity and energy intensity of the production process and the availability of emission abatement techniques. In addition to direct costs, industries may also face indirect carbon costs related to increases in the cost of energy inputs in reaction to an increased 'carbon constraint' (such as an increase in electricity price)'. See: *Ibid* pp. 98-99.

¹⁴⁴ OECD *The Political Economy of Environmentally related Taxes* OECD Paris 2006 p. 69; Reinaud *Issues behind Competitiveness and Carbon Leakages, Focus on Heavy Industry* IEA Information Paper OECD/IEA Paris October 2008 p. 7; Reinaud *Industrial competitiveness under the European Union Emissions Trading Scheme* IEA information paper Paris February 2005 p. 80; Zhang and Baranzini *Op cit*, Fn. 114 p. 513; Demailly and Quirion *Leakage from climate policies and border tax adjustment: lessons from a geographic model of the cement industry* HAL working papers No. halshs-00009337_v1 28 February 2006 p. 11.

¹⁴⁵ *Op cit*, Fn. 135 p. 282.

¹⁴⁶ *Ibid* p. 285.

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forestry, agriculture, fishing, chemicals, transport, cement and manufacturing industries as well as gas supplying utilities.¹⁴⁷

But the 2009 WTO-UNEP report on climate change states that:¹⁴⁸

‘Studies done to date have generally found that the effect on competitiveness of environmental regulations, including climate change policies, are relatively small, or are likely for only a small number of sectors, because the costs of compliance with a regulation are a relatively minor component of a firm’s overall costs, which also include, for example, exchange rate fluctuations, transportation costs, energy prices and differences across countries in the costs of labour.’¹⁴⁹ For instance, a study examining the literature on competitiveness effects of a carbon price concluded that it would negatively impact the competitiveness of only a few energy-intensive manufacturing industries and would be likely to have a limited impact on output and employment levels’.¹⁵⁰

4 Environmental effectiveness of carbon taxes

The impact of a carbon tax cannot be known in advance since too many factors play a role. However, should the tax level be low in relation to marginal abatement costs there would be no noticeable emission reduction; this is also true for energy demand as it is not flexible to price changes.¹⁵¹ Even so, there would be a short-term regional improvement in air when a domestic tax was implemented. On the other hand, this could influence long-term investment as was the case with the oil crisis in 1970, resulting in the replacement of old capital by new

¹⁴⁷ *Ibid*, using the UK as a detailed case study.

¹⁴⁸ *Op cit*, Fn. 142 p. 99.

¹⁴⁹ Jaffe with Peterson, Portney, and Stavins ‘Environmental Regulation and the Competitiveness of U.S. Manufacturing: What Does the Evidence Tell Us?’ *Journal of Economic Literature* 1995 Vol. 33 pp. 132-163 (158); Harris, Kónya and Mátyás ‘Modelling the Impact of Environmental Regulations on Bilateral Trade Flows: OECD, 1990-96’ *The World Economy* 2002 Vol. 25 issue 3, pp. 387-405; Xu ‘International Trade and environmental regulation: time series evidence and cross section test’ *Environmental and Resource Economics* 2000 Vol. 17 issue 3 pp. 233-257; Cole and Elliott ‘Do environmental regulations influence trade patterns? Testing old and new trade theories’ *The World Economy* 2003 Vol. 26 issue 8 pp. 1163-1186 (1167-1168); Hoerner and Muller ‘Carbon taxes for climate protection in a competitive world’ A paper prepared for the Swiss Federal Office for Foreign Economic Affairs by the Environmental Tax Program of the Center for Global Change, University of Maryland College Park 1996 p. 14; and OECD *Op cit* Fn. 144 pp. 10-11; Reinaud (2008) *Op cit*, Fn. 144 pp. 4, 27ff, 54; Reinaud (2005) *Op cit*, Fn. 144 p.80. Some other studies, however, have found significant effects of environmental regulation on trade flows. See for instance Ederington and Minier ‘Is environmental policy a secondary trade barrier? An empirical analysis’ *Canadian Journal of Economics* 2003 Vol. 36 issue 1 pp. 137-154.

¹⁵⁰ Reinaud (2008) *Op cit*, Fn. 144 p. 39; See also Reinaud (2005) *Op cit* Fn. 144 p. 80.

¹⁵¹ Baranzini with Goldemberg and Speck ‘A future for Carbon Taxes’ *Ecological Economics* March 2000 Vol. 32 issue 3 pp. 395-412 (406).

technology.¹⁵² In order to achieve a permanent effect and to achieve constant price signals in real terms, a mechanism should be included that will link the tax rate to inflation.¹⁵³

5 Usage of CO₂ tax revenues

The current usage of CO₂ taxation presents different points of view to consider. There are several studies showing that the use of CO₂ tax yields a double dividend concept. Other possibilities are to use the tax yield as a part of the budget for health, education, the military, etc. or as an additional source of income. On the other hand with a long-term perspective in mind, it is clear that the world needs clean and affordable energy which could be researched and developed with the tax revenue from CO₂ taxation. The following section will focus on utilising the Pigouvian tax and research and development principles in a two-fold manner: on the one hand for the compensation of the CO₂ tax burden on the nation and on the other hand to finance the decrease of climate change emissions before climate change becomes too problematic.

5.1 Pigouvian tax and tax shifting

The idea of a Pigouvian tax¹⁵⁴ is to tax a ‘bad’ rather than a ‘good’ thing. This perspective led Pearce¹⁵⁵ to establish the double dividend aspect in 1991. The first aspiration of CO₂ taxation is to decrease emissions and environmental damage, which is the first pillar. Here taxation results in corresponding market failures and internalising external effects.¹⁵⁶ With the revenue from this tax the public budget would rise and some existing taxation could be reduced or abolished (tax-shifting) or the money could be paid back (dividends). The revenue could be used to reduce or abolish taxation on other production factors, income and resources. Taxes on production factors, income and resources have a harmful distortion effect on the economy and are associated with welfare losses. Accordingly the reduction or even abolition of such

¹⁵² Godard ‘Taxes’ in Hourcade *International Economic Instruments and Climate Change* OECD Paris 1993 pp. 45-101(49f).

¹⁵³ *Op cit*, Fn 151.

¹⁵⁴ Named after Arthur Pigou.

¹⁵⁵ Pearce ‘The role of carbon taxes in adjusting to global warming’ *Economic Journal* 1991 Vol. 101 pp. 938-948.

¹⁵⁶ *Op cit*, Fn. 90.

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taxes would have a welfare benefit and positive effect on the economy and the public budget balance would not change¹⁵⁷ (second pillar).

Tax shifting is a concept that has been implemented for hundreds of years. For instance, it is known that Austria, the Netherlands and Great Britain used parts of their income tax revenue in the war against Napoleon.¹⁵⁸

Tax shifting today changes only the composition of taxes not the level. Because of the pioneering work of the former member of the German Bundestag, Ernst von Weizsäcker¹⁵⁹ Europe is the leader in tax shifting. As such, it could pass on knowledge about tax shifting and could send experts to supervise the implementation process in other countries.

Environmental tax shifting started in Sweden in 1991 in order to lower taxes on personal income while raising them on carbon and sulphur emissions, so as to discourage the burning of fossil fuels, though many industries in manufacturing received special exemptions and rebates in several of the environmental taxes. Thus, for them the tax rate was 50% less than the rates for households. In 2001, the Swedish government lowered income taxes and social security contributions, while increasing taxes on diesel fuel, heating oil and electricity. By 2002 6% of all government revenues in Sweden had been shifted,¹⁶⁰ which resulted in GHG emissions in Sweden being reduced faster than expected. A political agreement concluded by the government and the opposition aiming at a 4% reduction below 1990 levels in 2012, was on the brink of being finalised in 2000, at which point the emissions showed a 3,9% decrease from the 1990 level.¹⁶¹

Another European country that has shifted taxes successfully is the Netherlands. Starting in 1988 the Netherlands levied a general tax on fuel, which was subsequently modified in 1992 and is now levied on fossil fuels. The carbon and energy content of the fuels is the base for the tax rate calculation. Furthermore, the Netherlands implemented a Regulatory Energy Tax (RET) between 1996 and 1998 which was levied on natural gas, electricity, fuel oil, and

¹⁵⁷ *Op cit*, Fn. 90.

¹⁵⁸ *Op cit*, Fn. 78 p. 23.

¹⁵⁹ Former head of the Wuppertal Institute.

¹⁶⁰ Fischlowitz-Roberts *Restructuring Taxes to Protect the Environment* [Online] http://www.earth-policy.org/Updates/Update14_printable.htm accessed on 4 March 2010.

¹⁶¹ *Ibid*.

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heating oil. Contrary to the fuel tax, which was planned to generate revenue, the aim of RETs was to change consumer behaviour through incentives for energy efficient practices.¹⁶² In an effort to avoid competitive problems, major energy users were excluded from the tax; resulting in the tax being carried mainly by individuals. About 60% of the revenue from these taxes was derived from households and the aim was to return it to them by lowering taxes on income. The other 40% of revenue which came from businesses was recycled by using three instruments: minimisation of employer contributions to social security, decrease in corporate income taxes, and added tax exemption for the self-employed.¹⁶³ The added energy costs resulted in a 15% reduction in electricity use among consumers as well as a 5%-10% decrease in fuel usage.¹⁶⁴

Between 1993 and 1999 the United Kingdom utilised a steadily rising fuel tax known as a fuel duty escalator. One effect of this was the reduction of fuel consumption in the road transport sector, as well as a 13% increase in fuel efficiency in 33 tonnes-plus trucks between the years 1993 and 1998.¹⁶⁵ Furthermore, the sale of diesel which is ultra-low in sulphur and thus has a lower sulphur content than regular diesel and produces less CO₂, rose from 5% in July 1998 to 43% in February 1999. The United Kingdom had converted totally to ultra-low sulphur diesel, before the turn of the century.¹⁶⁶ The United Kingdom now has implemented the Climate Change Levy which will be examined in Chapter Four.

In Germany environmental taxes were put into practice in several stages; chiefly by decreasing income taxes and increasing energy taxes. Germany raised taxes on gasoline, heating oils, and natural gas, and levied a new tax on electricity (1999). With this revenue the German government lowered contributions to the pension fund. As in other countries the energy tax rates for most energy-intensive industries were lower (through implementing exemptions and waivers), because of concerns about international competitiveness. The following year Germany reduced payroll taxes and increased taxes on electricity and motor

¹⁶² *Ibid.*¹⁶³ *Ibid.*¹⁶⁴ *Ibid.*¹⁶⁵ *Ibid.*¹⁶⁶ *Ibid.*

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fuels, resulting in motor fuel sales being 5% less during the first six months of 2001 as the same interval in 1999.¹⁶⁷

As seen above, tax shifting has broad support in order to achieve environmental goals. Research in the United States and Europe in the late 1990s showed overwhelming support (more than 70%) for the environmental tax-shifting concept once it was explained.¹⁶⁸ Furthermore, tax shifting is an attractive economic tool, because it is used in one section and can easily be implemented in others.¹⁶⁹ If the world is to restructure the economy before environmental destruction leads to an economic downturn, tax restructuring could bring about, quickly enough, the systemic changes needed.¹⁷⁰ In the words of Harvard economist, N.Gregory Mankiw:¹⁷¹

‘Cutting income taxes while increasing gasoline taxes would lead to more rapid economic growth, less traffic congestion, safer roads, and reduced risk of global warming - all without jeopardizing long-term fiscal solvency. This may be the closest thing to a free lunch that economics has to offer.’

Tax shifting is a cost-effective and competitive solution, but it has its limits. It depends on existing tax structures. The best results have been found in countries with already high tax levels, together with a considerable group of applied taxes. However, countries that have fewer applied taxes will find it a greater obstacle to include social compensation measures directly into the format of the environmental tax regime. Furthermore, taxation can develop weak points over time. The reason for this is that people forget after a while how it was before the CO₂ tax was levied and that social insurance, for example, was reduced as a compensation for implementing the tax.

The awareness of the compensatory methods and their social advantages has to be highlighted; otherwise CO₂ taxation will be seen as just another revenue raising measure. Some countries have tried to do this through developing a direct progression in the tax system. Other possibilities, to keep this awareness awake and to highlight the financial cuts, would be by

¹⁶⁷ *Ibid.*

¹⁶⁸ Brown *Eco-Economy: Building an Economy for the Earth* W.W. Norton & Company New York 2001 p. 239.

¹⁶⁹ Roodman *The Natural Wealth of Nations: Harnessing The Market For The Environment* W.W. Norton & Company New York 1998 p. 243.

¹⁷⁰ *Op cit*, Fn 168 p. 239.

¹⁷¹ Mankiw ‘Gas Tax Now!’ *Fortune* 24 May 1999 pp. 60-64.

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subsidising household energy conservation activities and protecting certain households, such as those for students, single parents with low education or retired people.

A question that arises in this context is: what is going to happen if everybody uses fewer fossil fuels and more renewable energy? Since renewable energy should not be taxed, the revenue of countries would decrease. With this decrease the investment possibilities for tax-shifting or other dividend possibilities would shrink. This means that less money would be available to reduce income tax. On the other hand, taxpayers would have already paid fewer taxes as a result of their innovation and emission reductions. Thus the amount of tax which could be shifted would be less but it should more or less equalise their overall costs. For example: in period one, an enterprise pays USD 1000 tax on profit; in period two (implementation of the energy tax), the enterprise pays USD 500 tax on profit and USD 500 tax on CO₂; while in period three, the enterprise reduces its emissions by 50% and pays USD 500 tax on profit and USD 250 tax on CO₂. This, it could be argued would lead to a problem for the national budget. But it should not be a problem for the national budget at all. (The enterprise would have already saved USD 250 which means the state would collect USD 250 less revenue). The revenue of the tax on CO₂ should not be included in the overall national budget, but should flow into a separate pot for disposal as tax shifting. The smaller revenue, reduced by USD 250, would only lead to a smaller amount to pay back (only USD 250 would be paid back). This would lead to a balance in the overall costs for the taxpayer and for the overall national budget of the state. In addition, it would increase the money available for companies to invest, for example, in environmental technology or more employees.

5.2 The distributional effect of carbon taxation

The distributional effect of a carbon tax has to be seen on the one hand between the population in a country; more precisely poor and rich families, rural and urban residents, etc. and on the other hand the comparison has to be made between developing and industrialised countries. Plenty of empirical findings about the distributional effect of carbon taxation exist from developed countries, but there are only a few studies from developing countries or countries with economies in transition, which analyse the distributional effect of environmental policies.

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As reported by the OECD,¹⁷² the distributional effect should demonstrate apparent and also indissoluble issues: firstly the environmental benefits of the method and its efficiency and secondly the financial implications of the method and who would be the major and the minor payers. The global environment would benefit from the reduction of GHG emissions which can be achieved by the implementation of carbon taxes. But different taxes with different rates, waivers and exemptions could have different economic and environmental benefits in different regions.

5.2.1 Empirical studies from industrial countries

There are different methods used for the analysis of the empirical studies on which this thesis does not want to focus. The studies below are listed so as to give a general overview and will explain the differences which can occur in different countries through the implementation of individual carbon taxes.

One of the earliest studies is that of Poterba,¹⁷³ on American households in 1991. He arrived at the conclusion that a CO₂ tax is regressive. He suggested making offsetting changes in other tax or transfer programmes, because otherwise the burden would fall more heavily on low-income rather than wealthy households. The regressivity resulted from the comparison between rich and poor households. Poor households had to pay more for fuel, electricity and gas in relation to their income compared to wealthy households.

Another study in 1991, by Pearson and Smith,¹⁷⁴ looked into the distributional effect of CO₂ taxation on European countries. The outcome was that the burden of CO₂ taxation was only weakly related to income, or slightly regressive, with the exemption of Ireland and the United Kingdom where a strong regressivity was given.

¹⁷² OECD *The Distributive Effects of Economic Instruments for Environmental Policy* Paris 24 January 1994.

¹⁷³ Poterba 'Is the Gasoline Tax regressive?' NBER Working Papers no 3578 *Tax Policy and the Economy* 1991 Vol. 5 pp. 145-164.

¹⁷⁴ Pearson and Smith *The European Carbon Tax: An Assessment of the European Commission's Proposals* The Institute for Fiscal Studies European Commission London 1991.

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An examination for Canada in 1994, by Hamilton and Cameron,¹⁷⁵ came to a similar conclusion. Such a CO₂ tax would be fairly regressive: 1.1%-1.25% higher for the lower income households than for the highest.

Regressivity was also the result of a study in Australia, where the aim was to reduce 20% of CO₂ emissions of the 1988 level by 2005.¹⁷⁶

Further research¹⁷⁷ examined all members of the European Union who at that time had imposed an additional excise duty on energy products according to their carbon content. The study differentiated between those situations with revenue recycling and those without. Without recycling the result was regressive and with recycling it was progressive in terms of lump-sum transfer. This result has to be seen in the context of domestic energy taxes always being slightly regressive.

Tiezzi investigated the implementation of a carbon-energy tax in 1999 in Italy.¹⁷⁸ The tax had a proportional distributional effect. The reason for this might be the fact that the new tax was levied mostly on transport fuels and only slightly on heating fuels.

Because Denmark was the first country that implemented a CO₂ tax it is important and has undergone an interesting analysis. Denmark is the country with the highest burden of environmental taxation in the world, which is another reason why this analysis was so interesting. The result was that low-income households paid about 0.8% of their disposable income on the environmental tax, whereas high-income families only paid about 0.3% of their disposable income, which means that the tax was regressive in Denmark as well. All, except one report, came to the conclusion that CO₂ taxation in the developed countries was, at the least, slightly regressive. A study¹⁷⁹ from 2000 researched the burden of a CO₂ tax in a

¹⁷⁵ Hamilton and Cameron 'Simulating the Distributional Effects of a Canadian Carbon Tax' *Canadian Public Policy* 1994 Vol. 20 issue 4 pp. 385-399.

¹⁷⁶ Cornwell and Creedy 'Carbon Taxation, prices and inequality in Australia' in *Fiscal Studies* 1996 Vol. 17 No. 3 pp. 21-38 (35).

¹⁷⁷ Barker and Köhler 'Equity and Ecotax Reform in the EU: Achieving a 10 per cent Reduction in CO₂ Emissions Using Excise Duties' *Fiscal Studies* 1998 Vol. 19 No. 4 pp. 375-402.

¹⁷⁸ Tiezzi *The welfare Effects of Carbon Taxation on Italian Households* Dipartimento di Economica Politica, Università degli Studi di Siena Working Paper 337 December 2001.

¹⁷⁹ Symons with Speck, and Proops 'The Effects of Pollution and Energy Taxes across the European Income Distribution' Keele Department of Economics Discussion Papers No. 2000/5 *European Environment* July/August 2002 Vol. 12 issue 4 pp. 203-212(209).

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number of European countries where revenue recycling was not applied. The result was that the CO₂ tax would be regressive for Germany and France and weakly regressive for Spain. The outcome for Italy was neutral and in contrast to other studies the result for the United Kingdom was progressive.

A further study,¹⁸⁰ this time for New Zealand, stated that for the majority of types of household, the carbon taxes proved to be neither strictly regressive nor progressive. Nonetheless, a cost increase was documented by households with one child at a greater rate than by households with no children. A similar increase of costs was recorded for single adult households.

5.2.2 Empirical studies from developing countries

CO₂ taxation in developed countries is at least slightly regressive. Does the taxation have the same effect in developing countries? A survey of the OECD in 1995 demonstrated that it might be different in developing countries. The report stated that, 'there is some evidence that such programmes might actually be progressive in developing countries'.¹⁸¹

In contrast to the several reviews of the distributional effect in developed countries, there are only a few reports on developing countries. The reason for this is that the developing countries, even if they have signed the Kyoto protocol, do not have a legal commitment to reduce their CO₂ emissions by a specific level.

One of the earliest investigations in developing countries was in 1992.¹⁸² The analysis included not only the distributional effect of CO₂ taxes in developing countries, but also the revenue potential and its efficiency. The study included Pakistan, India and Indonesia, although the distributional effect was only analysed for Pakistan. To demonstrate the distributional effect the analyses differentiated between full forward-shifting, complete absence of forward-shifting and partial forward-shifting. Full forward-shifting meant that the price of the tax was completely translated into the consumer's price. The result was that the carbon tax burden was lowered with income, thereby yielding a regressive pattern of

¹⁸⁰ *Op cit*, Fn. 133 p. 81.

¹⁸¹ OECD *Climate Change, Economic Instruments and Income Distribution* OECD Paris 23 January 1996 p. 57.

¹⁸² Shah and Larsen *Carbon Taxes, the Greenhouse Effect, and Developing Countries* The World Bank Policy Research Working Paper Series 957 Washington 1992.

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incidence.¹⁸³ But the regressivity was not so marked with respect to household expenses. This result changed automatically when just a part of the tax was shifted forward. Then the outcome was almost proportional.¹⁸⁴

The distributional impact of carbon charges and revenue recycling was presented in another report for China, by Boyce, Riddle and Brenner.¹⁸⁵ The result was thought-provoking; despite revenue recycling, the effect of carbon tax was progressive. As an example, underprivileged households paid 2.1% of their total expenses, whereas the highest-income households paid 3.2%. It was speculated that product mixture was the cause of this outcome, because higher income households bought products with higher carbon intensity than the lower income households. Price discrepancies between urban and rural areas were also taken into account.

There is a further, but different study, from a developing country. Corong¹⁸⁶ examined the economic and poverty results of an autonomous carbon reduction in the Philippines. The result of imposing even a small carbon tax and reducing the income tax instead, was that the national poverty occurrence increased slightly.

A recent study¹⁸⁷ has examined the distributional effect a CO₂ tax in Indonesia would have. The immediate effect would be, as in all countries, an increase in the price of energy products and with it all other products which need energy for production or delivery. The final conclusion being that the effect of the tax on rural communities would be progressive, however the effect on urban areas would be dependent on if and how the revenue recycling took place. The effect would be essentially neutral in the event that there was no recycling or tax reduction, but progressive in the event of uniform lump-sum transfers.¹⁸⁸ Nonetheless, the effect of countrywide tax implementation would be progressive, in effect leading to lower-

¹⁸³ *Ibid*, p. 8.

¹⁸⁴ *Ibid*, p. 10.

¹⁸⁵ Boyce, Riddle, and Brenner *A Chinese Sky Trust? Distributional impacts of Carbon charges and Revenue Recycling in China* Working Papers Political Economy Research Institute University of Massachusetts at Amherst 2005.

¹⁸⁶ Corong *Economic and Poverty Impacts of a Voluntary Carbon Reduction for a Small Liberalized Developing Economy: The case of the Philippines* Fondazione Eni Enrico Mattei Working Papers#83 Milano 9 February 2007.

¹⁸⁷ Yusuf and Resosudarmo *On the Distributional Effect of Carbon Tax in Developing Countries: The Case of Indonesia* Australian National University Economics and Development Studies Working Paper EEN0706 27 August 2007 [Online] http://een.anu.edu.au/download_files/een0706.pdf accessed on 4 March 2010.

¹⁸⁸ *Ibid*, p. 21.

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income households gaining more from the tax than higher-income households. This would be tempered by the area; in other words the effect would be to some extent less in urban areas.¹⁸⁹

This can be explained by pointing out that the population working in rural areas was occupied in the least energy-intensive surroundings (the majority working as unskilled farmers). Consequently, in order to achieve growth in the distributional effect, an increase in rural areas – with less energy-intensive industries – would be required (in other words, going back to informal, unskilled, rural agricultural work). Whether or not, this would be an acceptable solution to government remains to be seen, as it would mean that the country would remain in the developing phase of its growth.

The outcome for developing countries with big agricultural sectors, is not the same for developing countries with higher energy-intensive sectors and less agriculture. There the distributional effect might be similar to the effect in developed countries; namely regressive.

As follows, the positive result of CO₂ tax would be a drop in poverty, specifically in the rural areas. This is especially true in the case where revenue from carbon tax is given back in terms of uniform lump-sum transfers.¹⁹⁰

The study of the effect of carbon taxation in Indonesia is a first step in the right direction and it is hoped that other developing countries will follow this example and investigate the effect a CO₂ tax would have on their inhabitants. If it is as positive as that in Indonesia, governments should consider the development and introduction of such a CO₂ tax.

5.3 Research and Development

An outcome of the research and development principle is the stimulation of clean energy sources and technology, as well as the usage of this technology. In the short-term this would not have any publicly visible advantages, but in the long run these would become more obvious. However, it is necessary to reduce carbon emissions immediately. (The support initiatives mentioned above have only been on a national, not an international level.)

¹⁸⁹ *Ibid.*

¹⁹⁰ *Ibid*, p. 24.

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Supporting initiatives, and with them technologies producing less CO₂, or which are even CO₂ free, are an important point and should be more integrated into climate agreements.¹⁹¹ Research and development could be financed by the revenue from the CO₂ taxation. Obviously, this is not a novel idea, considering that it was implemented in the 1970s, following the energy crisis during which the US government implemented tax incentives for investment in renewable energy. During the same decade, California took up a resolute tax incentive for wind power.¹⁹² The consequence was that, especially in California, the investment in wind built up a new industry, which used advanced technologies to convert wind energy into electricity.¹⁹³ The abolition of these tax incentives on wind power resulted in the progress of wind power in California standing almost still. Today Europe, strictly speaking Denmark, is the leader in wind energy technologies. It also provides wind energy subsidies and continues to develop the technology. Thus the incentive has launched a new, flourishing industry.¹⁹⁴ The renewal of fiscal subsidies in America led to a drop in the costs of wind energy generation and increased its growth by about 60% in 2001.¹⁹⁵

The potential for developing environmental sustainability via research and development is tremendous. Should industry apply renewable energy it would arrive at the point where investments would occur without the incentives, an obvious example being wind powered industry.¹⁹⁶

¹⁹¹ Barret *Environmental and Statecraft* Oxford University Press Oxford February 2003.

¹⁹² *Op cit*, Fn 168 p. 243.

¹⁹³ Meador *Building on a Breeze* 1 May 2006 [Online] http://ewweb.com/mag/electric_building_breeze accessed on 10 March 2010.

¹⁹⁴ *Op cit*, Fn 168 p. 243.

¹⁹⁵ *Ibid*, p. 244.

¹⁹⁶ Flavin 'Wind Energy Growth Continues' in Worldwatch Institute *Vital Signs The Trends that are Shaping Our Future* W.W. Norton & Company New York 2001 pp. 44-45.

IV Experiences and insights from selected countries in implementing carbon and energy taxes

Chapter Four analyses and compares different national systems of CO₂ taxation. This knowledge could be helpful in developing a model agreement on CO₂ taxation.

1 General thoughts about energy source specific differentiation

As mentioned in Chapter Three, for the link between the tax objective and the realisation of environmental protection, different models are possible. The environmental economists favour cause-specific taxation of the various energy sources. This differentiation, however, suffers from implementation problems such as efficiency loss and conflicts because of apprehensions regarding leakage, or administrative problems which could be a result of the design of specific energy duties. This means, for example, that brown coal, hard coal and peat appear in so many substances and quality characteristics, that it would be difficult to find a justifiable tax measure. Taxation of the different types of gas is similar. This leads to the result that in the case of specific energy duties it would only be possible to estimate the necessary quantification of emissions by the burning of these fossil fuels as an approach, with the result that the levy would include both high administrative and control expenses. This problem could be resolved through using a graduated tax rate which included approximate values.

However, there would still be many economic conflicts. For example, the use of coal on the one hand is linked to emissions of diverse pollutants, which would lead to a reduced use of coal by taxing it, but on the other hand it is one of the energy sources with an enormous deposit. By using coal, the use of rare energy sources can be diminished. Furthermore, the use of regenerative energy sources – which are generally taxed less or are tax free – involves other environmental problems (for example tropical dams, landscape destruction by wind power plants or monoculture of energy plants). By using fewer CO₂ contaminating sources like uranium, air pollutants are fewer, but with that comes other problems such as the cooling water increasing the temperature of rivers and oceans close by; and the final storage of

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nuclear waste is still a problem, with a high health risk, which makes a country vulnerable and open to attack.

As a consequence, the aims of a tax and its implementation have to be considered carefully. The CO₂-specific form of an energy source tax should be levied on the concentration of CO₂, with an essential indicator of environmental destruction. Bearing this in mind, Chapter Four of this thesis will show how selected countries and the European Union have tried to find an adequate CO₂ tax. Furthermore, it will explain why some countries have decided on a cap and trade system or are still unsure about which instruments might be the right ones.

As mentioned in Chapter Three, there are different theories and estimates concerning what the amount, which the avoidance or mitigation of climate change would cost the world at the moment. These vary between 1% and 6% of the GDP worldwide. Taxes are an effective revenue instrument for these costs. In the following analysis the European Union will be discussed first, then the carbon/energy taxes of developed countries and finally those of developing countries.¹⁹⁷

The reasons for choosing these different countries and various CO₂ taxes are manifold.¹⁹⁸ Decisive in the range of countries was to choose those which, being either high contaminators, have given reduction commitments under the Kyoto Protocol or have an exemplary system, which could be valuable for other countries. Unfortunately, it was

¹⁹⁷ Most of the developed countries, which have ratified the Kyoto Protocol, have to reduce their emissions to a level to which they have committed. Developing countries, on the other hand, do not have commitments under the Kyoto Protocol and also not under the Copenhagen Accord. In December 2009 the United Nations Climate Change Conference took place in Copenhagen. Only an accord was reached. Key points of the accord were as follows:

- the objective to keep the maximum temperature rise to below 2°C;
- the commitment to list developed country emission reduction targets, and mitigation action by developing countries by 2020
- to help developing countries, USD 30 billion short-term funding for immediate action until 2012, and USD 100 billion annually by 2020 in long-term financing, would be paid by Annex I countries, as well as mechanisms to support technology transfer and forestry.

The next conference was held in Mexico one year after Copenhagen, in 2010. The challenge for Mexico was to attempt to turn what was an accord into a binding agreement. (UNFCCC *Copenhagen Accord* advance unedited version Decision-/CP.15 Copenhagen 18 December 2009 [Online]

http://unfccc.int/files/meetings/cop_15/application/pdf/cop15_cph_auv.pdf accessed on 10 March 2010.)

¹⁹⁸ The European Union, for example, has been chosen because of its inimitability at designing and implementing such kinds of taxes. Other European countries have been chosen because they have either been one of the earliest countries implementing such taxation, or are unique, or, like Switzerland, not a Member State of the European Union.

sometimes not possible to find primary literature so that it was necessary to make use of secondary literature.

The essential characteristics of the taxes, such as the object of taxation, area of application, tax exemption and tax shelter, the assessment basis and the taxation itself have been the basis for elaboration. Under the point ‘object of taxation and area of application’ the main focus was on taxable turnover, subject of taxation, deliverables and performance, as well as location of deliverables and performance. The analysis of the taxation itself includes the base and rate of the tax, as well as the administration and monitoring if particularly useful.

However, the first aim of developing countries has to be the ability to supply all households with energy and fresh water, which will partly relieve their poverty.

2 The European CO₂ and energy taxation suggestions

As a party to the UNFCCC¹⁹⁹ the European Community was obliged to stabilise its CO₂ emissions at the level of 1990 by the year 2000.

Furthermore, by ratifying the Kyoto Protocol of 11 December 1997, the obligations of the Community were increased by setting the reduction in emissions of six GHGs, including CO₂, at 8% in relation to 1990 levels over the period 2008 and 2012.

To achieve this, the European Commission chose the use of market-based instruments; namely environmental taxes, emission trading schemes and incentives. The subsequent examination will focus on CO₂ taxation. It has to be kept in mind that in matters of taxation, unanimity of all members is necessary in order for a directive to be adopted. As an additional point regarding the implementation of carbon taxation in Europe, it should be taken into consideration that the European Community has also wanted to build up an internal energy market.

¹⁹⁹ Adopted in New York on 9 May 1992.

2.1 Proposal for a Council Directive introducing a tax on carbon dioxide emissions and energy by the Commission of the European Communities COM (92) 226, of 30.6.1992

As a result of the above mentioned situation the European Community was under pressure to act. Less than a month after the adoption of the UNFCCC in 1992, the European Commission submitted a first draft²⁰⁰ to the Council of Ministers on 2 June 1992 with suggestions for a regulation of the Council to introduce a tax on coal emissions and energy.

Being party to the UNFCCC was not the first time that the European Community had been confronted with the problem of how to fight climate change. The starting point of the common strategic considerations to mitigate CO₂ emissions was the realisation of the drastic climate changes from the middle 1980s. The European Council had already decided on 29 October 1990 to stabilise CO₂ emissions at the 1990 level by 2000.²⁰¹ The way to achieve this was a long process with many different strategies and instruments as well as discussions.²⁰² However, the Member States which supported the draft succeeded in submitting the draft at the conference of the United Nations in Rio de Janeiro in June 1992.

The aim of the 1992 tax model was to charge all sources of fossil energy. The chargeable elements of taxation were to be the extraction, manufacture or import of the taxable energy source.²⁰³ The proposal included that the tax should be charged at ‘the time of release or when shortages were recorded’.²⁰⁴ The proposal combined different points of levying: on the one hand the charge was focused on the energy usage and on the other hand on the energy source. The predominant tax objects were primary fossil energy sources used for heating or motor

²⁰⁰ This draft was part of a strategic package for European climate policies (so called SAVE-regulations).

²⁰¹ Introduction of *The Proposal of a Council Directive Introducing a Tax on Carbon Dioxide Emissions and Energy* COM (92) 226 of 30.6.1992.

²⁰² The Commission presented to the Council on 14 October 1991 see: EUROPA A *Community Strategy to Limit Carbon Dioxide Emissions and Improve Energy Efficiency* SEC (91) 1744 final of 14 October 1991 [Online] <http://europa.eu/rapid/pressReleasesAction.do?reference=P/92/29&format=HTML&aged=1&language=EN&guiLanguage=en> accessed on 10 April 2010.

²⁰³ Article 4(1) of COM (92) 226 of 30.6.1992.

²⁰⁴ Article 5. Since it did not define the term ‘shortage’ it may be understood in the context of the tax regime, which wanted to include the extraction of the crude products, the production of their derivatives and importation. Release in this respect should be, *inter alia*, any departure, including irregular departure, any extraction or manufacturing as well as any importation (Art. 5(1)).

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fuels.²⁰⁵ Secondary energy sources such as mineral oil derivatives and electricity served as tax objects as well.

The tax consisted of two equal components: the CO₂ emissions and the energy content (which had been calculated in European Currency Unit (ECU)²⁰⁶/MWh).

Fuel belonged to both the energy and the emission component, whereas electricity from hydropower plants would only be taxed on its energy component and therefore had a lower tax rate. The predicted total rate on fossil fuel was USD 3/barrel of oil equivalent and should have been raised by USD 1/annum at least for the first seven years after implementation to reach a rate of USD 10.²⁰⁷ The tax rate was ECU 2.81/tCO₂ for the CO₂-emission component and ECU 0.21 gigajoule (GJ) for the energy component. The rate was calculated by using an oil-emission factor of 0.075 tCO₂/GJ and an energy content of 6.1 GJ/barrel. Compared to the tax calculation on oil-emissions the planned tax on heating and electricity was rather different. It was envisaged that the taxation of oil should be levied on the input-factor. The tax on electricity on the other hand was to be levied under the energy component on its output-factor (ECU/kWh). The rate here was 0.21 ECU/GJ. To ascertain the tax rate of the power supply, an efficiency of 36% was assumed for fossil and nuclear sources and for water power plants the assumed efficiency was 99%. This led to a tax rate for the energy component of 2.1 ECU/MWh on fossil and nuclear power and of 0.76 ECU/MWh on water power.²⁰⁸

As mentioned above, fossil fuel had to face both components, each at 50%. According to that, the CO₂ component had to be considered in respect of the kind of fossil fuel. To achieve the tax rate according to the CO₂ content of the fossil fuel, a value referring to its assumed efficiency was estimated, instead of taking the effective value of used fuel into account. That led to a total charge for electricity on brown coal of 5.1455 ECU/MWh, on hard coal of 4.563 ECU/MWh, on gas of 3.540 ECU/MWh and on fuel oil of 4.112 ECU/MWh.²⁰⁹

²⁰⁵ Article 3(1).

²⁰⁶ ECU was a basket of currencies used in the EU as a unit of account before it was replaced by the Euro. The inconsistency in the usage of the currencies in this section is a result of the wording of the law itself.

²⁰⁷ Article 9(3).

²⁰⁸ Article 9(1)(a).

²⁰⁹ Kohlhaas and Welsch 'Modelle einer aufkommensneutralen Energiepreiserhöhung und ihre wirtschaftlichen Auswirkungen' *Zeitschrift für Energiewirtschaft* issue 1 1995 pp. 47-58 (53).

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In order to administer the tax on heating and electricity easily, the proposal obliged the suppliers to list the tax separately on the invoice.²¹⁰ This was also a common principle of other excise taxes within the European Union.²¹¹ The proposal ensured homogenous taxing in a clear timetable by the same supplier for all customers so as to secure a fair taxation.²¹² Fiscal supplies of primary energy sources on the other hand had to have the tax rate per unit listed in the invoice, and pro rata in the invoice of further deliveries²¹³ in order to avoid double taxation. Article 10 included exemption rules for firms with high energy consumption which would be seriously disadvantaged on account of an increase in imports from third parties. Because the proposal never came into force, a deeper focus on the exemption rules and the absence of rules for non-European suppliers can be omitted.

An interesting aspect of this proposal was the two component system which led, *inter alia*, to a different treatment of the different fossil fuels. Even though water power would have been taxed less than nuclear power or electricity from fossil fuels, it was still subject to taxation. I think that it is inappropriate to tax renewable energy yet, because renewable energy sources and derived power should be completely exempt from tax in order to promote this type of power generation in particular, and through it achieving an environmental rethink. The proposed tax was rejected for, among other reasons, the vulnerability of Member States regarding competitiveness with third countries.

2.2 Amended proposal COM (95) 172, of 10.5.1995

In 1994 the members of the European Commission realised that if there was no change in the environmental policy, especially regarding CO₂, they could not fulfil their own obligation to stabilise emissions at the 1990 level by 2000. Instead, they would have to expect an increase in CO₂ emissions of 4%-12% by the year 2000.²¹⁴

The Commission submitted its amended proposal to the European Council on 16 May 1995. It contained three key changes.

²¹⁰ Article 7(3)(a).

²¹¹ As an example §14 of the German Umsatzsteuergesetz of 21 February 2005 can be mentioned.

²¹² Article 7(3)(b).

²¹³ Article 7(4) 2. Semi-clause.

²¹⁴ Collier 'The European Union's climate change policy: Limiting emissions or limiting powers?' *Journal of European Public Policy* Vol. 3 issue 1 1996 pp. 122 – 138 (132).

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1. There was no condition that the agreement only came into force if other OECD countries introduced similar taxation.
2. The obligation to report the revenue neutrality of the tax was abolished.
3. The proposal no longer included minimum tax rates.

2.2.1 Key change No. 1

Since the US Congress refused the introduction of similar energy taxation at the federal state level in 1993, the conditional clause of the 1992 proposal was practically non-realizable. To avoid competitive problems the new proposal contained a variety of tax reliefs, mainly for energy-intensive industries. Additionally, it determined tax allowances and tax refunds for investments towards a decrease in energy use.²¹⁵

2.2.2 Key change No. 2

The report and control mechanism of the former proposal which had been developed to preserve the neutrality of the tax became vaguer in the later version. Furthermore, this time it touched the problem of border-crossing trade between Member States and third countries. Article 6(2), read with Article 10, stated that the excise duty committee of the Commission had to develop corresponding regulations.

2.2.3 Key change No. 3

At first, the determination of the tax rates was left to the Member States. The rates of the new proposal, which were almost four times the amount of the former ones, were only targets. The aim was that at least a tax would have been implemented; the rates could be adjusted afterwards.

Nonetheless, this amended proposal also had too much opposition and the ecological suitability was doubtful. Furthermore, there was still doubt in respect of industrial competitiveness especially of the energy-intensive companies.

²¹⁵ Art. 9(2) amended proposal COM (95) 172 of 10.5.1995.

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Accordingly, the Economic and Social Committee rejected the modified proposal.²¹⁶ In the end, the Committee questioned *inter alia* the benefit of the CO₂ component of the taxation related to coal as a long-term measure to protect the environment.²¹⁷ In my opinion the questioning of the CO₂ component occurred only for economic reasons and because it did not consider environmental reasons it went too far.

2.3 Proposal for a Council Directive restructuring the Community framework for the taxation of energy products, COM (97) 30 of 12.3.1997

After the refusal of the 1992 proposal and its amendments, the Community changed its tax tool in the proposal of 1997. This time it did not want to provide a completely regulated directive but rather a framework, which should encourage the Member States to adopt appropriate measures. The main focus was towards creating relevant methods of pro-employment based on observing the Community's competence and made within available policy frameworks.²¹⁸

The framework specifications offered individual Member States the possibility of increasing the prices of fuels and at the same time approaching the problem of unemployment by recycling the tax revenue. This recycling idea was a result, *inter alia*, of the transfer of the first legislative initiative of the fiscal strategy presented by the European Commission in October 1996, and endorsed by the European Council in Dublin in December 1996.²¹⁹ Noticeable in this context is that the proposal and its explanations were based on the argument that the introduction or the renewal of energy taxation had positive effects for employment. This was to have been achieved by fiscal neutrality through the reduction of statutory charges on labour, at the same time as introducing the new common system of taxing energy

²¹⁶ European Economic and Social Committee *Opinion of the Economic and Social Committee on the Amended Proposal for a Council Directive introducing a tax on carbon dioxide emissions on energy (COM (95) 172 final)* 28 March 1996 [Online] http://eescopinions.eesc.europa.eu/EESCOpinionDocument.aspx?identifier=archives.ces\anciennes_sections\eco\eco211\421-1996.wpd&language=EN accessed on 30 June 2010.

²¹⁷ *Ibid.*

²¹⁸ The policy content: a single market framework enabling a revenue neutral restructuring of tax systems to sustain employment and the environment *Proposal for a Council Directive Restructuring the Community Framework for the Taxation of Energy Products* COM (97) 30 of 12.3.1997 p. 1.

²¹⁹ SEC (96) 487 final.

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products.²²⁰ It included the restructuring not only of taxation and energy but also of transport and the environment because the former regulations had just taxed mineral oil.

By examining the regulations, it becomes clear that the new framework wanted to change the situation by charging all energy sources and products and wanted to give the Member States established clearance and freedom. The Community thought a framework would be necessary to give the individual Member States freedom to develop their own environmental tax systems and guarantee them their sovereignty. The reason for this was that the Community saw problems arising out of the already implemented, very different, energy taxes by some Member States, which were taxing different products in different ways and with differing speeds. It was feared that these different levels of energy taxation could lead to a negative curve of trade within the internal market. Accordingly, an aim of this proposal was to harmonise the European market and to strengthen it in competitive aspects against third countries.

By indicating the ‘principle of subsidiarity’ the European Community argued that the proposal was just a framework. But the proposal included tax rates, similar to the VAT-system, as a minimum tax level. The minimum level on mineral oil was already charged by the Directive 92/82/EEC and was to be increased. In addition, a minimum level was to be created for products other than mineral oil. Besides that, the framework stated in Article 10(2), that not later than 2001 the Council should fix the minimum levels of taxation. Until that had happened the States should treat the amount regulated in Annex I as ‘target levels of taxation from 2002’.²²¹

Tax objects should not only be mineral oil but also all other energy products used as motor fuels or heating. Furthermore, electricity as a secondary energy source should be charged. This idea was taken from the former drafts. Compared to fuel which should be charged on its input, electricity should be charged on its output. The reason for charging the output was chosen by the Commission, on the one hand to apply the method of destination principle, and on the other hand to avoid double taxation in the country of consumption.²²² Another reason

²²⁰ SEC (96) 487 final p. 2.

²²¹ Article 10(2) COM (97) 30.

²²² COM (97) 30 p. 5.

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for charging the output was that only by this method the tax burden for the energy-intensive industries could be reduced by granting different possibilities of incentives. Furthermore, it provided for ecologically attractive fuel and heating sources being supported by incentives and other advantages.²²³

The framework contained several competitive, social and environmental incentives. For example it proposed that the Member States could differentiate the tax rates applicable to a product on the basis of an environmental standard or apply reduced rates or exemptions from taxation for specific products or uses such as heat produced in combined generation installations, renewable energy sources, biofuels, rail transport and inland waterway navigation.²²⁴ A prior authorisation through the European Union was not necessary in the above mentioned cases.

For those companies whose energy costs were between 10% and 20% of production costs, the Member States were allowed to pay back the tax amount which was over 10% of the firms' total production costs, and for firms whose energy costs were higher than 20% of the production costs, the Member States had to pay back the tax which was paid on the proportion of the energy costs in excess of 10% of their total production costs.²²⁵ Nevertheless, repayment for the energy-intensive industries contained an upper limit. The taxes derived were supposed to equal 1% or higher than their actual sales.²²⁶

Another possibility for socially and environmentally friendly exemption included the proposal in Article 15(1). If a company invested capital to improve its efficient use of energy, up to 50% of taxes due could be claimed back.

Fuel used by commercial ships as well as, owing to international duties, kerosene for international air transport, continued to be exempt from charge.

The tax was to be levied from 1 January 1998 onwards and should have been increased gradually in 2000 and 2002.

²²³ COM (97) 30 p. 5.

²²⁴ COM (97) 30 p. 7.

²²⁵ COM (97) 30 p. 7.

²²⁶ Article 15(2).

To prove and monitor the observance of the minimum levels in the different Member States the Commission suggested considering all indirect taxes without VAT.

Nevertheless, even with all this support for industry, especially energy-intensive industries, a major point of criticism was the possibility of competitive impacts on European industry. The problem might be decreased by the tax incentives for industry, but it was not certain if it could bear all burdens and competitive disadvantages in the tax compared to third countries. A bicycle which was produced in France or the Netherlands, for example, would have additional production costs after the introduction of the CO₂ taxation, compared with a similar product from China or India.

On the other hand, studies undertaken by the Commission showed that the impact of the introduction of the proposal on GDP would be slightly positive. It would lead to a net creation of jobs and to reductions of CO₂²²⁷ and other emissions by 2005 and the effect on consumer prices would be limited.

Further points of criticism were:

- that the various possibilities of temporary and permanent tax incentives did not lead to tax harmonisation,
- the extensive scope of arrangements would lead to a very different tax level, which had happened with the VAT,
- the omission of the tax exemption on transport induced costs as well as the upper limit of the value of the sales,
- the abandoning of tax neutrality.

Abandoning tax neutrality was seen by the proposal as leaving the point of determination of the compensation of the tax revenue to individual Member States.

The proposal needed to be approved unanimously by the Council in order to be implemented, which was not possible because of the above mentioned points of criticism. In the first half of

²²⁷ Conclusion COM (97) 30 p. 10.

1999 the presidency of the European Union was held by the Germans. They tried to find a compromise to achieve unanimity but did not succeed.²²⁸

2.4 Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity

As shown in the previous section, the concern of the European Union was to find and agree on a common framework for an energy tax. The demand to reduce the consumption of fossil fuel had grown with the increase of oil prices. The lack of progress in the carbon mitigation field posed the risk of failing to fulfil the commitments of the Kyoto Protocol. Furthermore, the Community stated in 2001 in 'A Suitable Europe for a Better World: A European Union Strategy for Sustainable Development'²²⁹ that Kyoto was a first step but the European Union should thereafter aim to reduce GHGs further, including ambitious targets for energy taxation.

The Commission's proposal of the Community framework of 1997 was modified substantially during the long period of negotiations and was accepted by the Council in March 2003. Afterwards the EU Parliament had to agree on the changes to the Directive introduced by the Council. On 27 October 2003 the EU's Council of Ministers adopted Directive 2003/96/EC which, among other things, widened the scope of the EU's minimum rate system, previously limited to mineral oils, to all energy products.²³⁰ The Directive came into force on 1 January 2004.

Primary to the Directive was the widened scope to include all energy products (coal, gas and electricity) while simultaneously providing updated minimum rates for mineral oil (which have remained unchanged since 1992). However, this taxation only applies to energy products

²²⁸ Rosenstock *Energy, Taxation Policy and Green Tax Reform Policy issued in the European Union: a viewpoint from the European Commission* UN-ECE/OECD workshop on enhancing the environment by reforming energy prices Průhonice near Prague 14 to 16 June 2000.

²²⁹ COM (2001) 264.

²³⁰ European Commission *Legislation New Directive on Energy Taxation* [Online] http://ec.europa.eu/taxation_customs/taxation/excise_duties/energy_products/legislation/index_en.htm accessed on 10 March 2010.

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used for heating purposes but excludes its use as a raw material or in chemical, electrolytic or metallurgical processes.²³¹

Table 3.1: Minimum tax rates in the developing process of the directives

	Previous rates since 1992	Commission proposal, rates for 1998	New minimum rates since 2004	New minimum rates from 2010 onwards
Motor fuels in (EUR/1000 l):				
Leaded petrol	337	417	421	421
Unleaded petrol	287	417	359	359
Diesel	245	310	302	330
Other products (household use):				no increase
Electricity (EUR/Mwh)	0	1	1 (0.5)	
Natural Gas (EUR/Gj)	0	0.2	0.3 (0.15)	
Coal (EUR/Gj)	0	0.2	0.3 (0.15)	

Source: Manfred Rosenstock 'Energy taxation within EU' in *EU Climate Change Policy The Challenge of New Regulatory Initiatives* eds. by Marjan Peeters and Kurt Deketelaere Cheltenham Northampton 2006, p. 243 amended by the author. The numbers in brackets are tax rates for business use.

According to Article 7(1), the minimum level of taxation for motor fuel had to be stipulated on 1 January 2004 and 1 January 2010.

Energy products which are used in stationary engines, for agricultural, horticultural or piscicultural purposes, forestry, plant and machinery used in construction, civil engineering and public works, as well as industrial and commercial vehicles are taxed at a lower level than normal motor cars.²³²

²³¹ EUROPA *Energy Taxation Commission welcomes Council adoption of new EU rules*, IP/03/1456 Brussels 27 October 2003[Online] <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/03/1456&format=HTML&aged=1&language=EN&guiLanguage=fr> accessed 4 March 2010.

²³² Article 8(2) of the Council Directive 2003/96/EC of 27 October 2003 *Restructuring the Community framework for the taxation of energy products and electricity*.

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In addition, the Directive contains regulations for commercial diesel, to limit the distortions of competitiveness. Member States are allowed to differentiate between commercial and non-commercial gas oil, providing lower rates for commercial usage, as long as the rate for commercial gas oil does not fall below the national level of taxation in force on 1 January 2003. Similar norms are available for business use of energy products and electricity. Accordingly, the tax rates which Member States can levy on similar products can sometimes vary. Several requirements are necessary *inter alia* that the tax rates are above the minimum level and there is no breach of competition regulations and the internal market is respected.²³³

Furthermore, Member States are allowed to apply for other exceptions or reduced levels of taxation, if this exemption is not detrimental to the proper functioning of the market, and has no distortional effect on competition.²³⁴ In this context it has to be seen that the aim of the tax is to guide consumers to more environmentally-friendly products, a programme already practised by some Member States. The possibility of individual rates can reduce the gap in excise duty levels, especially between non-commercial diesel used as petrol, and normal petrol, because there is no environmentally justifiable reason to treat these two kinds of petrol differently.

Besides, there is an exemption for taxing energy products which are used for international air transport purposes (at least until the international commitments permit allows them to be taxed).²³⁵ The same applies for fuel used for maritime transport within Community waters.²³⁶ Article 17 includes rules to avoid competitiveness problems concerning energy-intensive businesses. It defines which businesses are energy-intensive and regulates refunds of taxes paid by companies which have invested in their efficient use of energy.

Member States have the possibility to exclude renewable energy sources as tax objects and reduce the tax for companies which have entered into special energy efficiency commitments and, with them, agreed to invest great effort into reducing their consumption. The reduction in the case of an energy-intensive company would decline to zero and in a non-energy-intensive company still drop down to 50% of the tax.

²³³ Article 5.

²³⁴ Article 15.

²³⁵ Article 14(1)(b) and (2).

²³⁶ Article 14(1)(c) and (2).

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In Article 18 the Directive allowed a transitional period, until 1 January 2007, for Member States to establish the new minimum levels of taxation, in order to avoid price instability. Furthermore, subject to a prior review by the Council, the Member States could arrange an additional transitional period for various derogations until 31 December 2006. Member States had to inform the Commission of the level of taxation they apply as well as their tax exemptions, tax reductions, tax differentiation and tax refunds.

According to Article 29, the Council has to examine the exemptions on a regular basis and shall adopt the necessary measures if unanimously accepted after consulting the European Parliament. Since it is a framework the Directive does not include special rules for the administration and the receipt of the tax. If administration rules were included this indeed would lead to a uniform application and administration of the tax which could increase cooperation within the Member States but would represent a major interference with their sovereignty.

Finally, the Directive has been implemented, which is a great success and as such should serve as a motivation for other countries and unions to consider and implement. Nonetheless, it has several weak points which are mainly a result of the need to protect Member States from competition from other countries worldwide that have not implemented energy taxes.

As shown above, the aim of the Directive is to avoid or reduce pollution while using energy. Therefore, it raises a uniform minimum standard of taxing CO₂ within the European Union and tries to build up an internal energy market. Furthermore, as already mentioned, it widens the scope beyond mineral oils to include the competing sources of energy, such as coal, lignite and natural gas as well as electricity. As such the Directive is to be welcomed. For instance, it has the advantage that the new EU members (among others Estonia and Czechoslovakia²³⁷) had to implement carbon taxation within a short period, in order to reach the EU standards, at least at their lowest level, whereas the environmental effects of the Directive for the old EU-15 has been of less relevance.

²³⁷ These countries joined the EU on 1 May 2004.

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It defines what energy-intensive industry is and helps competitiveness-wise with tax reductions. Reduction for this sector results in limitations or complete non-observance of the ‘polluter pays principle’, especially when it benefits the energy-intensive consumers who profit from the more energy they use. They are protected until their consumption for heating purposes reaches 50%; after that they are fully protected since the Directive includes no restriction for usage purposes.

Another point of criticism is that the tax rates of motor fuels, heating fuels and electricity are not indexed and so only a periodical update and increase can be hoped for. That could be a long process, as the implementation of the Directive has already shown, so it would be desirable to adopt an amendment to the Directive which would allow a periodical update and check of the data; for example in a cycle of three years. This point can be underlined by the small increase in the minimum rates compared to suggestions in earlier drafts. The 1992 proposal included in its Article 10 that the minimum rates for excise duties should be updated every two years. The update possibility and the early status of the 1992 proposal in respect of commitments to reduce carbon emissions explain the possibility of such low tax rates. The wording used in Article 7(1) of the Directive is completely different to that of the 1992 proposal and states only that in 2004 and 2010 ‘the minimum level of taxation applicable to motor fuels shall be fixed as set out in Annex I Table A.’ As can be seen in table 3.1, the only update has been for diesel used as motor fuel in 2010. Besides, the Council has to decide upon the minimum levels of taxation for the period from 2013 onwards for gas oil only.

It should be pointed out that Article 16 includes exemptions or rebates on biofuels but with the restriction of Article 16(3), which regulates changes in material prices to avoid over-compensation. However, these exemptions and rebates cannot apply to motor fuels, heating fuels and electricity taxation, as the minimum rates are already defined in Annex I.²³⁸ Here a change or amendment of the wording is desirable.

The use of different energy sources could result in a better product. Article 5 makes provision for tax differentiation where it is directly linked to product quality. But, it does not apply to

²³⁸ Soares ‘Energy and Taxation: Some critical implementation issues’ in Deketeleare and Peeters (eds) *EU Climate Change Policy: The Challenge of New Regulatory Initiatives* Cheltenham Edward Elgar Ltd. 2006 pp. 256-275 (261).

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final products of electricity, as it does not have an effect on its characteristics²³⁹ (electricity remains electricity) - whereas consumers, especially in Germany, want to know where and how their electricity is produced. This is based on the fact that the Directive only introduces an output tax; a tax on the quantity consumed, and not on the energy products used in its generation (input tax). The output tax gives Members the ability to differentiate between consumers and open up the tax reduction for the energy-intensive sector. It also facilitates the taxation of nuclear fuel under this Directive. The Directive makes provision for Member States to introduce reductions or exemptions on electricity derived from renewable energy, while some countries, like the Netherlands and Finland, directly subsidise the process itself, rather than providing tax benefits.²⁴⁰ This should be noted as well, since subsidies and taxation could work hand in hand and benefit each other to fulfil the aim of emission reduction.

Pertaining to the above, there is no consistency in the treatment of the different energy sources. The taxation on renewable energy seems to be outdated. It is based on output and applicable rates for fossil fuel have been used as rates for renewable energy sources. It neglects the fact that renewable energy has a lower energy base; thus, taxing these sources at the same level as fossil fuels, leads to a higher tax burden for renewable energy.²⁴¹ In my opinion it is desirable to exclude renewable energy from the elements of tax objects.

In November 2009 the EU Commissioner Lázló Kovács²⁴² brought up the issue of a revised tax Directive.²⁴³ He suggested developing a new Directive, again as a framework for carbon taxation, but recommended splitting the current energy tax base in two parts, one depending on the CO₂ emissions, and the other on the energy content.²⁴⁴ The reason for the division was that there should be a tax and price advantage for the renewable fuels over the fossil fuels.²⁴⁵

Another problem in the current Directive is the linkage between carbon tax and the avoidance of double payments and/or loopholes. The idea of a new energy tax Directive has already

²³⁹ *Ibid*, p 263.

²⁴⁰ *Ibid*, p 265.

²⁴¹ Global Utmaning *Carbon taxation - a forgotten climate policy tool?* Global Utmaning Stockholm 2009 p. 15.

²⁴² Commissioner for Taxation and Customs Union.

²⁴³ Speech at the conference 'What taxation for a low carbon economy?'.

²⁴⁴ *Op cit*, Fn. 241.

²⁴⁵ *Ibid*.

been discussed with EU Finance Ministers, with their support for appropriate EU-wide framework rules.²⁴⁶

The idea of a new tax Directive should be welcomed, as the current one has some good ideas but also several disadvantages which are difficult to resolve through amendments. It is important that the new tax should include among other things:

1. taxation benefits for the development of renewable energy sources and technology,
2. periodic updates to tax rates to include technological development,
3. better inter-operability with the European ETS,
4. if only a framework, current domestic rates should take preference when higher than the recommended rates,
5. monitoring of compliance, in the form of random samples or other methods, along with stipulated fines,
6. offset mechanisms such as CDM to support research and development of new technologies and renewable energy.

3 Denmark

Denmark was the first country worldwide, which imposed a specific CO₂ tax on households and businesses in 1992/1993. Like the European Union, Denmark's aim was to combine the decrease of CO₂ emissions with the realisation of better energy usage. To achieve these aims the Danish Government decided on the Danish Energy Package. Its aim was to attain a reduction of 20% of its CO₂ emissions in 2005.²⁴⁷ To achieve this aim the Energy Tax Act 1977 on coal, oil, gas and electricity consumption was amended by a CO₂ component in 1992, for households, and the area of application was extended in 1993 for businesses.

The assessment basis was a tonne of CO₂. The tax rate for the tonne of CO₂ was about USD 17.3 (DKK 100). To remain competitive, tax exemptions and shelters were provided to the

²⁴⁶ *Ibid.*

²⁴⁷ EUROPA The Commissions approves aid under the new Danish "Green Taxes" Package [Online] <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/95/777&format=HTML&aged=1&language=EN&guiLanguage=en> 30 June 2010.

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effect that 50% of the standard rate for all registered business would be reimbursed.²⁴⁸ Additional returns were based on energy usage of registered companies, while the biggest energy users were entitled to further refunds, covering whatever was left of the CO₂ tax bill.

A percentage of the net revenue was intended as subsidies for business energy conservation projects, while a large share was recycled into the general budget. The greatest part however was intended for subsidies, largely aimed at the improvement of profitable natural gas as well as power/heat projects.²⁴⁹

In the 1993 ‘green’ tax reform, the CO₂ tax and the energy tax rates increased to a total tax level of approximate USD 103 (DKK 600)/tCO₂ for households. Businesses on the other hand were excluded from the reform. To compensate for the financial cut in the budget of individuals and to adjust the social inequalities of indirect environmental taxation on lower income groups, the taxes on lower incomes were reduced and child support was increased.²⁵⁰

Because of many weak points in the amendments, energy taxation was reformed in 1995 by the business tax scheme, which came into force on 1 January 1996. Another reason for the reform was the so called ‘half mark report of 1994’ where it was estimated that Denmark would miss its national CO₂ reduction target by 5% if additional measures were not introduced.²⁵¹

The 1995 business tax scheme was introduced with the purpose of providing business incentives to reduce CO₂ emissions and not to provide additional public revenues. The tax objects were both primary and secondary energy sources, with the exception when the source was already used for power generation. In this case the energy sources were free of charge. Businesses and individuals were still excisable. The amended tax had an energy source-specific ascertainment of taxation combined with a consideration of the intended purpose on the final energy level. Concerning the energy source-specific ascertainment, the new tax differentiated between a CO₂ component and a specific energy component. Additionally, a

²⁴⁸ Wier with Birr-Pedersen, Jacobsen and Klok ‘Are CO₂ taxes regressive? Evidence from the Danish experience’ *Ecological Economics* 2005 Vol. 52 issue 2 pp. 239-251 (241).

²⁴⁹ *Ibid.*

²⁵⁰ *Ibid.*

²⁵¹ Denmark *Grønne afgifter og erhvervene: midtvejsrapport Embedsmandsudvalget om grønne afgifter og erhvervene* Finansministeriet April 1994.

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new sulphur (SO₂) component was introduced. Therefore, the tax for businesses was increased to the standard rate of USD 17.60 (DKK 100)/tCO₂. In addition, the tax on businesses was divided into an energy source-specific sector which itself was split into different levels.²⁵²

Recycling, and with it tax neutrality, occurred through paying back the total revenues of CO₂ taxes to the business sector, where a large part was invested to reduce the labour market contributions paid by employers. Another smaller part was paid firstly to support expenses on energy conservation and secondly to improve the working environment in small companies.²⁵³

The introduction of the tax in 1995 provided that its efficiency had to be evaluated in 1998, in order to consider possible necessary amendments. In 1998 eco-taxes on households were increased once again as part of a fiscal initiative. In 1999, the Danish Ministry of Finance presented an ex-ante evaluation of the tax scheme.²⁵⁴ The result was that the CO₂ tax scheme had created a substantial environmental effect in an economically efficient way, while taking international competitiveness into consideration. It had reached the expected cutback in CO₂ emissions and reasons for amendments were few. Only a 5% deficit of the original, overall national CO₂ reduction target was discovered, which was based on the growth in the number of cars, and insufficient initiatives within the transport sector.

A study by Bjørner and Jensen provided a similar result.²⁵⁵ Business energy taxes decreased consumption by 10% between 1993 and 1997. Even voluntary agreements reduced energy consumption by 9%.

²⁵² *Op cit*, Fn. 248.

²⁵³ Hoerner and Bosquet *Environmental Tax Reform: The European Experience* Center for Sustainable Economy Washington February 2001 p. 12 [Online] http://www.rprogress.org/publications/2001/eurosurvey_2001.pdf accessed on 30 June 2010.

²⁵⁴ Finansministeriet 'Evaluering af grønne afgifter og erhvervene' Finansministeriet København februar 1999 [Online] <http://www.fm.dk/db/filarkiv/4620/hele.pdf> accessed on 4 March 2010.

²⁵⁵ Bjørner and Jensen *Industrial Energy Demand and the Effects of Taxes, Agreements and Subsidies* AKF forlag Copenhagen 2000 [Online] http://www.akf.dk/udgivelser/2000/pdf/industrial_energy_demand.pdf accessed on 10 April 2010.

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This is an interesting phenomenon, because it seemed that voluntary agreements (in return for reduced CO₂ tax payments) were as effective as taxes in reducing CO₂ emissions (As will be seen later, voluntary agreements and taxes in other countries did not necessarily have the same effect).²⁵⁶

In relation to the above, the statement of the current Danish Minister for Climate and Energy, Cornelia Hedegaard is not surprising: “Since 1981 we have had 70% growth in our gross domestic product, but our total energy consumption has been kept almost stable.”²⁵⁷

Again, in February 2008, the Danish government decided on a broader energy agreement, which led to a further increase of the CO₂ tax.²⁵⁸

The reason for that was, *inter alia*, the increase of GHG emissions in 2007, which were 4% above the 1990 level.²⁵⁹ By converting to cleaner energy and the introduction of quotas for the electricity industry’s CO₂ emissions, Denmark has made some progress towards complying with its Kyoto commitment. Unfortunately, it is not enough yet. But, it has to be kept in mind that emissions in the year 1990 were exceptionally low, since Denmark was able to import record amounts of hydro-electricity from Norway and Sweden in that year.²⁶⁰ Taking that into account, the reality is that GHG emissions have fallen by some 13% since 1990.²⁶¹

²⁵⁶ The VAIE (Voluntary Agreements – Implementation and Efficiency Project Programme)²⁵⁶ a broader study in five EU Member States about the overall implementation and efficiency of voluntary agreements caused a comparable outcome. The reason for this is that specific investments were speeded up by agreement plans. The investment would have been made by the companies anyway but they happened earlier because of the agreement. (Sander, Johannsen and Larsen *Voluntary Agreements - Implementation and Efficiency The Danish Country Study – Case Study in the Sector of Paper and Milk Condensing Copenhagen March 2000* [Online] http://www.akf.dk/vaie_en/papers/taskc_danish.pdf accessed on 22 February 2010.

²⁵⁷ Larsen ‘Denmark continues its renewable tradition’ in *Renewable energy focus* 2008 pp. 66-69 [Online] <http://www.renewableenergyfocus.com/view/843/denmark-continues-its-renewable-tradition/> accessed on 4 March 2010.

²⁵⁸ Denmark commits to overall energy reduction see: Government of Denmark *Denmark commits to overall energy reduction* fact sheet energy policy published by Ministry of Foreign Affairs of Denmark Copenhagen April 2008 p.1 [Online] <http://www.denmark.dk/NR/rdonlyres/3E7A0904-D320-4171-BE84-149EAF91334/0/FactSheetEnergyPolicy20082011.pdf> accessed on 10 April 2010.

²⁵⁹ European Environmental Agency *Greenhouse gas emission trends and projections in Europe 2008* EEA Report No. 5/2008 pp. 3 and 6 [Online] http://www.eea.europa.eu/publications/eea_report_2008_5/Trends_and_projections_2008_executive_summary.pdf accessed on 10 April 2010.

²⁶⁰ *Ibid*, p. 6.

²⁶¹ Danish Energy Agency *The Danish National Allocation Plan* [Online] http://www.ens.dk/en-US/ClimateAndCO2/national_allocation_plan/Sider/Forside.aspx accessed on 10 April 2010.

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Denmark is one of the countries with the highest CO₂ taxation in the world. The taxes have successfully reduced the CO₂ emissions, but a further increase to achieve more reduction is not wise. The reason for this is that there could be a cut in competitiveness and also an added burden on the individual. The only conceivable tax increase could be by increasing the five tax rates for energy sources.

Further reductions of emissions could either occur through the implementation of an international measure, or at least a multilateral approach, or by the combination of other measures like emission trade, incentives for using renewable energy and research and development measures concerning renewable energy and other CDMs.

The Danish approach as early as 1992 was brave and its implementation exemplary. The mastery of the competitive problem by introducing different tax brackets with the equal tax rate for space heating for individuals and businesses and the lower tax bracket for production processes was commendable. It stimulated technical changes in industries which led to less CO₂ intensive production.

4 United Kingdom

The reduction target of the United Kingdom under the Kyoto Protocol was 12.5% of GHG emissions between 2008 and 2012 compared to its 1990 levels. This included the reduction of about 210 million tonnes of carbon equivalent (MtCe) down to 186 MtCe.²⁶² This target was achieved by 1999. The emissions had been stabilised below that level. However the United Kingdom set itself a target of 20% carbon emissions reduction by 2010, in relation to its 1990 level.²⁶³ To facilitate this target the United Kingdom introduced the Climate Change Levy (CCL). It was first introduced in the Finance Act of 2000 and came into force in April 2001.

²⁶² Leicester *The UK Tax System and the Environment* The Institute for Fiscal Studies London 2006 p. ii.

²⁶³ This implies an additional cut, down to 129 MtCe. By 2003, industry accounted for 28.1 % of their total carbon emissions and transport for 27.3 %. It was assumed that traffic would become the largest emitter. To reduce the carbon content for the transport sector the UK increased the VAT on domestic fuel which was 5 % in 2007.

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It was considered to be the 'UK's most significant green tax to date'.²⁶⁴ It was calculated to earn GBP 1 billion in revenues and save 2 million tonnes in carbon emissions annually by 2010.²⁶⁵

The CCL can be characterised as an environmental tax, but it is not a carbon tax as such, as it is in fact a tax on energy usage. It is compliant with, and closely mirrors, the so called 'Energy Products Directive' – EC Directive 2003/96/EC of 27 October 2003. The tax subject is, in contrast to Denmark, industry, commerce and the public sector. Thus, the CCL is levied according to the amounts of energy consumed. In comparison to the Danish law, private households are not a tax target. The CCL is the counterpart of the emission trading system in the United Kingdom. The scope of the tax is designed for small to medium-sized businesses as they are not covered by the trade system. Therefore the tax is levied on supply (tax object) instead of energy usage as it is easier to differentiate between households and businesses and whether the user is domestic. Levying on the energy user makes the CCL a downstream tax. An upstream tax would have been levied directly on the generator which would have given them more and would also have been a direct incentive for changing to low emission energy sources such as renewable energy. However, a downstream tax makes differentiation easier.

To avoid a tax burden on small and medium-sized businesses, employers' National Insurance contributions were reduced by 0.3% to shift the tax burden onto energy and away from labour costs (tax recycling).²⁶⁶

The CCL contains different tax rates for the different types of fuel and their energy content.

²⁶⁴ Andrew 'Green Taxes – Why, What, When, Where?' *The Tax Journal* 2000 Vol. 569 pp. 5-6.

²⁶⁵ Varma 'UK's Climate Change Levy: Cost Effectiveness, Competitiveness and Environmental Impacts' *Energy Policy* January 2003 Vol. 31 issue 1 pp. 51-61 (59).

²⁶⁶ *Op cit*, Fn. 262 p. 64.

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Table 3.2 shows the rates of climate change levy, 2001 – 2009

Table No. 3.2

	Electricity	Gas	LPG	Solid Fuels
April 2001	0.43 p/kWh	0.15 p/kWh	0.96 p/kg (0.07 p/kWh)	1.17 p/kg (0.15 p/kWh)
April 2007	0.441 p/kWh	0.154 p/kWh	0.985 p/kg	1.201 p/kg
April 2008	0.456 p/kWh	0.159 p/kWh	1.018 p/kg	1.242 p/kg
April 2009	0.470 p/kWh	0.164 p/kWh	1.050 p/kg	1.281 p/kg

p=pence

The table indicates relatively low tax rates, with the highest rate for electricity - mainly as a result of considerable losses during the combustion, transmission and distribution process, combined with the fact that most electricity is currently produced via coal combustion.

Petrol, diesel and road fuel gas as well as mineral oil are exempt from the tax since a differentiation between private households and businesses would be administratively too expensive. Also electricity generated from renewable energy sources, waste solids and combined heat and power stages is exempt, in order to encourage a switch to renewable energy. According to sections 8 and 9 of the CCL the supply for charity use and of very small amounts is also exempt.²⁶⁷ For competitive reasons supplies which are not for burning in the United Kingdom were exempted in section 11.

Administratively the CCL is added to the energy bill before VAT, but unlike VAT it cannot be reclaimed.²⁶⁸ This is the easiest and most cost effective way to levy the tax since it requires only a small number of new tax officials because the structure is already there for other excise taxes such as VAT.

Accompanying the introduction of the CCL was a depreciation tax shield, (in the form of the Climate Change Agreement scheme or CCAs) designed by the government to allow for an

²⁶⁷ In addition, natural gas supplied in Northern Ireland was exempt (the Treasury argues that this was because the market was very small and gas is less polluting than alternatives such as coal and oil). This exemption was set to expire in April 2011.

²⁶⁸ McKerchar and Hansford 'Climate Change Post-Kyoto' in Chalifour, Milne, Ashiabor, Deketelaere, and Kreiser (eds) *Critical Issues in Environmental Taxation Vol. V* Oxford University Press 2008 pp. 855-871 (857).

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80% discount on levies for energy-intensive sectors, in return for agreements to reduce carbon emissions or reach pre-determined efficiency targets.

By the implementation of the CCL John Prescott, Deputy Prime Minister argued:

‘Climate change is undoubtedly one of our greatest environmental threats. We are determined to respond, but in ways, which emphasise gain, not pain. That is why we are offering a lower rate of levy for energy intensive energy users who sign up to energy efficiency gains. The government wants to work closely with industry to ensure that we meet our climate change objectives and improve energy efficiency in a way which helps rather than hinders our overall competitiveness.’²⁶⁹

The Department of Energy and Climate Change (DECC)²⁷⁰ and the trade associations help companies to create CCAs. These so-called ‘umbrella agreements’ detail, for instance, targets for energy use. The DECC website currently lists 54 umbrella agreements for industry sectors ranging from egg production to printing and brewing.²⁷¹

In essence CCAs are agreements negotiated with parties engaging in ‘energy-intensive’ processes to improve energy efficiency. Applicable parties were set out in the Finance Act of 2000 and Statutory Instrument 2000/1973 – regulations related to the Integrated Pollution Prevention and Control (IPPC) European Council Directive of 24 September 1996.²⁷² The IPPC objectives were to ensure prudent management of natural resources in compliance with a ‘polluter pays principle’ alongside the ‘prevention’ of pollution. Based on Hansford et al.²⁷³, no more than 60% of those to whom CCAs are applicable in the UK manufacturing industry have agreed to CCAs. These are mostly large companies, since small and medium-sized businesses do not have the time or financial resources required to engage in the negotiations required to establish and maintain a CCAs.²⁷⁴

²⁶⁹ *Ibid.*, p. 857.

²⁷⁰ Which actually took over the work from DEFRA.

²⁷¹ Department of Energy and Climate Change Climate Change Agreements: umbrella agreements, reduced rate certificates’ [Online]

http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/ccas/umbrella_ccas/umbrella_ccas.aspx accessed on 22 February 2010.

²⁷² *Op cit.*, Fn. 268 p. 857; the EU Council Directive was replaced by Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control.

²⁷³ *Op cit.*, Fn. 268 p. 859.

²⁷⁴ Marshall *Economic Instruments and the Business Use of Energy: A Consultation Paper* UK Treasury 1998 p. 8 [Online] <http://archive.treasury.gov.uk/pub/html/prebudgetNOV98/marshall.pdf> accessed on 10 April 2010.

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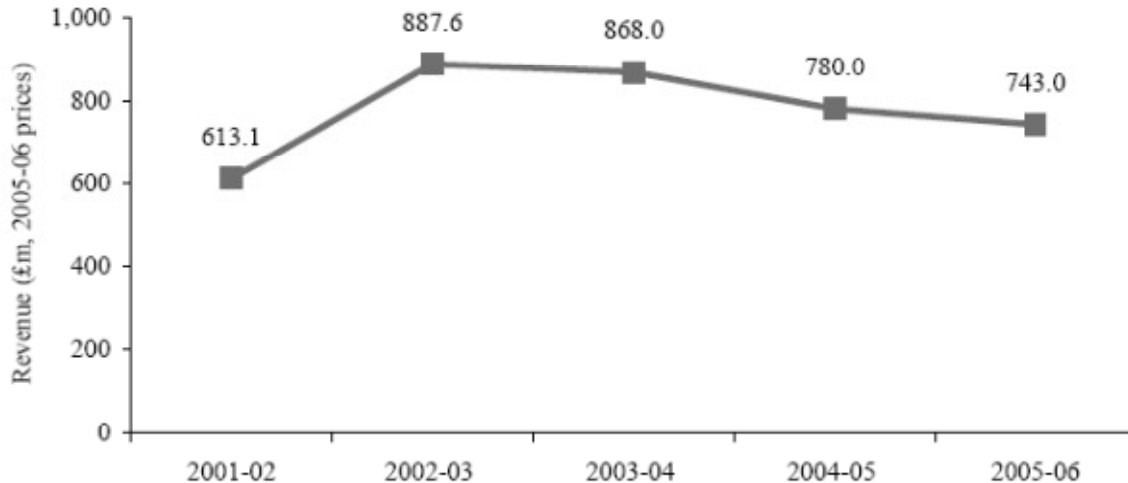
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To apply the CCAs to more small and medium-sized enterprises better assistance from the state should be considered. This could be achieved by special environmental development and support programmes which could be financed by the CCLs revenue. However, industries with a CCA are allowed to participate in the UK Emissions Trading Scheme, which will help them to meet their targets.

In 2001 the government gave a 100% corporation tax rebate on first year profits for investments made in energy saving technologies.²⁷⁵ The complete list²⁷⁶ of investments which currently qualify includes, *inter alia*, combined heat and power systems, boilers and heat pumps.

The expected revenue of GBP 2 billion annually was never reached. As Figure 3.1 shows, the expectations have been far too high.

Figure 3.1



Source: Leicester *The UK Tax System and the Environment* The Institute for Fiscal Studies London 2006 p. 66 (the figure for 2005/06 is projected).

About 75% of the total revenue comes from the supply of electricity, whereas 25% comes from the supply of natural gases; the generation of solid and other fuels in comparison is very small.²⁷⁷ Nonetheless, it seems that there is a move from electricity towards gas since the

²⁷⁵ *Op cit*, Fn. 262 p. 65.

²⁷⁶ *The Energy Technology List* [Online] <http://www.hoval.co.uk/docs/GB/PDFs/EnergyTechList.pdf> accessed on 25 July 2011.

²⁷⁷ *Op cit*, Fn. 262 p. 65.

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introduction of the CCL. The gas supply has been more or less constant at around GBP 200 million per year but the supply from electricity has fallen from GBP 640 million to GBP 530 million.²⁷⁸

Industrial pollution by emissions has fallen, but in the service industry the pollution from emissions has risen in the last three decades. This can be explained by the change in the UK economy from secondary to tertiary industries.²⁷⁹ Within the last three decades employment in the industry sector was reduced from 7.1 million to 3.3 million, whereas industrial output increased by about almost one-third and energy intensity decreased by more than 50%.²⁸⁰ The opposite can be seen in the service sector; here employment rose from 16.4 million to 24.1 million, the total output was almost doubled and the energy intensity decreased by roughly half.²⁸¹

Interestingly, a published report by the Cambridge Econometrics and the Policy Studies Institute concluded that as a result of the tax announcement, energy demand amongst non-industrial businesses had been reduced by about 1.2% in 2000 and 0.2% for the economy in its entirety.²⁸² It further estimated that the CCL would lead to an entire mitigation in energy demand of 2.9%.²⁸³

It is interesting that in the UK energy taxation alternative a domestic tax on households is not levied, as in other countries. The reason for this was the concern that such a tax would mostly affect low-income households. A study by Dresner et al.²⁸⁴ in which they simulated the implementation of a domestic energy tax at a similar rate to the CCL (approximately GBP 10/tCO₂) assessed that such a tax would create a revenue of about GBP 1.3 billion per year since the weekly payment per household would vary between 10 pence up to GBP 2 a week. Their calculation stated that an average household would lose approximately GBP 50/year or 0.22% of total income whereas the poorest households would lose approximately 0.5% of

²⁷⁸ *Op cit*, Fn. 262 p. 66.

²⁷⁹ *Ibid*, p. 67.

²⁸⁰ *Ibid*.

²⁸¹ *Ibid*.

²⁸² Cambridge Econometrics, University of Cambridge and Policy Studies Institute *Modelling the Initial Effects of the Climate Levy* Cambridge 2005.

²⁸³ The estimation included a rising rate of the CCL with inflation between 2005 and 2010. The report also stated that companies which agreed to a CCA seemed to exceed their targets.

²⁸⁴ Dresner and Ekins 'Economic instruments to improve UK home energy efficiency without negative social impacts' *Fiscal Studies* 2006 vol. 27 issue 1 pp. 47-74.

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income by paying *circa* GBP 37/year. In comparison the richest households would only lose approximately GBP 67/year which is about 0.1% of income. This is only an estimation and in general such a tax would never be introduced alone but with adjustment measures; for example the reduction of other domestic taxes such as income tax or social insurance contributions. Even so, according to Dresner et al. such a recycling measure would not help since about 20% of the poorest groups would still be negatively affected. As seen in other countries, and also discussed in Chapter Three, a tax on households does not have to be regressive. A solution could be found by either increasing the minimum subsistence levels and/or recycling the revenue by paying back parts of the money to the poorest part of the population; for example an annual payment of GBP 30/capita in cases of proven need. This could be achieved through cooperation between tax authorities and social welfare, although it would increase the administrative burden, especially in the first year of implementation.

It should be mentioned that the CCL tax rate for coal, if its rates were translated into an implicit carbon tax by taking account of the carbon content of the taxed fuels, is only half of the tax rate for gas and electricity.²⁸⁵ This shows the strength of the coal lobby in the United Kingdom. This could be changed by using an equal tax rate appropriate to the carbon content in the taxed fossil fuel source.

Nuclear power plays an important role in the revenue of the CCL. It is argued that if nuclear power were exempt from taxation, coal might gain a further reduction. A secondary motive for not including nuclear power from the exemption rule is that it would favour imports of electricity from France via interconnectors.²⁸⁶ Nonetheless, the inclusion of nuclear taxation in the CCL aimed to weaken dependence on UK nuclear power, not to support France.

It can be concluded that the introduction of the CCL was a big step for the United Kingdom in its fight against climate change but after almost ten years of levying the tax some changes or additions seem to be necessary. In particular, small and medium-sized enterprises should be better supported by the CCAs so as gain tax relief more easily. This is particularly important considering that it was decided not to introduce the CCL for private households in order to

²⁸⁵ Pearce 'The social cost of carbon' in Helm (edt) *Climate-change Policy* Oxford University press 1995 pp. 99-133(128).

²⁸⁶ OECD *Op cit*, Fn. 114 p. 114.

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avoid burdening the poorest individuals with such a tax. On the other hand it is mostly the small and medium-sized enterprises which are burdened by a higher CCL tax rather than big businesses.

In addition the tax should be levied on private households since they are the end users and as such it is necessary to encourage more environmentally friendly behaviour, which could lead to further changes in industry through changed demand. This tax could be introduced gradually, which would give households the chance to adjust their consumption. It could be supported by subsidies for environmentally friendly cars and heating methods. An adjustment for the poorest households would be necessary and would appear to be possible. An adequate method for the adjustment would have to be found. Additionally, the tax exemption of petrol, diesel and road fuel gas as well as mineral oil should be reconsidered.

5 Finland

Finland was the first country which implemented a tax based explicitly on carbon emissions in 1990, in addition to its already existing energy taxation. The analysis here will focus especially on the early years of Finland's energy and carbon taxation as it serves as a negative example. It will explain why the Finnish government changed its carbon tax system from input to output taxation.

Until 1996 Finland had a general, fiscally motivated energy tax, which included a CO₂ component. The basic energy tax was amended in 1990 by adding a carbon component which led to an increase in the use of some fossil fuels.²⁸⁷ The tax was then greatly increased in 1994. Oil and coal were taxed heavily whereas no tax was levied on gas and peat. An isolated examination concluded that 75% of the taxation was for carbon and 25% for the energy component; in comparison to the internal revenue which consisted of up to 60% of the CO₂ component.²⁸⁸

²⁸⁷ Law No. 1473/94 of 29 December 1994 (Eräiden energialähteiden valmisteverosta annettu laki).

²⁸⁸ Haavisto (Minister for the Environment) 'Energy Taxation in Finland' in: Bundestagsfraktion Bündnis90/Grünen (ed) *Eine Energiesteuerreform für Europa* Konferenzdokumentation vom 26.5.1997 Nr. 1370 Bonn pp. 32-34 (33).

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Taxpayers were the producers as well as importers of fossil fuels and their end products. It was interesting that before its revision of the tax in 1996, Finland taxed electricity by its input. Despite the carbon component, electricity which was produced by nuclear power plants was taxed more than twice as much as electricity manufactured in hydropower stations. The reason for that was to achieve a reduction of nuclear produced electricity and nuclear power plants, a typical trend in Western Europe after the nuclear accident of Chernobyl.

Concerning the carbon component of the tax, imported electricity had approximately a 55% higher rate than hydropower, and nuclear power was taxed at the same level as imported electricity.²⁸⁹

Surprisingly Finland's tax levied on imported electricity were implemented in a different manner to that of domestic electricity; namely about 13% lower than comparable internal products.²⁹⁰ Why did Finland choose this way? A possible explanation might be Finland's attempt at reducing its own carbon emissions by importing energy-intensive electricity from other countries. While this might lead to lower emissions it would, in turn have led to increased dependency on other countries.

Electricity produced by fossil fuels was not taxed so as to avoid double taxation. This was unusual since it was more common to tax electricity rather than the inputs (fossil fuel). Therefore, Finland only taxed specific electricity manufacturing processes and omitted others, such as the use of wind energy which had been issued in order to increase renewable energy production.

Thus, Finland had an input-tax system, which was considered fairer and it became easier not to support nuclear power. In comparison, an output tax would have been levied on the energy use itself and not on the energy source.

Compared to the taxes levied in neighbouring countries, Finland's basic tax rate was almost constant for most energy sources, whereas others had a slight increase. The tax rate on the

²⁸⁹ OECD *Environmental Taxes in OECD countries* Washington and Paris 1995 p. 31.

²⁹⁰ Jenzen *Energiesteuern im nationalen und internationalen Recht: eine verfassungs-, europa- und welthandelsrechtliche Untersuchung* Peter Lang Verlagsgruppe Frankfurt am Main Berlin Bern New York Paris Wien 1998 p.73.

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carbon component, in contrast, was dynamic for some energy sources and increased in the time between 1993 and 1995 for others. For example, leaded petrol increased 1.4 times, heavy oil 2.8 times, coal 3.5 times, nuclear power 3.6 times and, surprisingly, gas 4.6 times.²⁹¹

Administratively, the carbon tax was added to the general energy source tax on electricity from power and hydro plants, and was also levied on imported electricity.²⁹²

When Finland joined the European Union there was a problem with this energy tax system since the tax rate for imported electricity was measured on the average tax charged on domestic electricity. This average peak rate soon led to judicial proceedings in the European Court of Justice,²⁹³ since the tax for some imports was higher than for domestic energy (especially in the field of renewable energy). Then again, the domestic tax for nuclear power was higher than for imports. This differing taxation was not acceptable in a united Europe and finally the court decided that the Finnish import energy tax on electricity of 1994 was unconstitutional.

A positive factor was that the law did not include any exemptions or reductions for the industrial sector until 1996. This can be explained by Finland's hope that other countries would do the same by taxing inputs instead of outputs. Most of the OECD countries would have had to follow this lead in order to avoid inevitable failure. In the beginning, the lack of tax exemptions, especially for the energy-intensive industries, could have been justified because of the moderate tax rates, but with the high increases between 1993 and 1995 this was not possible. At this stage the government decided to change the entire energy taxation system from the beginning of 1997. This was mainly because of the weakness of Finnish competitiveness, especially as related to the coal market.²⁹⁴ Furthermore, Finland had to realise that neighbouring states such as Denmark, Norway and Sweden, as well as other competitors, had not introduced a similar type of taxation, which brought with it an energy price increase, without an adjustment by including tax exemptions.²⁹⁵ Thus, the government

²⁹¹ *Ibid* p. 74.

²⁹² *Op cit*, Fn. 289.

²⁹³ Report of the European Court of Justice *Outokumpu Oy Reference for a preliminary ruling: Uudenmaan lääninoikeus – Finland Excise duty on electricity - Rates of duty varying according to the method of producing electricity of domestic origin - Flat rate for imported electricity* Case (C-213/96) I-01777 2 April 1998.

²⁹⁴ *Op cit*, Fn. 288.

²⁹⁵ *Ibid*.

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changed the energy tax by adjusting it to a similar system as that used by its neighbouring countries.

The tax was transformed from an input into an output tax, which included consistent taxation of electricity consumption, levied on the final consumer.²⁹⁶ The former energy source tax was replaced by a new electricity consumption tax. To avoid competitive problems the new energy tax system included rebates for the Finnish industry.²⁹⁷ The only remnant of the former tax system was the taxation of the energy sources used for the generation of heat and transportation. These remained directly taxed and their measurement was based only on their carbon footprints and no longer on energy. Tax reductions were included, *inter alia*, for gas and peat.

The new tax was split into two basic categories: mining, manufacturing and the greenhouse cultivation sector of GHGs are taxed less (FIM 25/MWh), whereas agriculture, services and households, etc, are taxed more (FIM 41/MWh).²⁹⁸ The object of the tax is domestic and imported electricity. Tax reductions are included, especially for renewable energy. This general structure of energy taxation in Finland has remained unchanged since 1997.²⁹⁹ This speaks for the acceptance of the system within the country and Finland does not seem to have competition problems.

The carbon tax component of fuels used for heating and transportation has been 20 EUR/tCO₂ (75 EUR/tCO₂ since January 2008).³⁰⁰ According to the web page of the Ministry of Environment, the most recent changes – as from 1 January 2008 – are:

- the increase of the tax rates by 9.8% on average
- increase in carbon surtax by 13%
- the exemption of biofuel oil used in working machines or heating
- the repeal of exemptions for leisure aviation, pleasure yachting and waste oil.

²⁹⁶ *Ibid.*

²⁹⁷ *Ibid.*

²⁹⁸ *Ibid.*

²⁹⁹ Environmental Administration *Environmentally related energy taxation in Finland* [Online] <http://www.ymparisto.fi/default.asp?contentid=299288&lan=EN> accessed on 4 March 2010. Furthermore see Appendix no. 2 for details.

³⁰⁰ *Ibid.*

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In conclusion, it can be said that the first version of the Finnish energy taxation was the way most preferred by exponents of an environmentally related energy tax reform, which was seen as the most effective one. It was levied on input which granted a precise distinction and taxation of CO₂ emissions. However, this approach was, especially without tax exemptions for the energy-intensive industries, non-competitive. The prevention of competition problems by the introduction of such a tax by only one state, or a small number of states, seems only to be possible by granting tax exemptions and tax shelter, but this did not take place. Such input tax would only be beneficial if it was implemented by all, or at least most of the OECD countries together, to avoid competitive distortions. Unfortunately, it has to be realised that in an open energy market an input tax system weakens the competitiveness of the domestic energy producer, and the rest of the industry. (As seen above it was one of the reasons why the European Union energy tax law took so long to be implemented and was so watered down). According to this, the most effective way to internalise external effects in Finland, was considered politically impossible in a global market. It can also be seen as an interesting example in our current global energy market which demonstrates that the realisation of a border tax adjustment for an input taxation would be very difficult and administration-intensive if it was carried out correctly; instead, approximation procedures should be used.

6 Switzerland

The Swiss government wanted to introduce an emission-related carbon fee as early as 1994. The initiative included a gradually implemented tax rate on fossil fuels; for example, on petrol it was approximately 3 centimes/litre in the first year and after five years, 8 centimes/litre. The plan integrated revenue neutrality, which should have been achieved by returning about two thirds of the tax income to households and companies and the other third for the implementation of environmental measures. But the proposed tax did not obtain the required majority. Thus the Federal Council of Switzerland developed a revised strategy to mitigate carbon emissions, which was introduced as a draft in March 1997. The general CO₂ law came into force on 1 May 2000.³⁰¹

³⁰¹ Bundesgesetz vom 8. Oktober 1999 über die Reduktion der CO₂-Emissionen (CO₂-Gesetz).

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The Swiss CO₂ law contained three specifics in comparison to other carbon (framework) laws. First, it included a fixed amount of emission targets. Secondly, the implementation of a CO₂ fee should only occur as a secondary measure, if other measures did not fulfil the pre-defined target. Thirdly, the law included a consequent compensation component which did not seem to have a fiscal nature.

The CO₂ law provided that Switzerland would reduce its carbon emissions in 2010 by 10% of the 1990 level. The Swiss have repeated this commitment by signing and ratifying the Kyoto Protocol which includes the commitment to reduce their emissions at least by 8% of the 1990 level.³⁰² It was planned to achieve the mitigation level mostly through voluntary measures. Only if these measures were not enough, would the Federal Council of Switzerland introduce a carbon levy in the form of an incentive charge (which was allowed to be implemented at the earliest in 2004). It became clear by 2005 that the voluntary measures were not successful. Finally, Switzerland introduced the CO₂ levy on 1 January 2008, after experts had become doubtful that the Swiss would be able to achieve their target. In 1990 GHG emissions were 53.3 million tonnes; in 2000 they were still 52.7 million tonnes.³⁰³ According to the 2009 key statistics of the International Energy Agency,³⁰⁴ the CO₂ combustion for fuel was only 42.18 million tonnes in 2007.

The CO₂ charge is levied on fossil fuels of CHF 12³⁰⁵/tonne. This is in accordance with an amount of approximately 3 centimes/litre of heating oil and 2.5 centimes/cubic metre of gas.³⁰⁶ The Swiss government planned to increase the rates in 2009 and 2010, each time by CHF 12, if the carbon emissions had not fallen below a specific percentage of the 1990 level.³⁰⁷ Taxpayers are households and industry: the law does not differentiate between them in general. The revenue generated from this charge is returned in two ways.

- The public enjoys the advantage of a reduced health insurance fee.
- Industry gains from a proportional decrease of the Swiss social insurance.

³⁰² Switzerland ratified the Kyoto Protocol on 28 August 2002.

³⁰³ Swissworld *climate policy* [Online]

http://www.swissworld.org/en/environment/climate_change/climate_policy/ accessed on 10 March 2010.

³⁰⁴ International Energy Agency *Key World Energy Statistics 2009* Paris 2009 p. 56.

³⁰⁵ Swiss Franc. Switzerland is not a Member State of the European Union.

³⁰⁶ Honauer with Hutter and Di Costanzo 'CO₂-Abgabe – Eine aktuelle Auslegeordnung Umverteilung über AHV und Krankenkassenprämien' *Der schweizer Treuhänder* 2008 pp. 164-168 (164).

³⁰⁷ Art. 3 Verordnung über die CO₂-Abgabe (CO₂-Verordnung) vom 8. Juni 2007.

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The revenue which is recycled, is calculated independently of the respective CO₂ emissions and based on ‘the insurance for old age, the disabled and survivors’ through the social security system. This leads to an advantage for employment-intensive industries and for companies with small amounts of CO₂ emissions.

The levy is charged by the federal customs authority. It is levied at border crossings or at removals from toll free storage. The supplier has to disclose the amount of CO₂ levy separately, which is included in the invoice total.

Recycling of the revenue started in 2010 when the income of the CO₂ levy of 2008 had been returned to industry and households (origin principle). For industry, payback was arranged by the Federal Compensation Fund. For private persons the return occurred through a reduction of the health insurance rate. Interestingly the Swiss government changed the payback modalities in 2009 to strengthen its economy. The income from the CO₂ levy for the years 2008 – 2010 was returned in 2010. From 2011 onwards the payback is not going back to the original mode as it would create an undesired economic gap but continues the return distribution without interruption. The money will be returned within the same year as its collection.

Energy-intensive companies can apply for an exemption from the CO₂ charge (Article 5ff). A necessary requirement to apply for the exemption is that the company is a global player. Companies that want to be exempted need to submit a proposal to the Bundesamt für Umwelt (BAFU). According to Article 9, paragraph 2, of the CO₂ law of 2000, only specific companies can apply for such an exemption:

- big businesses,
- multiple users of combined fossil fuels and
- energy-intensive industries when their CO₂ charge burden is more than 1% of their gross production value.

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Before the implementation of the carbon levy more than 600 enterprises already had mitigation agreements on a voluntary basis with the Energy Agency of Economy (EnAW).³⁰⁸ A large number of these enterprises have applied for a waiver of the charge, especially companies working in the energy-intensive sector such as ceramics, glass, paper, chemicals, metal, engineering, plastics, aluminium and food. To receive such a tax exemption for the year 2009, two application possibilities were provided: either the application had to be submitted before 1 September 2007 or the submission of a proposal for carbon mitigation, together with a waiver application, before 1 September 2008. The proposal³⁰⁹ in general had to be prepared in cooperation between the enterprise and the EnAW.

If the waiver was accepted then the enterprise could apply for a tax return with the Federal Custom Authority.³¹⁰ Also necessary for the return was that it had to be submitted in due time and it could only be granted if the amount reclaimed exceeded a limit of CHF 100. If the compliance with the reduction aim was at risk the Federal Custom Authority, after consultation with BAFU, had the right to withhold the payback until it was clear that there was no longer any risk.

Further distinctions between exempted enterprises were made concerning the type of waiver which could be granted with or without any target agreements.

Enterprises which already had voluntary target agreements needed to transform them into legally binding agreements. According to Article 7, the scope of the reduction was based, *inter alia*, on the reductions already realised in the period from 1990 onwards and the potential residual reduction. Technically reductions could only be given if the enterprise was profitable and economically justifiable. Once agreed upon, the enterprise would receive emission rights³¹¹ from the federation on the amount of CO₂ which, according to the agreement, the enterprise was allowed to emit. The emission rights would be valued by the enterprise on a yearly basis in relation to the amount of effectively emitted carbon. If the carbon emissions of an enterprise were lower than the agreed amounts it would be possible to

³⁰⁸ Schweizerische Eidgenossenschaft *Faktenblatt 3 zur CO₂-Abgabe - Befreiung von der CO₂ Abgabe* Bundesamt für Umwelt (BAFU) 8 Juni 2007.

³⁰⁹ Details about it can be found in Articles 6 to 8 of the CO₂ charge.

³¹⁰ More details can be found in Article 13 of the CO₂ charge.

³¹¹ For more details see Article 12 of the CO₂ charge.

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sell the excess rights. If, on the other hand, the carbon emissions of the company were above the committed allowance, then a purchase of more emission rights from other companies, which were under their limited targets, would be necessary. To a limited extent it was possible to buy foreign carbon certificates as well.³¹²

To arrive at a target agreement and receive an exemption was difficult for small enterprises, since an application was only possible when the emissions were at least 250,000 tonnes of CO₂.³¹³ But it was possible for companies with low carbon emissions to fulfil the emission requirements through an interconnection of multiple enterprises. This simplifying option enabled them to fulfil their reduction obligations. The EnAW has developed different models of target agreements for small to medium-sized enterprises (the energy-model, the small to medium-sized enterprise model and the benchmark-model).³¹⁴ Two of the three models envisage the formation of groups, which are, in general, developed with the help of the inter-trade organisation. These groups are juristically treated as single associations for which it is necessary to prove and measure their liability risk.

The Swiss Federal Office of Energy has developed an Excel sheet that simulates a variety of situations in order to enable industrial and service companies to estimate the financial impacts of a CO₂ charge.³¹⁵ (For further information see Appendix no. 3-5)

According to press releases in July 2009, Switzerland did not fulfil its own set emission targets.³¹⁶ As a result, the carbon charge rates have been tripled from 1 January 2010 onwards which means, among other increases, that the fee is 9 centimes/litre of heating oil instead of 3 centimes.³¹⁷ Furthermore, it is planned that approximately CHF 200 million of the carbon fee revenue will be used for modernising insulation of buildings. Therefore new regulations have been included, see Article 28a-j.

³¹² Article 18.

³¹³ Art 5(3).

³¹⁴ *Op cit*, Fn. 308.

³¹⁵ Schweizerische Eidgenossenschaft *Calculation tool for CO₂ fee* [Online]

<http://www.bfe.admin.ch/energie/00572/00573/00626/index.html?lang=en> accessed on 10 March 2010.

³¹⁶ The target for 2008 was 86.5 % of the 1990 level. The real amount was 88.8 percent of the 1990 level.

³¹⁷ NZZ Online *Nachrichten Schweiz: Dreimal höhere CO₂-Abgabe ab 2010* 19 Juni 2009 [Online]

http://www.nzz.ch/nachrichten/schweiz/dreimal_hoehere_co2-abgabe_ab_2010_1.2771709.html accessed on 22 February 2010.

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As shown above, the CO₂ charge is revenue-neutral, but is expected to lead to a change in pollution behaviour and environmental awareness, especially since the rate has tripled. Before the increase, it was too small to achieve the required change in behaviour.

A disadvantage of the fee is that it is only levied on oil and gas for heating purposes and not on all fossil fuels. Petrol and coal in particular, should be charged, since coal is the fossil fuel with the highest emissions.

The charge is levied equally on industries and individuals (as long as there has been no exclusion through a target agreement).

The recycling guidelines are commendable, but must be revised each year, because the annual revenue can only be estimated as it has no fixed size and is thus subject to variability.

7 Germany

Germany introduced its ecological tax reform (ETR) in 1999. Its concern was to combine environmental protection, in particular the mitigation of GHG emissions, with the reduction of labour costs, especially the reduction of the statutory pension contributions, in order to increase employment. Before the ETR was introduced, Germany had established a systematic approach to environmental taxes; ecological measures existing mostly in the form of command and control measures, subsidies, administered prices, or negotiated voluntary agreements. Motor vehicle tax, the mineral oil tax (on fuels utilised for road transport) and taxes charged for road usage by heavy goods vehicles were all taxes with an ecological impact. Prior to the introduction of the ETR in 1999, the mineral oil tax made up approximately 8% of the total tax revenue in Germany.³¹⁸ Political representatives, unions, environmental NGOs and scientific research institutes were involved and discussed the implementation of the ETR.

The ETR was implemented through changes in existing laws, which introduced a five-step increase of fossil fuels and electricity over a period of five years.³¹⁹ It came into force, with its

³¹⁸ Bach 'Ökologische Steuerreform in Deutschland' Rudolph and Schmidt (edt) in *Der Markt im Klimaschutz* Metropolis Verlag Marburg 2009 pp. 19-47 (24).

³¹⁹ BMF Gesetz zum Einstieg in die ökologische Steuerreform; Gesetz zur Fortführung der ökologischen Steuerreform.

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first step, in April 1999, followed by steps two to five in the beginning of each following year.³²⁰ It included a reduction of 10.23 cents on the tax on heavy oil for generating electricity, whereas the tax on heating oil increased to 17.89 cents/tonne (which was an addition of 2.56 cents to the existing tax on heavy oil for generating heat).³²¹ Furthermore, road fuels were taxed by 3.07 cents/l and electricity by 1.02 cents/kWh, light heating oil by 6.14 cents/l (which was an increase of 2.05 cents/l) and natural gas by 0.35 cents/kWh (which was 0.17 cents/kWh extra).³²² Different tax rates were established to prevent market alterations between the different energy sources. The increases in the following four years were similar but with a smaller increase on road fuels (only 3.0 cents/year) and electricity (0.26 cents/year).³²³

Tax exemptions were included for production industries, as well as the agricultural, fishery and forestry sectors and companies employing disabled people. They were allowed a reduction of up to 80% of the tax if a minimum consumption of 50,000 kWh/energy source was exceeded.³²⁴ Furthermore, the production industries could apply for an additional net compensation as soon as their additional tax burden from ETR was 1.2 times higher than the tax reduction resulting from the decrease of the statutory pension contribution.³²⁵ Another sector which qualified for the 80% reduction was the mineral oil and natural gas power stations³²⁶ (since coal was not taxed), and at least a 50% reduction of the tax rate was awarded to public transport for electricity and mineral oil usage. The granting of the tax reduction for public transport was implemented to promote the use of a well-developed public transport system in Germany.

Another tax change was introduced in 2004 which implemented an increase in tax on natural gas by 0.55 cents/kWh, on liquid gas up to 60.60 EUR/1.000kg and on heavy heating oil by

³²⁰ Law on the Continuation of the ETR.

³²¹ Beuermann and Santarius 'Ecological tax reform in Germany: handling two hot potatoes at the same time' *Energy Policy* 2006 Vol. 34 pp. 917-929 (920).

³²² *Op cit*, Fn. 319.

³²³ *Ibid*.

³²⁴ Whereas a minimum of two energy sources was required.

³²⁵ *Op cit*, Fn. 319.

³²⁶ Heat and power plants, highly efficient gas-steam power-plants and night storage heaters in households have had special exemptions as well.

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7.11 EUR/1.000kg; in addition exemptions in the industrial field were decreased. Exemptions were reduced from 80% to 40% in the production industries.³²⁷

Another major change was that 95%, no longer 100% of the tax revenues were refunded, which led to a reduction in the subsidy of the statutory pension contributions.³²⁸ These, plus some other small changes, led to a revenue increase of about EUR 1.4 billion.³²⁹ About EUR 1 billion on average went into the general budget instead of promoting renewable energy projects, or on granting money for other tax recycling measures.

The ETR of 1999 was replaced in 2006 by the new Energy Tax Law. A tax on coal for heating purposes was introduced, according to the minimum rates implemented by the European Union (Energy Products Directive 2003/96/EC).

Table: 3.3

energy source	quantity unit	tax rate	increase by ETR			energy tax	total increase		
		before				law	between		
		01.04.1999	1999	annually	2003	2006	1999 and 2006		
				2000-03			(cumulative)		
	(QU)	Cent/QU	Cent/QU	Cent/QU	Cent/QU	Cent/QU	Cent/QU	Euro/GJ	Euro/tCO ₂
transport fuels									
benzine	l	50.10	3.07	3.07			15.35	4.74	65.87
diesel	l	31.69	3.07	3.07			15.35	4.29	57.97
gas (heating purpose)	kWh	0.19	0.164		0.200		0.364	1.01	18.04
heating oil (light)	l	4.09	2.05				2.05	0.57	7.77
heating oil (heavy)	kg	1.79			0.71		0.71	0.18	2.31
coal (heating purpose)	GJ					33.00	33.00	0.33	3.24
electricity	kWh		1.02	0.26			2.05	5.69	37.96

Source: Bach 'Ökologische Steuerreform in Deutschland' Rudolph and Schmidt (edt) in *Der Markt im Klimaschutz* Metropolis Verlag Marburg 2009 pp. 19-47 (28)

The tax is still mostly levied on road fuels as well as electricity, whereas fuels used for heating purposes were at the time taxed at a moderate level since the taxation of coal for heating purposes was exempt until the end of 2010. It is interesting that vegetable oil is taxed to avoid its usage as petrol or a heating oil replacement.

A waiver for renewable energy can only be granted if the producer is using the electricity himself or it can be proved that the electricity originates from a grid which is exclusively

³²⁷ *Op cit*, Fn. 321.

³²⁸ *Ibid.*

³²⁹ *Ibid.*

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supplied by renewable energy. The former tax reduction for night storage heaters used in households expired at the end of 2006. On the other hand, since the introduction of the energy tax law in 2006, the agricultural industry has been able to apply for the additional net compensation which previously only included the production industries. The former taxation of gas and heating oil power stations was removed. Furthermore, some energy-intensive processes, for example the production of glass, ceramics, cement, lime, asphalt and fertilisers, methods of metal production, chemical reduction methods, methods of electrolysis, the dual usage of fuel for roads and heating, and other items as well as thermal waste and discharged air treatment were completely exempted.

In principle the ETR was, and the new energy tax is, designed to be revenue neutral except for the relatively small, though increasing, amount which is spent on renewable energy projects³³⁰ and other small sums which go into the general budget. The residual revenue is still being used for a gradual reduction in statutory pension contributions so they are on an equal level for employers and employees.

Table: 3.4

measure	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
					revenue usage of ETR bn Euro					
additional revenue by mineral oil and electricity tax	4.3	8.8	11.8	14.3	18.7	18.1	17.8	17.4	17.8	18.0
revenue usage:	4.6	8.5	11.4	13.9	16.6	16.5	16.4	16.1	16.2	16.0
benefits of social pension fund	4.5	8.4	11.2	13.7	16.1	16.0	15.9	15.5	15.6	15.4
law for the taxation of future senior citizens' financial assets					0.4	0.4	0.4	0.4	0.4	0.4
aid programme for renewable energy	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2
balance	-0.3	0.3	0.4	0.4	2.1	1.6	1.4	1.3	1.6	2
					calculated contribution rate recovery of social pension fund %-point contribution rate					
Change of contribution rate of social pension fund	-0.6	-1.0	-1.3	-1.5	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7
					calculated increase of the current annuity value %					
change by social fund adjustment	0.00	0.00	0.62	0.83	1.17	1.17	1.17	1.17	1.17	1.17

Source: Bach 'Ökologische Steuerreform in Deutschland' Rudolph and Schmidt (edt) in *Der Markt im Klimaschutz* Metropolis Verlag Marburg 2009 pp. 19-47 (28)

Points of criticism were, for example, the inconsistencies in the design of the ETR, in particular with regard to its exemptions. Criticism increased when the new energy tax law was

³³⁰ In 1999 and 2000 EUR 102 million/year, in 2001 EUR 153 million, in 2002 and 2003 EUR 190 million/year, in 2004 EUR 200 million, in 2005 EUR 220 million and in 2006 EUR 230 million were used to promote renewable energies.

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implemented and with it the inclusion of energy-intensive companies for a surplus settlement (Spitzenausgleich). This settlement destroyed the higher steering effect (which lay in the reduction of the tax rate for the production industries from 80% down to 40%) of the new energy tax almost completely.

Acceptance of the ETR was low and the public did not understand why revenue was not used for environmental projects. Far from it, it was believed that the revenue flowed automatically into the general budget, instead of reducing or stabilising pension contributions.

Another point of criticism was that public officers and judges who are not subject to, and accordingly do not have to pay, pension contributions nevertheless have to pay the higher tax burden but are not part of the revenue compensation. As a consequence it has been recommended by Beuermann and Santarius³³¹ that the use of the revenue should be changed into a per capita environmental bonus system.

In general, after a while, the public forgets the recovery of tax and only sees the burden. Beuermann and Santarius had an interesting idea to keep the ETR compensation mechanism fresh in everyone's mind by including ETR-related tax savings on salary and wage slips.³³²

Another point of criticism was the tax on electricity produced by renewable energy for household use. Taxing renewable energy is counterproductive because it increases public suspicion that the tax reform was only another tax increase to raise the general budget.

Also, industries preferred voluntary agreements, as implemented in other countries, rather than a tax reform, since the agreements would give industries more problem-solving measures and a more flexible time period to achieve the changes.

The ETR has led to a permanent change in the German tax system which will not be rescinded. Its implementation has achieved a revenue resource and an adjustment of the pension contribution as well as an increase of the pension itself. The success of the tax, from an environmental view, is hampered by the consideration of competitiveness however, in spite of

³³¹ *Op cit*, Fn. 321 p. 922.

³³² *Ibid* p. 927.

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criticism, the ETR has led to a 2-2.5% annual reduction of carbon emissions on a middle-term basis.³³³

Further reform could help to iron out the points of criticism and help to adjust the tax system and the emission trading system. Furthermore a general exemption of electricity generated by renewable energy and considerable promotion for the system and its environmental friendliness would help to bring it closer to the public. In addition, other more environmentally neutral transport solutions or alternatives to petrol (renewable) have to be found (for example the electro car³³⁴). To achieve this aim it is necessary to support more research and development in the field of renewable energy than is done currently, otherwise Germany will lose the leading role in this science.

Additionally, it would be preferable to have a tax rate in relation to the carbon emissions of the product used, which is difficult, as we have seen in the analysis of Finland. I would also recommend the reduction of exemptions and implement a structural change in revenue usage which should include a greater part for research and development projects as well as a different payback system, either by reducing income taxes or maybe by implementing a per capita environmental bonus system.

8 Czech Republic

The Czech Republic started the implementation of its first air emission charge in 1967.³³⁵ A later system of economic instruments included, among others, air emission charges, sewage

³³³ *Op cit*, Fn. 318 p. 34.

³³⁴ In some EU countries, one gets from the state up to EUR 5,000 when buying an electric car. This concept will not be applied in Germany. Instead, after the summit meeting a resolution was passed between research, the automotive industry and federal government to fund the research and development in this technology. It was decided to promote the development of electric cars. Particular attention would be given to the development of the batteries, which currently represent one of the biggest drawbacks for this kind of car. They are large, heavy and do not take up enough energy. It should also be observed, that electric cars, in spite of the hype, are not more environmentally friendly than small gasoline or diesel engines, since most of the energy in Germany is still generated by coal power plants. So the CO₂ emissions are not necessarily lower. The federal government will provide up to EUR 500 million for research in the next ten years, which is small by international standards. It is intended that in the same period up to 1 million electric cars will be on the road in Germany. This will probably be only 2%, however, compared to traditional vehicles.

³³⁵ Vojáček and Klusák *Resource productivity, environmental tax reform and sustainable growth in Europe (pertE) Environmental tax reform: qualitative research in the Czech Republic* 2007 pp. 62-70 (62).

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charges, water pollution and mining charges and was introduced in the early 1990s and changed at the end of 2007.³³⁶

In 2001 the Czech Government discussed the proposal for ETR that was drawn up by the Ministries of Finance and Environment in 2000.³³⁷ The only result was an increase in excise duty rates on motor fuels e.g. EUR 0.42–0.49/l for petrol, EUR 0.14/l for diesel oil, and EUR 0.12/l for LPG) and simultaneously the income tax was decreased by 7% to 24% in 2006.³³⁸ An additional environmental tax reform draft was created in late 2003 and subsequently amended twice. Once the Czech Republic joined the European Union in 2004, they were bound by the Directive 2003/96/EC but received an exemption until the end of 2007 for the implementation thereof and designed a new Energy Tax Act to fulfil its duties as an EU Member State, which was introduced on 1 January 2008.³³⁹

- Fossil fuels were subject to a rate of EUR 0.3/GJ of gross calorific value, which would increase the price of solid fuels per household by around 10%.
- Natural gas was taxed by EUR 1.1/MWh of gross calorific value.
- Electricity was levied by a tax of EUR 1/MWh, resulting in an estimated 1% increase. Electricity generated from renewable energy sources was exempted.

³³⁶ Especially after 1993, when the public finance reform act came into force, environmental taxes became an issue in the Czech Republic. The public finance act appointed the specific degree in which environmental taxes could be implemented. In the beginning, the discussions about environmental taxes were only about the protection of the environment. In later stages the plan was to develop a whole environmental tax reform in return for lowering labour taxes.

³³⁷ *Op cit*, Fn. 335 p.63.

³³⁸ *Ibid.*

³³⁹ *Ibid.*

The Government included exemptions to the EU framework, of which some were:³⁴⁰

- natural gas used for the heating of households,
- if district heat (combined heat and power) is the source,
- heat and power from methane and nitrogen fuel cells (renewable energy sources),
- compressed natural gas used in vehicles,
- electricity used for rail traffic,
- coal as electricity production source.

The tax act distinguished between three different kinds of goods.

- i. Energy products not taxed would be sold between licensed wholesalers. Wholesalers would have to apply for a licence to make use of this tax exemption. The products would then be taxed at end user level.
- ii. Energy products taxed would be those purchased by end consumers (households, producers or service providers).
- iii. The possibility of exemption for energy products existed, depending on the purpose for which the product was utilised and the nature of the consumer. In order for producers and service providers to buy exempt electricity, either gas or coal, they needed to apply for a licence. This was mostly applicable to the mineralogy and metallurgy industries.

The implementation of an energy tax was laudable. Nonetheless, there are some points of criticism which might result from the short implementation time for the new tax. Topics such as the way an 'international market of energy products should work' or 'possibilities of exemptions for energy taxes' have been discussed but not always with satisfactory effects.

³⁴⁰ *Ibid*, p. 64.

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The tax exemptions are too wide. None of the taxpayers should be allowed to buy exempt electricity, especially that produced by coal. A reduced tax rate, if any reduction at all for such electricity should be implemented.

Problematic in the issuance of licences for buying energy products tax free, is that this is done ex-post which has a retrospective effect. It is unclear how to categorise the taxpayers who uses both tax free and taxable electricity. An additional tax return could be initiated for products which have been taxed, although they belonged to the products purchased without tax. Public hearings have been arranged by the Ministry of Finance to address the issues and challenges of the new energy act. Restrictions have been set in terms of any changes that are made. The sole purpose should be to clarify the wording of the act, without the subject of the tax and potential tax exemptions being altered.

Accordingly, it is to be hoped that phase II (which will focus on the transformation of air emission charges into environmental (carbon) taxes and the fiscal neutrality of fulfilment, which will come into force between 2010 and 2013) and phase III (which should come into force between 2014 and 2017) of the environmental tax reform in the Czech Republic which will be focused on transformation, is clearer and has fewer inconsistencies.

9 Spain

Compared to the rest of the European Union and its environmental taxation, Spain has a unique system. In Spain carbon is not taxed federally but in some of the ‘Autonomous Communities’.³⁴¹

The power to levy taxes is the domain of the central government (‘State’³⁴²) and the 17 autonomous regions. Autonomous towns and local governments have limited power in levying taxes.³⁴³ Regional parliaments are empowered to levy their own taxes, as long as the

³⁴¹ Spain is split into 17 autonomous regions and two autonomous towns. Each autonomous community has its own parliament, with the power to enact laws.

³⁴² Spain has a central government which is called the ‘State’. At the central government level the power to impose legislation is vested in ‘las Cortes’ which is composed of a Congress or Lower House and the Senate.

³⁴³ Marsilla *Guide to Spanish Tax Law Research* p. 3 [Online] <http://www.uv.es/ibanezs/SpanishTLRG.pdf> accessed on 10 March 2010.

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taxable commodities are not already taxed by central or local government. Currently, the only emission taxes levied by central government are the mineral oil and electricity tax.³⁴⁴

In 1995 the region of Galicia³⁴⁵ implemented a tax on air emissions which was unique in Spain for a long time. It was levied only on nitrogen and sulphur dioxide emissions but not on CO₂. In 2000, the autonomous community of Castilla de Mancha³⁴⁶ followed the example by taxing the same type of contaminating substances as Galicia and, as a pioneer they extended the tax to the generation of electricity by nuclear power plants and the storage of radioactive waste from the latter, in order to lessen the amount of electricity produced by nuclear power.

Both these regions belong to poorer areas with significant pollution.

Andalucía³⁴⁷ implemented a tax on atmospheric pollution in 2003 followed by Aragón³⁴⁸ and Murcia³⁴⁹ in 2005.

The laws of these different Spanish autonomous communities have the common feature that they all levy taxes on nitrogen and sulphur dioxide emissions. The taxes apply to a large number of industrial facilities, regardless of the volume of emissions, but there are differences between the tax exemption minimums.

³⁴⁴ The mineral oil and the electricity tax fall in the category of 'environmental taxes *sensu largo*' which means they only belong to environmental taxes in the broadest sense. Look at OECD *Taxes, fees or charges – Main characteristics for selected countries* [Online] <http://www2.oecd.org/ecoinst/queries/index.htm> accessed on 10 March 2010.

³⁴⁵ Art. 6 Ley 12/1995, de 29 de diciembre: 'emisión a la atmósfera de cualquiera de las siguientes sustancias: a) dióxido de azufre o cualquier otro compuesto oxigenado de azufre. B) dióxido de nitrógeno o cualquier otro compuesto oxigenado del nitrógeno'.

³⁴⁶ Article 2 Ley 11/2000, 26 de diciembre: 'actividades cuyas instalaciones emiten a la atmósfera dióxido de azufre, dióxido de nitrógeno o cualquier otro compuesto oxigenado del azufre o del nitrógeno'; 'producción termónuclear de energía eléctrica'; 'almacenamiento de residuos radioactivos'.

³⁴⁷ Article 23 Ley 18/2003: 'la emisión a la atmósfera de dióxido de carbono, óxidos de nitrógeno u óxidos de azufre que se realice desde las instalaciones a las que se refiere el artículo 22...'

³⁴⁸ Ley 13/2005, de 30 de diciembre, de Medidas Fiscales y Administrativa en materia de Tributos Cedidos y Tributos Propios de la Comunidad Autónoma de Aragón (B.O.A. no 154, de 31 de diciembre de 2005).

³⁴⁹ Article 45 Ley 1/1995, 8 de marzo: 'canon por vertido de residuos'; 'canon por emisión de gases contaminantes a la atmósfera'; 'canon por vertidos al mar' (modificado por la Ley 8/2004, de 24 de diciembre).

9.1 Aragon 2005

The tax on air emissions in Aragon came into effect on 1 January 2006. It was aimed at the actual economic burden that was manifested in certain situations that caused serious air pollution with a negative impact on nature, humans, animals and plants in the region.³⁵⁰

Taxable persons were owners of facilities which caused environmental damage; mainly industrial facilities. Energy sources were considered as emitting pollutants and as such their owners were tax subjects too.³⁵¹

The tax base is constituted by the sum of the amounts released into the atmosphere systematically from each of the pollutants.³⁵² Hence, the tax base takes into account ecological values, particularly units of pollution, to raise the tax burden of the taxpayer in order to achieve a reduction in environmental damage, since the taxpayer usually tries to avoid higher taxes (steering effect).

Indeed, through the taxation of activities which pollute the atmosphere, environmentally friendly behaviour is rewarded, while certain 'dirty' industrial processes are discouraged, while searches for better business operations, in harmony with the environment, are supported.

Pursuant to Articles 9 and 11, the scope of the tax only includes the territory of the Autonomous Community of Aragon.

The revenue earned by the tax, minus the costs of management and collaboration, is used for the funding of preventive, corrective and restorative measures for environmentally exploited, degraded or emitted air from the negative effects arising from certain contaminants.³⁵³

³⁵⁰ Preamble.

³⁵¹ Article 24.

³⁵² The tax period coincides, in general, with the calendar year and the taxes are due on December 31 of each year. The tax period is less than the calendar year when the taxpayer's compliance with the conditions for the tax liability is after 1 January. In such cases, the tax period shall begin with the compliance date. Also, the tax period is less than the calendar year when the taxable behaviour ends before 31 December. In such cases, the tax period ends on that date if it is reported.

³⁵³ Article 12(1).

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The taxable base is determined by polluting units. Article 13(4) defines polluting units as measurement and determination units of environmental damages, expressed in various settings, parameters, or varying magnitudes of the estimated pollution load caused by selective exploitation or abuse adversely affecting the environment. CO₂ for example is categorised in tonnes/year.

According to Article 21(2), the tax entity is either the polluter who is the contaminant source of any stationary technical unit, where the activity is being exploited through facilities of any nature, which causes the issue, directly or indirectly; or the owner of the polluting source as a natural or legal person who operates the facility or who has, directly or by delegation, a decisive economic power over it.

Article 27(b) determines the tax rate for CO₂ which is EUR 200/tonne.

Pursuant to Article 23, CO₂ which is produced by the burning of biomass, biofuel and biogas is exempted. Furthermore, the emissions discharged from facilities which are subject to the regime of emissions trading of GHGs that are released in excess of allocations, according to their individual regulations, are exempt unless the excess involves failure to surrender allowances under that legislation.

Furthermore the State, the Community of Aragon, and the local agencies and public entities are exempt if the emissions occur under their respective administrations, while they are performing necessary duties that may directly damage the environment, provided that these are assigned for public service or development in the exercise of public functions or purposes.³⁵⁴

³⁵⁴ Article 37.

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The tax is determined through estimations made by direct statements³⁵⁵ from the taxpayer or, where appropriate, through data or documents held by the authority.³⁵⁶

Notwithstanding the above, taxpayers may declare the values arising from the use of other methods or systems, if they provide sufficient evidence of their technical suitability.

Article 42 gives the opportunity to deduct 30% of the amount of investments in real assets in the material scope of the tax if preventive measures are adopted and for remedial or restorative efforts. A deduction of 20% is possible for purchase prices or production costs of the actual investment.

Management, validation, verification, collection and inspection of environmental taxes are the responsibility of the officers of the tax department of Aragon. The relevant departments: Environment, Industry, Trade and Energy, within their respective competencies, help and cooperate with the management bodies, within their respective competencies, to fulfil the functions of clearing and to settle the verification of the tax.

In the event of a termination of polluting activities, the taxpayer is obliged to submit a declaration of termination, subject to verification by officials.

The tax is clearly structured, but its scope is limited to emitters within Aragon. It should be replaced by regulations valid for the entire kingdom.

The methods of estimation, in order to determine the tax base, are interesting, but could lead to different results within comparable situations. It is difficult to measure carbon emissions because this depends on factors such as technology, usage and know-how. Accordingly, emissions have to be estimated by the use of benchmarks or by the effective value of the

³⁵⁵ Therefore the statement has to comply with the following standards.

- i. When polluting units should be measured directly, because this is required by the sector-specific rules, or their magnitudes are recorded in the corresponding administrative and sectoral inventories, the statement will be limited to express the resulting well known value.
- ii. When the issuer has entered, on a voluntary basis, and there exist measurement systems for registration of polluting units, previously approved by the competent sectoral body, the declared value shall be the same.

³⁵⁶ Article 38.

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emissions. Since the determination of the effective value is too cost-intensive for the small or medium-sized industries affected by the tax, estimation is the more reasonable method.

The use of other methods or systems would entail, especially in the beginning, a greater amount of work and higher labour costs so as to prove their suitability. But this seems to have been considered from the beginning through the task sharing by the different departments which are affected, such as Finance, Environment, Industry, Trade and Energy.

The tax reduction incentive is laudable as it promotes the change to more environmentally friendly production in the small and medium-sized industry sector.

9.2 Murcia 2005³⁵⁷

Murcia established new environmental regulations for contamination in 2005 which came into effect on 1 January 2006. According to Article 5 the tax included emissions of gases into the atmosphere, with the aim of protecting the environment in the Autonomous Community of Murcia only. It was important that the levy of this tax was compatible with any special rate or national, regional or local application of taxable transactions.³⁵⁸

The tax was divided into different parts. Part four regulates the tax on emissions of polluting gases into the atmosphere. The purpose of part four is described in Article 41(2) as ‘the removal of substances which are emitted directly or indirectly into the atmosphere from specific sources in an installation’.

An installation in this regard can be understood as any stationary technical unit which is involved in one or more industrial activities.³⁵⁹ This term also comprises pollution prevention as well as control of pollution and any other direct relation of emissions linked to technical activities in this field which may have an impact on emissions and air quality.

³⁵⁷ Law 9/2005 of December 29, Tax Measures on taxes and ceded taxes in 2006 (BORM Supplement No. 3 No. 301 of December 31, 2005). (The tax to develop this law was created by Article 45 of Law 1/1995 of March 8, Environmental Protection Agency of Murcia - 3/04/1995 BORM-changed by the additional provision fifth of Law 8/2004 of December 28, from administrative, tax rates and public service - BORM 30/12/2004).

³⁵⁸ Article 5(3).

³⁵⁹ Listed in Annex 1 of Law 16/2002, of July 1.

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The taxable event was the emission of specific pollutants³⁶⁰ into the air, *inter alia* CO₂. According to Article 43(2), CO₂ emissions from combustion of biomass, biofuel or biogas are exempt from the liability to pay this tax, as well as those from facilities under the regime of emission trading in GHG emissions.

Taxpayers are the operators of the emitting facilities. If there are two or more persons or entities as potential emitters, since, for example, they operate the facility together, then both are severally liable to pay the tax to ensure that the tax will be adequately collected to guarantee the revenue of the Autonomous Community of Murcia.³⁶¹

Article 45 envisaged that the owner of the facility from which the emission took place could also be an additional taxpayer if he differed from the person operating it.

The amount of pollutants (units) from an industrial facility during the tax period (legal year) is taxed. Units in this case mean tonnes/year. According to Article 47, taxpayers could apply for a reduction if they fulfilled necessary requirements. Otherwise the full rate would be applied gradually, whereas the base per unit was regulated as follows:

- up to 10 units pollutants = EUR 5,000
- between 10.1 and 20 units pollutants = EUR 8,000
- between 20.1 and 30 units pollutants = EUR 10,000
- between 30.1 and 50 units pollutants = EUR 12,000
- more than 50 polluting units = EUR 14,000

Pursuant to Article 49, taxpayers are entitled to a reduction in the fee for investments made in the tax period on infrastructure and equipment aimed at monitoring, preventing and correcting air pollution. The assumption was that the investment is deemed to be made when the assets are placed in operating condition and should remain at the same level of environmental suitability, at least over the following three years. It is applied in percentages:

³⁶⁰ Listed in Decision 2000/479/EC of 17 July (OJ L 192, 28/07/2000) on the European register of pollutant emissions (EPER) which is copied into Annex II of the regulation.

³⁶¹ The administrative action may be directed against any collection of them for a full share.

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- i. thirty per cent of the investment, when it is for atmospheric monitoring,
 - ii. twenty-five per cent of the investment, when the industrial plants concerned have obtained the certificate International Organization for Standardization (ISO) 14000 or Eco-Management and Audit Scheme (EMAS) on environmental management,
 - iii. fifteen per cent of the investment, if licences have not been obtained before.

The reduction was limited to a maximum of 50% of the full tax. If the limit for the reduction could not be applied in the corresponding tax period the limit might persist up to the three following periods.

A necessary condition for the application of the reduction is to obtain a certificate of environmental suitability of investment issued by the Ministry of Industry and Environment.

The revenue from the tax is completely recycled to finance measures for environmental protection, such as developing regional solutions for waste, creating infrastructures for waste management, repairing or rehabilitating environmental damage, promoting alternative measures regarding environmental mitigation and management, information and awareness. This revenue is also used to enforce the permitted emission levels, as well as for financing activities and improved sanitation for the quality of coastal waters.

The Ministry of Economy and Finance is liable for the management, collection, inspection and review of the acts of management. It ensures that technical norms to facilitate the fulfilment of obligations are in place, and organises the manner in which the tax is paid.³⁶² Furthermore, it is the responsibility of the Ministry competent to supervise the environment, to allow for the installation of technical tools to determine, verify and check the environmental parameters that determine the quantification of these taxes.³⁶³

Taxpayers are required to submit an annual statement for each pollutant, at the latest within the month following the expiration of the tax period.

³⁶² Article 7(1).

³⁶³ Article 7(2).

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Taxpayers whose taxable emission is less than a pollutant unit are required to keep a register, available to the Administration of Murcia, for processing, and serving as a means of control, surveillance and monitoring of compliance with environmental regulations.

The above tax has interesting aspects. It has gradually increasing tax rates which seem high enough to persuade the taxpayer to decrease emissions in order to qualify for the lower rate. Also the tax exemptions/reductions are aimed at reducing the emissions and do not favour or waive taxes for the main polluters.

Additionally, the task sharing between the Ministries is commendable since each can act in the field where it has the best knowledge, which eases and accelerates the working process.

Recycling of the tax might be difficult since it might be too thinly spread and many needs are not foreseeable up front, especially environmental catastrophes when the cleanup costs might last for years.

9.3 Andalusia

The tax on air emissions is a tax of the Autonomous Community of Andalusia.³⁶⁴ Taxable events are the emissions of CO₂, nitrogen oxides (NO_x) or sulphur oxides (SO_x), which are emitted by certain plants. Not taxable under this regulation are CO₂ emissions from the combustion of biomass, biogas or biofuel, as well as those from facilities under the regime of emissions trading of GHGs.

Taxable persons are individuals or legal entities that operate the facilities from which the pollutants have been emitted into the air. Article 32 determines the tax rates identically to those of Murcia. According to Article 33, taxpayers are entitled to a full tax reduction through investments made in the tax period on infrastructure and equipment aimed at the monitoring, prevention and correction of air pollution.

³⁶⁴ Which is regulated in Ley 18/2003, de Medidas Fiscales y Administrativas, en el Decreto 503/2004, de 13 de octubre, por el que se regulan determinados aspectos para la aplicación de los Impuestos sobre emisión de gases a la atmósfera y sobre vertidos a las aguas litorales y en las Ordenes de desarrollo de 22 de octubre de 2004, por las que se aprueban los modelos de pago fraccionado a cuenta y de declaración-liquidación anual.

9.4 Comparison

As seen above, the taxes and their structures are similar. Nonetheless, there are several differences, especially in the use of the tax, the administration thereof and also the tax object. One thing which they all have in common is the scope. Indeed Spain, which is not the most economically powerful country in Europe, has no mitigation target according to the 1990 level, since they are one of the few countries within Europe which is allowed to increase its emissions. Thus, it is understandable that the state itself has not yet implemented a national energy tax. On the other hand this consideration will only be helpful for a short period since Europe will increase its reduction aims up to 30% and it is expected that this will affect Spain as well. Therefore a solution in compliance with emission trading is desirable.

One point of criticism is the scope of the current regulations, which only include the territory of the regions. Besides that, the tax rates seem to be too low. It might have been good if the central government had supported the regional governments by increasing their fiscal revenue in the last few years as their increased financial commitment has had a negative impact on their creativity in looking for alternative resources. But then all regions should follow the example of taxing CO₂ emissions so as to cover the entire landscape and give the same competitive incentives and disadvantages to the entire Spanish industry. It seems that these low tax rates have not provided enough incentives for changing polluting behaviour. Hence, as much as these measures are considered as transitional, it could be possible that they work as psychological incentives, which is adequate. Furthermore, the tax base can change in future years because of the current situation under Kyoto and the unpredictability of following agreements. Accordingly it is possible to leave the tax as a psychological incentive and only change it when Spain has new and higher CO₂ emission targets to fulfil but this is not wise. Since it is a global environmental problem the state as the central administration of Spain should take responsibility for a national emissions tax.

The question whether the state itself has the competence to implement a national tax was analysed by Herrera.³⁶⁵

³⁶⁵ He came to the conclusion that a national implementation would be possible. See for more details: Herrera 'Legal Limits on the Competence of Governments in Spain' in Milne, Deketelaere, Kreiser and Ashiabor *Critical Issues in Environmental Tax Vol. I International Comparative Perspectives* Oxford University Press 2004 pp. 111-123.

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The different recycling solutions are part of the regional sovereignty and can be designed differently as occurred in the different tax laws. Nonetheless, the situation in Murcia, in particular, which can use the revenue for almost everything, seems to be too wide and is neither economical nor predictable.

10 United States of America

The United States of America signed the Kyoto Protocol on 12 November 1998 but has neither ratified nor withdrawn its participation. Without ratification, the Kyoto Protocol is not binding on the United States since the signature only has a symbolic meaning. Before the Protocol was finalised the US Senate unanimously passed the Byrd-Hagel Resolution³⁶⁶, which stated that the United States should not be a signatory to any protocol which did not include time schedules for developing, transitional and developed countries, as well as binding targets for all. Thus Al Gore in his position as Vice President signed the protocol, but because of the lack of participation of the developing countries it was never ratified.³⁶⁷

The United States signed the Asia Pacific Partnership on Clean Development and Climate. Its members can set their aims for reducing GHG emissions individually but like the Kyoto Protocol, it has no enforcement mechanism. The target of the United States was an 18% reduction in carbon ‘intensity’ (the amount of emissions divided by GDP) which is still an increase on their 1990 level.³⁶⁸ The hope that President Obama would take action on climate change policy has not been fulfilled, especially since he stated in April 2009 that “it doesn’t make sense for the United States to sign [the Kyoto Protocol] because [it] is about to end”.³⁶⁹

³⁶⁶ Text of the Byrd-Hagel Resolution [Online] <http://www.nationalcenter.org/KyotoSenate.html> accessed on 10 March 2010.

³⁶⁷ ‘Clinton Hail Global Warming Pack’ *CNN* published 11 December 1997 [Online] <http://www.cnn.com/ALLPOLITICS/1997/12/11/kyoto/> accessed on 10 March 2010.

³⁶⁸ Krugman ‘Ersatz Climate Policy’ *New York Times* published 15 February 2002 [Online] <http://www.nytimes.com/2002/02/15/opinion/15KRUG.html?scp=1&sq=Ersatz%20Climate%20Policy&st=cse> accessed on 4 March 2010.

³⁶⁹ Hattem *Obama Challenged on Climate During Turkey Trip* Treehugger 8 April 2009 [Online] <http://www.treehugger.com/files/2009/04/obama-challenged-on-climate-during-turkey-trip.php> accessed on 22 February 2010.

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As far back as 1979, John Anderson, according to his campaign brochure,³⁷⁰ wanted to implement an energy tax which included a 50 cent/gallon energy conservation tax on motor vehicle fuels. The intention behind this was to reduce consumption and dependence on foreign fuels. He wanted to use the revenue to reduce payroll taxes by 50%, and increase social security benefits, supporting those who were not on a payroll (and with it not on a payroll tax).

More than a decade later parts of the population in Minnesota made efforts to implement a billion-dollar state ‘tax shift’ by raising prices on energy and reducing taxes on income and property. The proposal never came into force.³⁷¹

In the 1990s, President Clinton presented a general tax on all energy forms with a base rate of 25.7 cents/million British Thermal Units (Btus), and in addition 34.2 cents/million Btus on refined petroleum products.³⁷² Because of major opposition from industry and farmers, only the ‘Transportation Fuels Tax’ came into force on 1 October 1993, with an average tax of 13.814 cents/gallon on gasoline, diesel, and special motor fuels.³⁷³ One of the reasons why the tax was not successful was because of the gap of revenue neutrality since it only increased the household costs and the national budget.

The first carbon tax in the United States was introduced by Boulder, a city in Colorado, in April 2007. The tax is levied on electricity at a level of about USD 7/tCO₂ which costs an average household about USD 15.96 annually and will be increased gradually every year.³⁷⁴ The tax differentiates between households, businesses and industry since each of them has its own tax rate: the rate for industry is the lowest followed by the rate for businesses. Utility-provided wind energy is waived from the tax. The revenue is used to fund Boulder’s climate action plan.³⁷⁵ The tax was increased in 2009 and will expire in March 2013.

³⁷⁰ John Anderson for President 1980 Campaign Brochure *Most polls show that if people believe John Anderson can win, he will win. Your support will make Anderson President* [Online] <http://www.4president.org/brochures/andersonlucely1980brochure.htm> accessed 22 February 2010.

³⁷¹ Institute for Local-Selfreliance *ILSR’s Minnesota Carbon Tax Shift Achieves* [Online] <http://www.newrules.org/energy/ilsr-minnesota-carbon-tax-shift-archives> accessed 22 February 2010.

³⁷² TED Case Studies *US BTU Tax* [Online] <http://www1.american.edu/TED/usbtutax.htm> accessed on 22 February 2010.

³⁷³ *Ibid.*

³⁷⁴ Carbon Tax Center *Where Carbon is Taxed* [Online] <http://www.carbontax.org/progress/where-carbon-is-taxed/> accessed on 22 February 2010.

³⁷⁵ *Ibid.*

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The tax is a first step in the right direction. Even if it is only levied on electricity it is a start and can be extended to all fossil fuels. The same can be said about the expiry date. It is not the norm to enact a tax law for a short period of time but it is also not unusual for a tax to be implemented to finance a special project and when the aim is achieved to abolish the law afterwards.³⁷⁶ An extension in the case of Boulder's tax seems to be likely since the achievement of the aim to reduce GHG emissions by 2012 seems to be doubtful.

Another interesting point concerning the tax is that it is collected by IXcel Energy, the local energy utility. For this collection the city has paid IXcel a one time fee of USD 40,000.³⁷⁷ So the city did not need to take on new tax collectors themselves.

The United States as a whole still does not have a carbon/energy tax but the current 111th congress has several proposals for carbon taxes and cap and trade mechanisms. The bills concerning carbon taxes will be described subsequently.

10.1 Carbon Tax bills by Stark and Larson

Both bills envisage gradually raising upstream taxes. Stark with his 'Save our Climate Act of 2009' allots a carbon content tax on fossil fuels when the fuels are initially removed from the ground or imported into the United States, starting at USD 10/tCO₂ which will increase by USD 10 every year ending with the year after the target attainment.³⁷⁸ The usage of the revenue is undetermined. Exports will be credited for the carbon tax.³⁷⁹

Larson with his 'America's Energy Security Trust Fund Act of 2009' has designed a fossil fuel tax starting at USD 15/t with an additional increase of USD 10/year if the emission targets identified by the Environmental Protection Agency are met. If the targets are not met

³⁷⁶ The solidarity surcharge in Germany can be named as an additional example which was implemented to finance the German reunification but is still in place. Currently there is a claim against it instituted at the Federal Constitutional Court.

³⁷⁷ A Program of the Institute for local self-reliance *Climate Action Plan Tax – Boulder CO* <http://www.newrules.org/environment/rules/climate-change/climate-action-plan-tax-boulder-co> accessed 28 June 2010.

³⁷⁸ Stark Carbon Tax bill H.R. 594 'Save Our climate Act of 2009' (1/15/09) Section 4691(b).

³⁷⁹ Carbon Tax Center *Bills* [Online] <http://www.carbontax.org/progress/carbon-tax-bills/> accessed on 4 March 2010.

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the tax will increase by USD 15/t.³⁸⁰ Larson would like to tax sources such as mines and refineries and utilities that revenue for research purposes in the clean energy technology field as well as providing assistance to affected industries. He envisions the remaining revenue being used for individuals by clearing payroll taxes on the first USD 3,800 of wages per annum and a 10% increase for social security recipients.³⁸¹

Furthermore, his bill envisages border tax adjustments to the amount of an equivalent fee on carbon-intensive products imported from non-carbon taxing countries, on the one hand, and credits for carbon tax on exported items on the other.³⁸²

10.2 Carbon Tax bill by Inglis

Similar to the Larson bill is Bob Inglis's 'Raise Wages, Cut Carbon Act of 2009' which he introduced on 13 May 2009.³⁸³ According to the explanatory notes revenue will be used to reduce taxes on income and the tax reduction will be split between employers and employees. The bill aims to increase social security payments to avoid recipients having to carry too heavy a burden because of the carbon tax.³⁸⁴ The bill envisages that the tax rate will start with USD 15/t and will increase by a varied percentage until it reaches its maximum of USD 100 in 2040.³⁸⁵ It is an upstream tax and Inglis wants to take into account that the taxing of coal emissions is based on

'most efficient burning [which] should ensure that 100% of possible carbon emissions are taken into account for each grade of coal, as well as provide a disincentive for less-efficient technology. At the same time, energy producers would not be penalised for CO₂ they could not possibly be emitting'.³⁸⁶

He also envisages a credit or pay back system for exports³⁸⁷ and a border adjustment for imported goods.³⁸⁸

³⁸⁰ Larson Carbon Tax bill H.R. 1337 'America's Energy Security Trust Fund Act of 2009' (3/5/09) Section 4691(3).

³⁸¹ Carbon Tax Center *Bills* [Online] <http://www.carbontax.org/progress/carbon-tax-bills/> accessed on 4 March 2010.

³⁸² *Op cit*, Fn. 380 Section 4692(d).

³⁸³ See: Inglis Carbon Tax bill H.R. 2380 'Raise Wages, Cut Carbon' Act of 2009.

³⁸⁴ See Section 4691 (c).

³⁸⁵ See Section 4692 (b) (3).

³⁸⁶ Inglis Explanatory Notes to Accompany the Raise Wages, Cut Carbon Act of 2009.

³⁸⁷ See Section 4693.

³⁸⁸ See Sections 4695-4696.

10.3 *Bills by McDermott and Doggett*

The bills of McDermott and Doggett both allow the authorisation of the Treasury Department to set a price on carbon. McDermott envisages implementing a price which will increase within five years to achieve the emission targets. Doggett on the other hand wants to auction permits so as to meet the price targets for the first ten years (accordingly it is a cap and trade system and will not be discussed further).

McDermott's 'Clean Environment and Stable Energy Market Act of 2009' was introduced on 24 March 2009. According to his bill, producers and importers of GHG substances have to purchase a permit for each tCO₂ emissions or equivalent.³⁸⁹ Since the permits are not tradeable it is a carbon tax in spirit. Based on reducing the annual emission allocations, it is the Treasury Department's task to set an emission price every year. (6835 million tonnes CO₂ in 2011 down to 1337 tonnes in 2050).³⁹⁰

Interestingly the Treasury would have to release price schedules every five years.³⁹¹ A modification might be necessary if emission permits 'significantly exceed' or 'fall short' within the five year period.³⁹² The permits have to be purchased at the first point of sale or importation which makes it an upstream tax. The revenue use is not specified. Nonetheless, exports will also be credited for permit fees.³⁹³

10.4 *Comparison*

The United States has several proposals for tax systems as well as cap and trade systems but has not implemented a uniform system. However, implementation is essential if it is to participate in a global fight to mitigate carbon emissions.

Stark's upstream tax needs some revision especially regarding the usage and the determination of the tax. It suggests that the tax will increase until the target is attained but when is this going to happen? If never, then the tax will have a strangling effect; also if the

³⁸⁹ See Section 9902.

³⁹⁰ Carbon Tax Center *Bills* [Online] <http://www.carbontax.org/progress/carbon-tax-bills/> accessed on 4 March 2010.

³⁹¹ See Section 9902(c)(2)(A).

³⁹² See Section 9902(c)(2)(B).

³⁹³ See Section 6633.

time frame for attainment is unknown the increases will climb too high. The time schedule is too vague to be determined and could cause problems with the constitution.

Larson's bill is more concrete. It defines the revenue usage as well as border tax adjustments. Not clear is the duration of the tax increase, which is not determined. Furthermore, it is difficult to estimate the revenue to be received when there are two possible increase rates. This makes the revenue vague and leads to difficulties concerning its allocation.

The Inglis bill on the other hand gives a fixed maximum amount which will be reached in 2040. It also includes revenue usage, border tax adjustment and a pay-back system for exports and seems to be the most developed of the three bills.

McDermott sets the price on carbon by selling permits which companies buy according to their demands. This is classic for a cap and trade system. The only difference is that the permits are not tradeable which makes it more a tax than a cap and trade system. It does not have classic tax rates but annually set prices. This leads to a problem in the allocation of the revenue, since the amount of the revenue can only be estimated by the former demands of companies. Also the revenue usage is not defined, which needs to be changed. It seems to be an interesting hybrid solution (tax and cap and trade) but needs further elaboration.

As a result it can be said that all of the above mentioned proposals have problems. These problems need to be solved and a system implemented. The most sensible one seems to be the Inglis bill.

11 Canada

Canada ratified the Kyoto Protocol in December 2002. According to this Canada has to reduce its GHG emissions to 6% below its 1990 levels by 2012. Canada established various reduction targets and policy instruments to fulfil its goal through its Climate Change Action Plan (CCAP) published in November 2002. The CCAP's key instruments were voluntary agreements, public spending, as well as public information programmes. Taxes were also mentioned but without any clarification. Even though Canada's pollution is high and it appears that it will not be able to fulfil its reduction aim under Kyoto. British Columbia and

Quebec are the only provinces which have introduced a carbon tax. Consequently, the carbon taxes of the provinces of British Columbia and Quebec are discussed.

11.1 *Quebec*

Quebec implemented its carbon levy in October 2007. To achieve its Kyoto reduction aim it needs to decrease emissions to 15% below the 1990 level by 2012. Taxpayers are about 50 energy enterprises which have to pay 0.8 cents/litre on gasoline and 0.94 cents/litre on diesel for their distribution in Quebec.³⁹⁴ The expected revenue per year is approximately CAD 148 million.³⁹⁵ In addition energy consuming businesses like mining, steel and cement have to pay the levy. Accordingly, Quebec is indirectly taxing end consumers and directly taxing producers. The revenue from Quebec's tax goes into a fund.

Quebec's tax on gasoline is already one of the highest in Canada and opponents therefore feel that the tax is unfair.³⁹⁶ Other critics focus on the aim of the levy as a point of criticism; namely to raise traditional energy prices by privileging the producers of clean energy, especially of hydro-electric and wind power, as a key component of Quebec's economy.³⁹⁷

Since Canada is a big carbon emitter it is brave to introduce the levy through which competitive disadvantages may occur; not only internationally but also nationwide. Nonetheless, the aim has to be achieved. The tax cannot be commended enough, at least as a starting point and can be named as a good example for other provinces to follow. It could be extended to cover electricity and other fossil fuels such as coal and gas. Since coal is the fossil fuel with the highest carbon emitting rate it should be one of the first fuels to be taxed.

³⁹⁴ Roberts *Carbon tax: A one-size-fits-all solution?* Canada West Foundation [Online] <http://cwf.ca/CustomContentRetrieve.aspx?ID=1097959> accessed 10 March 2010.

³⁹⁵ *Ibid.*

³⁹⁶ *Ibid.*

³⁹⁷ *Ibid.*

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11.2 *British Columbia*

On 1 July 2008 taxation started with CAD 10/tCO₂ equivalent and annually a CAD 5/tCO₂ increase was aimed for until 2012(CAD 30/tCO₂ in 2012).³⁹⁸ The tax is levied on all fossil fuels. The following table shows the tax rates for different fuels.

Table 3.5:

Fuel	Unit	2008	2009	2010	2011	2012
Carbon	Tonne of Carbon	CAD 10	CAD 15	CAD 20	CAD 25	CAD 30
Regular Gasoline	cents/litre	2.33¢	3.50¢	4.66¢	5.83¢	6.99¢
Diesel	cents/litre	2.69¢	4.04¢	5.38¢	6.73¢	8.07¢
Jet Fuel	cents/litre	2.61	3.92¢	5.22¢	6.53¢	7.83¢
Propane	cents/litre	1.54¢	2.31¢	3.08¢	3.85¢	4.62¢
Natural gas	dollars/GJ	CAD 0.50	CAD 0.74	CAD 0.99	CAD 1.24	CAD 1.49
Coal – low heat	dollars/tonne	CAD 17.77	CAD 26.66	CAD 35.54	CAD 44.43	CAD 53.31
Coal – high heat	dollars/tonne	CAD 20.77	CAD 31.16	CAD 41.54	CAD 51.93	CAD 62.31

Source: Litman *Carbon Taxes 'Tax What You Burn, Not What You Earn'* Victoria Transport Policy Institute 24 February 2010 [Online] <http://www.vtpi.org/carbontax.pdf> accessed 10 March 2010 p. 2.

The revenues are returned to taxpayers through diverse tax cuts and rebates for individuals and businesses. As such one can name the reduction of corporate and personal income tax rates to keep the tax revenue neutral

According to the government, keeping the carbon tax revenue neutral was through the development of a strategy, which has to show how the revenues will be refunded annually through the reduction of other taxes.³⁹⁹ Specific reductions in tax were included in the 2008 Balanced Budget for the year 2008/2009 as well as further rate cuts which needed to be confirmed, for the years thereafter, by the annual updated 'revenue-neutral' plan.⁴⁰⁰ The

³⁹⁸ Litman *Carbon Taxes 'Tax What You Burn, Not What You Earn'* Victoria Transport Policy Institute 24 February 2010 p. 1 [Online] <http://www.vtpi.org/carbontax.pdf> accessed 10 March 2010.

³⁹⁹ British Columbia *Balanced Budget 2008 Backgrounder B.C. 's Revenue-neutral Carbon Tax* [Online] http://www.bcbudget.gov.bc.ca/2008/backgrounders/backgrounder_carbon_tax.htm accessed on 22 February 2010.

⁴⁰⁰ *Ibid.*

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government estimated in 2008 that CAD 1.85 billion in revenue would be gathered from the carbon tax in the first three years.⁴⁰¹

The reductions would be as follows:

- The lowest two personal income tax rates would be reduced for British Columbians, which meant a tax cut of 2% in 2008 and 5% in 2009 on the first CAD 70,000 of income. In 2010 a further reduction was expected (CAD 784 million over three years).
- The general corporate income tax would be reduced by 1% with effect from July 2008 and another 1% reduction planned by 2011, which would bring it to CAD 415 million over three years.
- A decrease of 1% to 3.5% for small business tax was planned from July 2008, with reductions planned for 2011 to 2.5% (CAD 255 million over three years). Lower-income British Columbians were considered in the new Climate Action Credit by receiving a payment of CAD 100 per adult and CAD 30 per child annually with a further increase of 5% in 2009 and in later years. (CAD 395 million over three years).⁴⁰²

The implementation of the carbon tax in British Columbia was a major step in the right direction. The broad coverage which includes all fossil fuels by their carbon contents is welcome, especially with the gradual increase of the rates within a period of five years, its protection of lower income households and its revenue-neutrality. Nonetheless, there have been estimates that businesses have to pay the bigger part of the tax by receiving a smaller return than individuals. According to a calculation, industry will be liable for two thirds of the carbon tax while receiving rebates of one third, while individuals will be paying one third but receiving two thirds of the tax benefits.⁴⁰³ This should be monitored and could be equalised by changing the revenue usage if necessary.

⁴⁰¹ Fowlie and Anderson 'B.C. introduces carbon tax' *Vancouver Sun* published 19 February 2008 [Online] <http://www2.canada.com/vancouversun/news/story.html?id=ecea1487-507c-43ef-ab88-5a972898e0b7&k=38130> accessed on 4 March 2010.

⁴⁰² *Op cit*, Fn. 399.

⁴⁰³ *Op cit*, Fn. 401.

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Unfortunately, the tax has had many opponents who say that the tax hurts the poor and is unfair in comparison to other provinces. Furthermore, it was considered to be non-revenue-neutral. The Premier, Gordon Campbell, thus altered its priorities and gave the responsibility for the tax to the Ministry of Environment, while cutting down the ministry's budget. The new Finance Minister, Colin Hansen, did not increase the credits for low-income groups for 2010.⁴⁰⁴

12 New Zealand

New Zealand ratified the Kyoto Protocol on 19 December 2002⁴⁰⁵ and committed to reducing its carbon emissions back to the 1990 level. The latest investigation of New Zealand's emissions in 2010 detected that the GHG emissions had increased about 22% since 1990.⁴⁰⁶

In 2001 New Zealand established the Tax Review Committee to review the tax system. It had to investigate among other things whether the introduction of eco-taxation or carbon taxation would be suitable for New Zealand. It came to the conclusion that the eco-tax would not be an effective measure but a carbon tax would be sensible. According to the report⁴⁰⁷ the level of the tax rate should be at maximum as high as the international carbon price.⁴⁰⁸ Furthermore, it recommended introducing the tax from 2008 onwards. The government followed the recommendation and in 2002 announced its intention to introduce a carbon tax⁴⁰⁹ on 1 April 2007.⁴¹⁰ The tax rate was set at NZD 15/tCO₂ emissions for the time between 2008 and 2012 but allowed an adjustment to the international price, in the case of a substantial change, by a maximum of NZD 25/tCO₂. The proposal covered all emissions from fossil fuels and

⁴⁰⁴ Lee Happy Birthday, *Carbon Tax!* The Progressive Economics Forum 18 February 2009 [Online] <http://www.progressive-economics.ca/2009/02/18/happy-birthday-carbon-tax/> accessed on 10 March 2010.

⁴⁰⁵ Ministry for the Environment *The Kyoto Protocol* [Online] <http://www.mfe.govt.nz/issues/climate/international/kyoto-protocol.html> accessed on 22 February 2010.

⁴⁰⁶ Ministry for the Environment *New Zealand's greenhouse-gas-inventory 1990-2008* Wellington New Zealand April 2010 p. iv [Online] <http://www.mfe.govt.nz/publications/climate/greenhouse-gas-inventory-2010/greenhouse-gas-inventory-2010.pdf> accessed on 22 April 2010.

⁴⁰⁷ The report was called 'New Zealand's central Kyoto measure for the first commitment period'.

⁴⁰⁸ Devine and Watts 'New Zealand: Movement from Carbon Tax to Emissions Trading' in *Environmental Taxes: A Global Perspective* London July 2008 pp. 70-71 (70).

⁴⁰⁹ *Ibid.*

⁴¹⁰ Cullen and Hodgson *Implementing the carbon tax - A Governmental consultation paper* published by the Policy Advice Division of the Inland Revenue Department Wellington May 2005 p. 2.

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utilisation of industrial processes as well as fugitive energy emissions of CO₂, methane and nitrous oxide.⁴¹¹ The tax was limited to emissions occurring within New Zealand.

It included rebates for taxed fossil fuel if it was exported or the emissions from it were permanently embedded or sequestered.⁴¹² Companies having qualified for the Negotiated Greenhouse Agreements (NGAs) would receive further rebates. In order to circumvent leakage which might have happened if the tax had reduced international competitiveness, a special system was pre-empted by the NGA for companies wishing to engage with the NGA. This process included two steps, of which the first condition was for the company wishing to enter into the NGA to establish its negotiation eligibility, and secondly the negotiation of the NGA.⁴¹³

The eligibility criterion for companies was the provision of evidence that their products were sold on the international market to other companies, which had more lenient climate change policies than New Zealand.⁴¹⁴ The company would be eligible for either a partial or full exemption from the carbon tax, provided they were in agreement to reduce emissions to the World's Best Practice levels.⁴¹⁵

A review of New Zealand's climate change policies started in June 2005 and was followed by a report on its emissions. The outcome was that emissions had increased substantially and the planned carbon tax would not be a cost-effective means for reduction. The envisioned carbon tax was substituted by an ETS. The New Zealand government had previously shown an interest in some form of emission trading as a transitional path towards full or partial emission trading,⁴¹⁶ because of speculation that the global emission markets were unstable.⁴¹⁷ Between the end of 2006 and early 2007, five different discussion documents on emissions reduction were released by the government. They included emission trading, a narrowly based carbon tax, incentives, subsidies, direct regulatory measures, and voluntary approaches.⁴¹⁸ The race was won by the ETS. The new government (New Zealand held an election at the end of 2008

⁴¹¹ *Ibid.*

⁴¹² *Ibid.*

⁴¹³ *Op cit*, Fn. 408.

⁴¹⁴ *Ibid*, p. 71.

⁴¹⁵ *Op cit*, Fn. 410 p. 6.

⁴¹⁶ *Op cit*, Fn. 408 p. 71.

⁴¹⁷ *Ibid.*

⁴¹⁸ *Ibid.*

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which resulted in a change from the Labour Party to the National Party) took another look at the legislation, and did not change from an ETS to a carbon tax. However the original Act was amended by the Climate Change Response (Moderated Emissions Trading Amendment Act 2009 of 7 December 2009).

Since the ETS has been in force only briefly, its effect cannot be estimated. However, a reduction of at least 22% to fulfil its Kyoto commitment within the next two years seems impossible.

More thought should be given to the implementation of a carbon tax system in addition to the ETS, since trading systems generally only cover large companies and the energy-intensive sector. Besides, the tax could be levied only on small and/or medium-sized businesses so as to cover all industry. Furthermore, the tax could also be levied on private households in order to increase the possibility of achieving New Zealand's Kyoto targets. This is especially advisable since a potential tax law already exists and would only need some adjustments to the new situation, to become part of a dual system (trading and taxation).

13 Australia

Australia is not only made up out of the biggest desert regions in the southern hemisphere,⁴¹⁹ but its contribution to global GHG emissions (per capita) is the highest in the OECD countries and it is also the second largest net exporter of energy⁴²⁰ (of which the value has grown by 5% over the past two decades to AUD 38 billion in 2006/2007).⁴²¹ At this time, 81% of the country's electricity production was derived from thermal coal, 12% natural gas, 6% hydro; oil and other fuels⁴²² made up less than 1%. Its energy sector provides work for 1% of the labour force of Australia.

⁴¹⁹ National Museum of Australia *Australia* [Online]

http://www.nma.gov.au/exhibitions/past_exhibitions/extremes/australia/ accessed on 10 April 2010.

⁴²⁰ The Garnaut Climate Change Review *Australia's emissions in a global context* [Online]

<http://www.garnautreview.org.au/chp7.htm> accessed on 10 April 2010.

⁴²¹ Australian Government *Energy White Paper National Energy Policy - Framework 2030 Strategic Directions Paper* Department of Resources, Energy and Tourism Canberra March 2009 p. 5.

⁴²² *Ibid.*

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In July 2005 Australia, the United States, China, India, Japan, and South Korea launched the Asia Pacific Partnership on Clean Development and Climate. The goals of this Partnership are to design, organise and transfer existing and emerging clean energy.⁴²³ But, this Partnership and its plans do not include anything new. It supports non-binding agreements and focuses on technical advances to clean dirty energy, rather than control it.⁴²⁴ This policy also reflects the climate change policy of Australia.

Australia, as did most OECD countries earlier, refused to implement a GHG levy in 1994. Nonetheless, for the last couple of years Australia has been discussing a carbon tax.

Australia released its 'Securing a Clean Energy Future – The Australian Government's Climate Change Plan' in July 2011. The plan includes the proposed introduction of a so-called 'carbon tax'. This is part of the carbon price mechanism which will start from July 2012 onwards. The steps will be as follow:

- The carbon price will be fixed for the period of the first three years with a progressive rate increase of 2.5% each year. (First year: AUD 23/tCO₂, second year: AUD 24,15/tCO₂, third year: AUD 25,40/tCO₂). The number of permits will be uncapped during the introduction period.⁴²⁵
- On 1 July 2015 an ETS will be introduced with a transitional cap and floor price
- The revenue collected from selling the carbon permits will be incorporated in the budget for transitional costs and the support of clean energy activities.

The so-called carbon tax is called a carbon tax since in the first three years the price on carbon is fixed. This fixed price is the element which this system has in common with a 'real' carbon tax as demonstrated in other countries. The other elements of the system belong to an ETS, except that a flexible price is missing. But it will change by the introduction of a flexible price in July 2015. The first three years function as introduction period to help companies plan their strategic management, carbon emissions, operational and financial issues as well as carbon

⁴²³ *Op cit*, Fn. 268 p. 865.

⁴²⁴ *Ibid.*

⁴²⁵ Australian Government *Multi-Party Climate Change Committee – Clean Energy Agreement* <http://www.climatechange.gov.au/en/government/initiatives/multi-party-committee/clean-energy-agreement.aspx> accessed on 26 July 2011.

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abatement options. This is helpful for the Australians by giving them certainty on a fixed progressive carbon price and helping them prepare for an international system. The subject of this tax will range from domestic property to small businesses, as well as large industry. Carbon permits are transferable and personal and as such have nothing in common with a tax. Accordingly, since they are not a carbon tax the permits will not be discussed here.

14 Taiwan

Taiwan has recently developed from an agricultural into a manufacturing-based economy. To support this development the Taiwanese government completely controlled its energy industry and market until the early 1990s, by keeping prices under the OECD market level and with that, prevented electricity prices from increasing.⁴²⁶ To understand Taiwan's energy situation a bit better it has to be mentioned that almost all of its energy is imported.⁴²⁷

Taiwan reassessed its tax system in 2001 through the Fiscal Reform Committee and in May 2006 the Energy Tax Statutes draft was reviewed, but anxiety about not being re-elected to government, caused the draft to be withdrawn in January 2008.⁴²⁸ A new Tax Reform Committee was formed in June 2008 to create a 'fair and sophisticated tax system' in an internationally competitive market.⁴²⁹

Yunlin County is a part of Taiwan in which the Formosa Plastics Group's petrochemical industrial park is located, which produces more than 25% of the national CO₂ emissions. The district is disaffected about the current situation since it believes that it has been treated in an imbalanced way regarding budget sharing in comparison to the amount of taxes which the central government collects from the Formosa Group and the part which is returned to the district by the central government. Because of this imbalanced allocation, the Yunlin region

⁴²⁶ Wesner 'Die Energiepolitik Ostasiens, Bedarf, Ressourcen und Konflikte in globaler Perspektive' in Kupfer and Gu (ed) *Die Energiepolitik Taiwans* Frankfurt New York Campus Verlag 2006 pp. 103-122 (106).

⁴²⁷ *Ibid.*, p. 105.

⁴²⁸ Peng and Tsai 'Environmental and Energy Tax Reform in Taiwan: Seeking a Balance' in Spicer *Environmental Taxes: A Global Perspective* USA 2008 pp. 77-78 (77).

⁴²⁹ *Ibid.*

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submitted a bill to the government at the beginning of 2009 which was challenged by the Ministries of Finance and Economic Affairs.⁴³⁰

In June 2009, the Tax Reform Committee introduced a draft of an energy and environmental tax, which was approved by the Ministry of Finance. It included three main taxes, an energy tax and an environmental tax which was split into two main components: the tax on GHGs and a pollutant tax. The main targets of the energy and GHG taxes were oil and natural gas which would raise the prices of gasoline and electricity. The expected revenue from the environmental tax was about New Taiwan Dollar (NTD) 80 billion in 2011.⁴³¹ A summary of the proposed energy and environmental tax follows.

⁴³⁰ Taipei Times 'Yunlin County's tax proposal raises eyebrows in Taipei' *Taipei Times* published 24 February 2009 [Online] <http://www.taipeitimes.com/News/taiwan/archives/2009/02/24/2003436890> accessed on 4 March 2010.

⁴³¹ Government Information Office Republic of China (Taiwan) 'Energy taxes to take effect in 2011' *Taiwan Review* published 18 June 2009 [Online] <http://taiwanreview.nat.gov.tw/fp.asp?xItem=53024&CtNode=205> accessed on 22 February 2010. In comparison NTD 1 was about USD 0.03 on 5 August 2010.

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Table 3.6:⁴³²

Energy Tax	<ol style="list-style-type: none"> 1. Taxable Items: Gasoline, diesel fuel, kerosene, aviation fuel, liquefied petroleum gas, and nuclear energy. 2. Taxation Method: Energy tax will be levied on the basis of the amount of each taxable item at the time when such items are dispatched from a factory or are imported, and the tax rate will increase year by year within the first 10-year period and become fixed from the 11th year. 	
Environmental Tax	GHG Emission Tax	<ol style="list-style-type: none"> 1. Taxable Items: Gasoline, diesel fuel, kerosene, aviation fuel, liquefied petroleum gas, fuel oil, coal, and natural gas. 2. Taxation Method: Green house gas emission tax will be levied on the basis of the CO₂ and fluorocarbon gas emitted by use of each taxable item, and the tax rate will increase year by year within the first 10-year period and become fixed from the 11th year.
	Pollution Tax	Taxpayer: Polluter of air, water, ocean, soil, and underground water.

According to the latest report by the tax committee, the tax for gasoline will start with NTD 5.73/l in the first year, increasing by NTD 1.91/l annually afterwards, up to NTD 22.92/litre in the tenth year.⁴³³ The tax will also include nuclear energy and will be levied at NTD 0.08/kWh in the first year and increase by NTD 0.09/kWh in the second year and from then onwards it will rise by NTD 0.08/kWh in each subsequent year to a tax of NTD 0.84/kWh in the tenth year.⁴³⁴

⁴³² Table plot by Lee and Li attorneys on request. Their contact can be found [Online] <http://www.leeandli.com> accessed 10 March 2010.

⁴³³ Government Information Office Republic of China (Taiwan) 'Energy taxes to take effect in 2011' *Taiwan Review* published 18 June 2009 [Online] <http://taiwanreview.nat.gov.tw/fp.asp?xItem=53024&CtNode=205> accessed on 22 February 2010. In comparison NTD 1 was about USD 0.03 on 5 August 2010.

⁴³⁴ *Ibid.*

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Fuels emit the CO₂ and fluorocarbons upon which the GHG tax has been based, depending on the levels they emit. Using gas as an example, in the first year each litre will be taxed at NTD 0.45, with an additional NTD 0.45 tax tacked on each year, for a final tax in the tenth year of NTD 4.48/litre.⁴³⁵

To avoid double taxation, the current vehicle fuel fees (fuel surcharge) and the air pollution control fees for fixed polluters will be eliminated then.⁴³⁶ Moreover, to reduce the tax burden, the tax reform committee has proposed repealing the stamp tax, entertainment tax and some excise taxes.

The GHG emission tax is expected to generate revenues of NTD 63 billion and the pollutants tax NTD 16.3 billion in 2011.⁴³⁷

The proposed new taxes have to be approved by the Cabinet and pass three readings in the legislature before becoming law.⁴³⁸ In February 2010 the Premier Wu Den-yih stated that before an energy tax would be introduced, the government needed to ensure that the tax would be the right policy at the right time and that the method of implementation was right.⁴³⁹

The tax would be an amazing step for Taiwan to take into a climate-friendly and competitive future. But as it currently looks the tax will be revised again and again and an introduction is not going to happen in the near future. Again a politician seems to be afraid about the consequences for his status in the country instead of implementing environmental measures to help the country in the long run.

Looking at the tax itself, I appreciate the energy tax, especially the inclusion of aviation fuel and kerosene. None of the other countries levy energy taxes on these items although it is

⁴³⁵ *Ibid.*

⁴³⁶ *Ibid.*

⁴³⁷ *Ibid.*

⁴³⁸ Status of 19 October 2009 see: NASDAQ Taiwan Panel OKs Energy, CO₂ Taxes; Taxes May Start In 2011 [Online] <http://www.nasdaq.com/aspx/stock-market-news-story.aspx?storyid=200910190351dowjonesdjonline000088&title=taiwan-panel-oks-energy-co2-taxes-taxes-may-start-in-2011> accessed on 22 February 2010.

⁴³⁹ Lee Ming-Chung and Low 'Premier outlines principles for energy tax' *Taiwan Online News* [Online] <http://www.highbeam.com/doc/1G1-219639040.html> accessed on 21 June 2010.

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common knowledge that aviation and air traffic consume a lot of fossil fuels and emit high amounts of CO₂. On the other hand, the fact that under the energy tax, coal would not be a taxable item is not good. It is part of the GHG tax for which realisation seems to be difficult at first glance since the tax was planned on the basis of the CO₂ content emitted by each taxable item. Should this be done through benchmarks or by declaring the exact amount? How is it possible to measure it in an affordable way? Unfortunately, I have not had enough details to estimate this, but if they have found a way then I only can plead that both taxes should be introduced immediately.

15 Japan

Japan is concerned about the environment and tries to comply with its Kyoto commitments but it still has not implemented a carbon or energy tax. Japan adopted the Kyoto Protocol in 1997 and agreed to reduce its GHG emissions by 6% of its 1990 level. In 1999 the emissions were 6.8% above the 1990 level⁴⁴⁰, increased up to 7.8% in 2005 and since then have been almost constant.⁴⁴¹

In March 2002 the government created a ten year climate change plan, dividing it into three parts, of which the first section,⁴⁴² between 2002 and 2004 was an introduction to the framework and the global warming concept for government and industry, in which industry was given the opportunity to introduce voluntary action. Each sector had set targets for reduction; for example only 17% increase in the traffic segment, 7% reduction for the industrial sector and 2% for the domestic sector.⁴⁴³

⁴⁴⁰ According to the Institute for Global Environmental Strategy (IGES).

⁴⁴¹ Seung-Joon A *Carbon Tax or an Environmental Tax Reform: Difficult Decision for Japan* The Eighth Global Conference on Environmental Taxation Munich 18-20 October 2007 p. 2.

⁴⁴² Morotomi 'Environmental Taxation in Japan and a Proposal for a Mix of Policies' in Milne, Deketelaere, Kreiser and Ashiabor *Critical issues in environmental taxation Vol. I International Comparative Perspectives* Oxford University Press 2004 pp. 289-307 (294).

⁴⁴³ *Ibid.*

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The Kyoto Achievement Plan was revised in 2008 but still consisted mainly of voluntary actions and an increasing use of nuclear power instead of mandatory economic measures, such as cap and trade or an energy tax.⁴⁴⁴

In 1997 Nippon Keidanren (Japan Business Federation) developed a voluntary action plan which comprised 137 organisations from 36 industries which participated in this plan and set goals for each industrial association to deal with global warming.⁴⁴⁵ Most of the industries set numeric targets and reviewed their results regularly, but there was still an increase instead of the targeted decrease in carbon emissions. The reason for the increase seems to be obvious since the steel and power sectors have the strongest lobby in Nippon Keidanren and have shown no interest in meeting their targets and have forced other member companies to resist mandatory policies.⁴⁴⁶

Since 2004, in adherence to the Kyoto Protocol commitments, the Japanese Ministry of Environment has tried to introduce its self-developed carbon tax several times,⁴⁴⁷ but because of little civic support and a resistant industrial lobby no agreement with the Ministry of Finance has been achieved.⁴⁴⁸

This was not the first proposal for a carbon tax in Japan. In 1996 the former EPA proposed a carbon tax with different kinds of approaches related to its tax base, rate and revenue use.

⁴⁴⁴ Ayukawa *Japanese Policy on Climate Change: Adaptation and its complexity* April 2009 p. 5
http://www.nautilus.org/projects/cc-workshops/seoul/workshop-papers/Japanese_Policy_on_Climate_Change.pdf/view accessed on 26 April 2010.

⁴⁴⁵ Bakker (ed) *Tax on the Environment: A world of possibilities* IBFD Amsterdam April 2009 p. 271.

⁴⁴⁶ *Op cit*, Fn. 444.

⁴⁴⁷ On 5 November 2004 'A Concrete Proposal for the Environmental Tax', on 25 October 2005 'A Concrete Proposal for the Environmental Tax', and on 22 November 2006 'Greening the Budget for Anti Global Warming' see: *Op cit*, Fn. 441 p. 8.

⁴⁴⁸ *Ibid* p. 2.

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Table 3.7: EPA 1996

	Tax Base	Tax Rate	Revenue Expenditure	Environmental Effect	Amount of Revenue and effect on GDP
Concept 1	Carbon	3,000JPY/tC	Subsidy for energy efficient investment	Stabilizing the CO ₂ emission at 1990 level in 2000	1 trillion JPY effect on GDP: - 0.06% (annual)
Concept 2	Carbon	30,000JPY/tC	General Budget	Same as above	10 trillion JPY effect on GDP: from - 0.50% to -1.36% (2010)
Concept 3	Carbon (50%) and Energy (50%)	1,500JPY/tC, the rest on energy	Subsidy for energy efficient investment	Same as above	1 trillion JPY effect on GDP: same as Concept 1
Concept 4	Carbon (50%) and Energy (50%)	First year: 1,500/tC, 10 th year: 15,000 JPY/tC, the rest on energy	General Budget	Stabilizing the CO ₂ emission at 1990 level after 10 years of its introduction	Effect on GDP: from -0.31% to -0.94% (2010)

Source: Morotomi 'Environmental Taxation in Japan and a Proposal for a Mix of Policies' in Milne, Deketelaere, Kreiser and Ashiabor *Critical issues in environmental taxation Vol. I International Comparative Perspectives* Oxford University Press 2004 pp. 289-307 (295).

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As can be seen in Table 3.7 the EPA 1996 suggested four different policy concepts. In concepts one and two the tax was only levied on carbon, whereas in concepts three and four the tax levy was divided into half on carbon and half on energy. Concepts one and three implied that the revenue should be used to subsidise energy-efficient investments and was based on the low tax rate of 3,000 JPY/tCO₂ or 1,500 JPY/tCO₂ and the rest on energy. In comparison concepts two and four had a high tax rate of 30,000 JPY/tCO₂ or 15,000 JPY/tCO₂ and the rest on energy. The revenue would be used for general budgeting

Either concept one or three would have been preferable, since both of them would keep distributional problems as low as possible. Implementation problems would be the integration of the existing fossil fuel tax, the purpose for which the revenue would be used and prerequisites for subsidies.

With the introduction of a new tax, different problems would emerge. But in the case above the problems would be few. The introduction of a purely carbon tax (concept one) would be possible as an additional tax. The mixed version of a carbon/energy tax could be introduced by a change in the current fossil fuel taxes which did not include climate change policies at the moment.

Earmarking the revenue for certain purposes would, according to Morotomi⁴⁴⁹ lose the flexibility of the budgetary system as a whole. He argued that the goal for energy efficient improvements might be reached in the next 10 - 20 years and that earmarking should be removed when the purpose was achieved. This solution could be embedded in the new law so when the goal was achieved a new subsidy could be found, or, for example, the money could be used for double dividend purposes.

A similar solution could be found for the other problem: the criteria necessary for the disbursement of subsidies would have to be based on certain technical standards, but should be flexible regarding the development of new technologies and changes in technical knowledge. As stated above, the subsidy could be changed from energy efficient investments into a double dividend mechanism; for example, to reduce labour costs.

⁴⁴⁹ *Op cit*, Fn. 442 p. 296.

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Table 3.8 The carbon tax of the Japanese Environmental Ministry provided:

	Tax Rate	Revenue	Use of Revenue	Special Treatment
Proposal 2004	2400 JPY/tC (c. a. 20\$/tC) (654 JPY/tCO ₂ , 5.45\$/tCO ₂)	490 Billion JPY	Subsidy for Climate Protection and Forestry (340) Reduction of Social Security Contribution (150)	Steel; Agriculture, Forestry, Fishery (Exemption); Heavy Industry; Diesel; Small Firms and Household (Reduction etc.)
Proposal 2005	2400 JPY/tC (654 JPY/tCO ₂)	370 Billion JPY	General Budget But: Subsidy for Climate Protection and Forestry	Steel (Exemption); Large emitter which performed which performed reduction activity (50% Reduction); Kerosen (50% Reduction); Motor Fuel (put-off)
Proposal 2006	2400 JPY/tC (654 JPY/tCO ₂)	360 Billion JPY	General Budget But: Subsidy for Climate Protection and Forestry	Steel; Fishery (Exemption); Large emitter which performed reduction activity (80% Reduction); Kerosene (50% Reduction); Motor Fuel (put-off)

Source: Seung-Joon A *Carbon Tax or an Environmental Tax Reform: Difficult Decision for Japan* The Eighth Global Conference on Environmental Taxation Munich 18-20 October 2007 p.9.

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In the 2004 draft, the proposed tax base was focused on all fossil fuels as well as electricity. Hence, the tax should have been divided into two parts; namely taxed upstream for diesel fuel, kerosene, gasoline and LPG and downstream for coal, heavy oil, natural gas, electricity, town gas and jet fuel. As shown in the table above the tax rate per unit was set at 2400 JPY/tC. Furthermore, there were several exemptions included in the draft to reduce international competitiveness problems.

The 2005 draft differentiated between three groups of taxpayers (household, offices and industry). Households and offices on the one hand had to pay taxes on petrol, LPG, and kerosene. The tax should have been levied upstream before the products left the refinery, or on their importation. Businesses on the other hand would be subject to tax when using coal, natural gas, heavy oil and jet fuel. A broad consumer base, producers of power and other businesses should pay taxes (which would be downstream, based on reports submitted by the power producer and suppliers) on fuel used for generating power and natural gas. As part of the high cost of crude oil the law provided a tentative reduction for gasoline, diesel fuel and jet fuel. With a tax rate of 2400 JPY/tCO₂ the assumed monthly tax payment per household would be at about JPY 180.⁴⁵⁰ Furthermore, the draft included tax reductions of 50% for some emissions when high volume consumers had proven their efforts to reduce emissions. In addition, some tax exemptions for the steel and iron industry and a 50% tax reduction for the use of kerosene were designated.

The 2006 tax plan was based on the 2005 version but was modified in relation to tax reduction (up to 80%) for companies which made certain efforts to reduce emissions. The usage of the tax was not well defined. It would go into the general budget.

One argument against the introduction of this tax has been that the tax rate of 2400 JPY/tCO₂ would be too low to be an incentive to reduce CO₂ emissions. Furthermore, the voluntary efforts taken by industry would be enough to achieve the 6% reduction committed to in the Kyoto Protocol and the tax burden for industry and public would be too high under the tax.⁴⁵¹ However, the proposed tax rate would only affect households by JPY 180 which should be

⁴⁵⁰ Toudou 'The Limits to Self-Restraint and Eco Efficiency: Proposed Application of Japanese Environmental Policy' in Chalifour, Milne, Ashiabor, Deketelaere and Kreiser (edt) *Critical issues in environmental taxation Vol. V* Oxford University Press 2008 pp. 783-802 (792).

⁴⁵¹ *Ibid* p. 797.

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possible for every household. The effect on industry should also not be too high since they would transfer their expenses to the price of the items or services. On the other hand for an environmental tax it is not possible to be too low if it is used just as a psychological incentive.

Despite the voluntary efforts industry has made, it has to be mentioned once again that the carbon emissions are not decreasing, but increasing. Japan needs an immediate change in its environmental policy but the steel lobby seems too strong to allow the government to introduce laws to reduce carbon emissions so that Japan will be able to keep its commitment under the Kyoto Protocol. It is not enough to produce environmentally friendly cars if other production is not environmentally acceptable. Concerning this matter, Japan should learn from Europe and introduce a carbon tax immediately. There have been enough models, proposals and concepts; now it is time to change and implement one of them. I suggest rethinking the revenue use especially in the EPA 1996 concepts two and four as well as the 2005 and 2006 proposals since it seems to be more helpful to use some revenue for tax neutrality, which means paying it back to the citizens. This was a good point in the 2004 proposal which designated one third of the budget to be spent for the reduction of social security contributions.

16 Israel

Israel ratified the Kyoto Protocol on 15 March 2004. It came into force on 16 February 2005. Israel, as a non-Annex I country, has no mitigation commitment but it is expected that Israel will have to commit to mitigation under a Kyoto Protocol replacement, if there is one (the Climate Conference in Cancun left the debate on legal structure to replace the Protocol to the conference in Durban in 2011).

Israel's government started to focus on climate change issues in 2006 by establishing the Committee for Green Taxation, which announced its recommendations for a green tax reform in January 2008. Half a year earlier the Israel Union for Environmental Defence (IUED) report, 'The Forecast is in our Hands'⁴⁵² was released, which was based on scientific findings including the adaptation of the IPCC model scenarios to the local context. The IUED's report

⁴⁵² Adam Teva v'din IUED report on global warming [Online]
<http://www.adamteva.org.il/?CategoryID=436&ArticleID=976> accessed on 22 February 2010.

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foresaw for Israel terrifyingly hotter summers, drier winters, coastal flooding, desertification and depletion of water resources, with increased public health threats. According to the IUEP website the need to tackle climate change goes way beyond specific anticipated local impacts.⁴⁵³ Change is urgent because of the real possibility that the status of Israel could change from being a ‘developing’ nation to being a ‘developed’ nation under the post-Kyoto Protocol.⁴⁵⁴ As early as 2001 the IUED had developed a draft for a clean air law, which was ready for adoption in 2003,⁴⁵⁵ but was only approved in July 2008. The clean air law grant the Ministry of Environmental Protection modern legal tools to carry out its responsibility for air pollution reduction.⁴⁵⁶ Furthermore, the law require the formulation of a national programme for air pollution reduction and gives the Ministry the power to treat major polluters individually.⁴⁵⁷ The law allows for the establishment of obligatory standards for industry, power stations and vehicles: large industrial plants which emit pollutants to apply for emission permits as a condition for operation and impose responsibility on polluters.⁴⁵⁸ Because of these huge changes, which on the one hand need additional skilled people and, on the other hand, a budget increase, the law will come into force at the earliest on 1 January 2011.

On 2 August 2009 Israel’s Green Tax reform came into force. It is based on the recommendations of the Green Tax Committee which included representatives of the Ministries of Finance, Transportation, National Infrastructures and Environmental Protection.⁴⁵⁹ The reform created tax incentives aimed at reducing vehicular air pollution. Parallel to the purchase tax, the Ministry of Environmental Protection published regulations which required that pollutant levels in advertisements for all new cars had to be shown.

⁴⁵³ *Ibid.*

⁴⁵⁴ *Ibid.*

⁴⁵⁵ Adam Teva v’ din Israel has a Clean Air [Online]

<http://www.adamteva.org.il/?CategoryID=392&ArticleID=358> accessed on 10 March 2010.

⁴⁵⁶ Ministry of Environmental Protection *Statement of Minister of Environmental Protection Gideon Ezra to the Knesset Plenum on July 22, 2008: Clean Air Law* [Online]

http://www.environment.gov.il/Enviroment/Static/Binaries/News/Minister_on_clean_air_law_1.pdf accessed on 10 March 2010.

⁴⁵⁷ *Ibid.*

⁴⁵⁸ *Ibid.*

⁴⁵⁹ Schmil ‘Green’ car tax reform hits the road Haaretz 27 November 2009 [Online]

<http://www.haaretz.com/hasen/spages/1130796.html> accessed on 22 February 2010.

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The tax reform was based on the purchase of new motor vehicles with a weight below 3.5 tonnes. The tax rate was connected to the quantity of emissions which the car was expected to emit; consequently for cleaner cars the taxpayer would pay less tax and benefit from lower sales prices than buyers of cars with higher emissions who would be taxed more. Air pollution tests (CO₂, carbon monoxide, hydrocarbon, nitrogen oxide and particulates) were necessary for the classification of the different car models and for each car before it was approved for use.⁴⁶⁰ The cars were then categorised in 15 groups depending on their pollution levels (from grade 1 representing the cleanest car up to grade 15 representing the most polluting one). The tax benefit was granted after uniform taxing of all vehicles at a rate of 83%⁴⁶¹ (except hybrid cars and electric cars). The rate of benefit ranged from NIS⁴⁶² 15,000 for relatively clean vehicles to zero NIS for the most polluting group. The tax rate would be reviewed in a year's time. If the tax level was found not to be substantially affecting emission levels, it would be changed.⁴⁶³

The tax has a different approach from the taxes discussed prior to this. It was implemented to cover the emissions produced by cars, but not all cars. Those with a weight of more than 3.5 tonnes, which are mostly used for business transport, are tax free. The tax was intended to achieve a rethink and thus a change, by making cleaner and smaller cars less expensive by thousands of NIS, while the cost of polluting cars would increase significantly in order to incentivise the public to purchase more environmentally friendly cars. Small family cars were expected to get cheaper because of the reduced tax (up to NIS 120,000).⁴⁶⁴

The tax is a start in the right direction, as is clean air law planned for 2011.

The tax is levied on one of the main pollution sectors, transport, and gives incentives for cleaner cars by recycling the revenue. Nonetheless, for the other emission factors, such as those in industry, a solution should be found as well, in order to mitigate most of the emissions, and, ideally, including revenue neutrality.

⁴⁶⁰ *Ibid.*

⁴⁶¹ In the beginning it was 90% and was reduced end of November 2009.

⁴⁶² NIS is the abbreviation for New Israeli Shekel. One NIS was about USD 0.26 (status 30 July 2010).

⁴⁶³ *Op cit*, Fn. 459.

⁴⁶⁴ Israel Ministry of the Environment *Green Taxes in Effect in Israel* [Online] http://www.sviva.gov.il/Environment/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=Object&enDispWho=News^14767&enZone=e_news accessed on 22 April 2010.

17 India

India is a significant consumer of energy as it is the fifteenth largest country in the world with a constant economic growth. More than 40% of the total energy consumption is based on coal followed by combustible renewables and waste at 27,2%, oil at 23,7%, natural gas at 5,6% and hydroelectric power at 1,8%.⁴⁶⁵ According to the Minister of Environment, Jairam Ramesh, India's per capita carbon emissions will, in the next two decades, remain "below the global average of 25 years earlier".⁴⁶⁶

India ratified the Kyoto Protocol in 2002. However, as a developing country, India does not have to agree to a specific reduction of carbon emissions. But, as a member of the Kyoto Protocol it has to stabilise its emissions. Currently, India has neither implemented a carbon trade system nor a carbon tax. In fact India has no excise duties at all.⁴⁶⁷

According to an economic study by Ojha,⁴⁶⁸ an ETS implementation would be preferred above domestic carbon tax options (within the next 20 years), provided the international market price of emissions permits remains low.⁴⁶⁹ India has also indicated that even if the revenue collected by an energy tax was paid back to households, it would still be advisable to install an ETS. The study shows that high costs and increased poverty could be the results of a domestic carbon tax. If there was a restricted target for emissions and revenue was flowing to the poor, at least increased poverty could be halted.⁴⁷⁰ The reason for this distributional factor is the structure of India. The study analysed a domestic carbon tax which reduced the carbon emissions to the 1990 level and another tax which only reduced the emissions by 10%/annum. The revenues should be recycled either to the households as additional government transfers, or exclusively to a target group of households comprising the four lowest income brackets. The findings were that a tax reducing emissions to the 1990

⁴⁶⁵ U.S. Energy Information Administration *India Background* [Online] <http://www.eia.doe.gov/cabs/India/Background.html> accessed on 10 March 2010.

⁴⁶⁶ Singh *India Says Per-Capita Emissions to Stay Below World Average* [Online] <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aOpKN3dUPWF8> accessed on 20 June 2010.

⁴⁶⁷ *Op cit*, Fn. 241 p. 18.

⁴⁶⁸ Ojha 'Carbon emissions reduction strategies and poverty alleviation in India' *Environment and Development Economics* 2009 Vol. 14 issue 3 pp. 323-348.

⁴⁶⁹ *Ibid*, p. 323.

⁴⁷⁰ *Ibid*.

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level would impose heavy costs through a fall in GDP and a rise in poverty. The 10% annual reduction solution would still lead to significant GDP losses and poverty would also increase, but not as badly as the full emission reduction. By recycling the revenues to the poorest households there would be only a small increase in the number of poor Indian people.

The study showed that a participation in a global ETS for at least the next two decades would be preferable for India. The reason for that is its small per capita emission rate; India could sell parts of its emission trading certificates to other countries and could recycle the money to the poor. India would become a net buyer of permits in about 20 years.⁴⁷¹ Consequently, from then onwards a carbon tax would become more attractive.

According to these findings, participation in an ETS is recommended in the medium-term. But, it has to be remembered that there will be a change within the next 20 years. India should try to reduce its emissions now, through regulations related to low emission policies and should work quickly on the implementation of a modest energy tax, at least, to reduce its emissions permanently, while recycling the revenue to the poor. This could prevent it from becoming a net buyer of permits within the next two decades.

Unexpectedly, India implemented a nation wide carbon tax on 1 July 2010.⁴⁷² The tax is levied on coal, both produced and imported into India, using a tax rate of INR 50 per metric tonne (USD 1.07/mt).⁴⁷³ Indian industry is not a proponent of the tax and expects inflation. Nonetheless, the tax is there and will help to finance a National Clean Energy Fund,⁴⁷⁴ which will be used for funding research, innovative projects in clean energy technologies, and environmental remedial programmes.⁴⁷⁵ The tax was expected to raise INR 25 billion (USD 535 million) for the financial year 2010-2011.⁴⁷⁶

⁴⁷¹ *Ibid*, p. 346.

⁴⁷² Since the implementation of the new tax has occurred shortly before the finalisation of the thesis the new tax is only shown for completeness sake but without any closer analysis.

⁴⁷³ Pearson *India to Raise \$535 Million From Carbon Tax on Coal* [Online] <http://www.businessweek.com/news/2010-07-01/india-to-raise-535-million-from-carbon-tax-on-coal.html> accessed on 10 August 2010.

⁴⁷⁴ *Ibid*.

⁴⁷⁵ Ministry of Environment and Forests *India: Taking on Climate Change Post-Copenhagen Domestic Action* 30 June 2010 Government of India [Online] <http://www.indiaenvironmentportal.org.in/files/India%20Taking%20on%20Climate%20Change.pdf> accessed on 10 August 2010.

⁴⁷⁶ *Op cit*, Fn. 473.

The implementation of this carbon tax should help India achieve its voluntary targets of emissions reduction and is a big step towards an international carbon tax, since an additional main emitter has implemented such a tax. Of course it would have been more effective to levy the tax on all fossil fuels instead of only coal. The same can be said about higher tax rates. But the tax can be amended and it is a first step towards a clean environment, especially since coal is the main energy source in India. Furthermore, it can serve as an example for other countries which have not yet implemented a carbon tax. According to Pearson, the new tax has inspired Australia's new Prime Minister Julia Gillard, who stated on 24 June 2010 that she would "re-prosecute the case for a carbon tax" at home and abroad after her predecessor had shelved plans for an emissions-trading plan.⁴⁷⁷

18 China

China is the biggest emitter of CO₂ worldwide. Although not the biggest emitter per capita, China is a fast growing country in terms of pollution and industry and is a candidate to move from a developing country to an industrialised nation, which means greater responsibilities related to global warming. China signed the Kyoto Protocol on 29 May 1998.⁴⁷⁸

Currently China has a pollution levy but wants to launch a carbon tax in 2012.⁴⁷⁹ China's fiscal system includes both taxes and charges. A tax is levied by the national tax authority and the revenue goes into the general budget, whereas a charge is levied by government authorities in accordance with relevant laws and regulations. The revenue collected is used for defined purposes.

⁴⁷⁷ *Ibid.*

⁴⁷⁸ UNFCCC *Status of Ratification of the Kyoto Protocol* [Online] <http://unfccc.int/playground/items/5524.php> accessed on 21 June 2010.

⁴⁷⁹ 2012 is the ideal time to address China's commitment under the Bali Road map.

18.1 *Pollution levy*

Environmentally friendly behaviour and policies were an early concern in China. In 1979 the Trial Environmental Protection Law came into force. Article 18 declared that:

‘the levy should be imposed on pollution discharges which exceed national pollution discharge standards, based on quantity and concentration of discharges and levy fee schedules established by the State Council.’

As a result most⁴⁸⁰ local governments introduced one or more environmental charges. For the standardisation of environmental charges the central government developed an ‘Interim Procedure on Pollution Charges’ in February 1982,⁴⁸¹ as a framework which included the definition of the system’s objectives, principles, levy standards, levy collection methods, and principles for fund use. The levy system was based on a discharge standard system which only charged pollution which exceeded determined standards.⁴⁸² In 2003 the Chinese government changed the implementation system to one of charges imposed on all pollutant discharges, not just those above a certain level.

The statutory levy rate for air emissions is 0.6 CNY/PE,⁴⁸³ which has been determined by the central government’s State Environmental Protection Administration (SEPA). The local Environmental Protection Bureau is responsible for implementation which results in the fact that the *de facto* rates are much lower than they have been designed for.

Thus, the main result of the reform in 2003 has been that the levy is applied to all emissions. According to Goulder,⁴⁸⁴ the current levy system has many desirable properties, such as incentives for efficient use of the major channels for emission reduction, exploration of

⁴⁸⁰ 27 of China’s 29 provinces.

⁴⁸¹ Wang and Wheeler *Endogenous Enforcement and Effectiveness of China’s Pollution Levy System* working paper Development Research Group World Bank 2005 p. 6.

⁴⁸² The standards were defined by the State Council in 1982 and revised in 1991; they cover 65 water pollutants and 44 air pollutants (status 2006).

⁴⁸³ ‘PE’ stands for ‘pollution-equivalent’, a damage-based measure of emissions. In general, the quantity of emissions corresponding to one PE will be lower, the greater the environmental damage associated with the pollutant in question. CNY is the currency code for the Yuan, the currency in China. One Yuan is approximately USD 0.15 (status 30 July 2010).

⁴⁸⁴ Goulder *China’s Pollution Levy System Theoretical Capabilities and Practical Challenges* Stanford 2005 p. 21.

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particularly efficient sources of government revenue, thus reducing overall economic costs. It also deals with insecurities about marginal costs of compliance.

On the other hand the current system has implementation problems because of a lack of enforcement at the local administration levels, where there is little incentive to enforce the system.⁴⁸⁵ The only way to solve this problem would appear to be the introduction of Environmental Protection Bureaus financed by the central government, thus shifting responsibility to the SEPA.

Nonetheless, the levy is a first step towards emission reduction. The standardisation of the system can be seen as positive since all citizens have to think about their own consumption of emissions and to consider whether it is worthwhile to pollute. Because the poor cannot afford to use renewable energy, their poverty has increased.

It needs to be stated that the pollution levy should not be an alternative for research and development measures and cleaner technologies.

18.2 Chinese planned carbon dioxide tax

According to several reports in April 2009,⁴⁸⁶ the Chinese government was planning to introduce a carbon tax. The tax would be levied *inter alia* on emissions of CO₂ and pro rata on coal, natural gas and petrochemical products.⁴⁸⁷ A team of 20 experts from seven government areas spent more than a year studying its implementation. According to officials in the Ministry the most efficient method to reduce carbon emissions from industry would be the implementation of such a tax.⁴⁸⁸

One reason for the implementation of the tax is, *inter alia*, a statement from China, before the Copenhagen Conference in 2009 that it was working towards 'voluntary action' to reduce the

⁴⁸⁵ *Ibid* p. 22.

⁴⁸⁶ Chinese in Vancouver *China to impose carbon tax* [Online]

<http://www.chineseinvancouver.ca/2009/04/china-to-impose-carbon-tax/> accessed on 22 February 2010, Power-Gen WorldWide *Chinese government 'to impose carbon tax'* [Online]

<http://www.powergenworldwide.com/index/display/articledisplay/359955/articles/power-engineering/industry-news-2/2009/04/chinese-government-to-impose-carbon-tax.html> accessed on 20 October 2010.

⁴⁸⁷ *Ibid*.

⁴⁸⁸ BusinessGreen.com *China to impose carbon tax from 2012* [Online] <http://www.businessgreen.com/business-green/news/2262857/reports-china-impose-carbon-tax> accessed 24 June 2010.

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'intensity of CO₂ emissions per unit of GDP in 2020 by 40%-45% compared with 2005 levels'.⁴⁸⁹

Another reason for the tax was China's anxiety concerning border tax adjustments on imported goods from foreign countries that did not have quotas for emissions reductions (for example America's Clean Energy and Security Act).⁴⁹⁰ This could be avoided by the implementation of an internal tax, since double taxation is prohibited by the World Trade Organization.

The tax will be introduced in 2012, at the latest 2013, and only be levied on industries. The tax rate will start at CNY 20/tCO₂ which would be CNY 11/tonne of coal and CNY 17/tonne of oil⁴⁹¹ and increase to CNY 50/tCO₂, until 2020. According to other information, the tax will start at CNY 10/tCO₂, going up to CNY 70/tCO₂.⁴⁹²

According to the Ministry of Finance, concessions will be made for industries which are most affected, if those companies agree to work towards emissions mitigation.⁴⁹³ In addition, the revenue will be invested to subsidise energy saving and environmentally friendly industries.⁴⁹⁴ Furthermore, it is planned to split the revenue from the tax between the local government (30%) and the state (70%).

The tax can be appreciated even if introduced to avoid border tax adjustments. Implementation will stabilise the economy since the revenue will be kept inside the country. It might be advisable to analyse the use of the revenue so that it is not only used to subsidise environmentally friendly industry. Maybe an allocation towards an income tax reduction, so

⁴⁸⁹ China.org.cn *Levying carbon tax, promoting low-carbon education proposed* [Online] http://www.china.org.cn/china/NPC_CPPCC_2010/2010-03/10/content_19572382.htm accessed on 24 June 2010.

⁴⁹⁰ *Ibid.* Even if the Act was defeated in July 2010 a similar law could be implemented somewhere in the world.

⁴⁹¹ *Op cit*, Fn. 488.

⁴⁹² China.org.cn *Carbon Tax poor fit for China* [Online] http://www.china.org.cn/opinion/2010-06/18/content_20291786.htm accessed on 24 June 2010.

⁴⁹³ Alibaba.com *China ministries propose carbon tax from 2012-report* [Online] <http://news.alibaba.com/article/detail/energy/100297064-1-china-ministries-propose-carbon-tax.html> accessed on 24 June 2010.

⁴⁹⁴ People's Daily Online *China likely to levy carbon tax around 2012* [Online] <http://english.peopledaily.com.cn/90001/90778/90862/6980805.html> accessed on 24 June 2010.

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as to avoid poverty, would be interesting. A direct payment to the poorest should be considered since they might be most affected.

19 Costa Rica

Costa Rica is a developing country which has changed from destroying its environment in the name of economic growth to saving and supporting the environment and achieving, with it, economic growth. Costa Rica signed the Kyoto Protocol on 27 April 1998 and ratified it in August 2002.

Today Costa Rica is a developing state with one of the greatest economic growth in Latin America. In 2002 the six World Bank Governance indicators classified it at the 77 percentile which is 22% higher than comparable nations in its region and 14% higher than the average in its income classification.⁴⁹⁵ Where does this economic growth come from? Could it also become possible for other developing countries worldwide, or at least those in the region?

Costa Rica started environmental activities early on, which included developing a network of governmental and non-governmental organisations, creating 28 national parks and reserves with a comprehensive national park system.⁴⁹⁶ Furthermore, Costa Rica was, *inter alia*, a founder of the UNFCCC and initiated a system of fees and taxes imposed primarily on fossil fuels, that supported farmers and landowners who conserved private forests.⁴⁹⁷

Although Costa Rica is ahead of some of its neighbours and other developing countries in the development of environmental tax laws, there is still a lot to be done, especially in the creation of a coherent, long-term policy or strategy. Currently, there are several tax related incentives, but they are spread out in different laws and institutions, which are briefly outlined.

⁴⁹⁵ Kaufmann, Kraay and Mastruzzi *Governance Matters III: Governance Indicators for 1996-2002* World Bank Policy Research Working Paper 3106 Washington 30 June 2003.

⁴⁹⁶ Pax Natura *Payment for Environmental Services (PES) Program Highlights* [Online] <http://www.paxnatura.org/CostaRicanPESProgram.htm> accessed on 22 February 2010.

⁴⁹⁷ *Ibid.*

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An institution in charge of paying for environmental services is granted 3.5% of revenue from taxation on gas fuels. Formerly, the Forest Law (article 69 repealed by Tax Law No. 8814 in 2001) established that from the amounts collected by selective consumption taxes on fuel and other hydrocarbons, one third was to be allocated annually as compensation to owners of forests and forest plantations for environmental programmes, which mitigated emissions of GHGs and which protected and developed biodiversity. Article 5 of (Tax Law No. 8814 2001), intends to guarantee a more stable transference of those funds. It establishes that 3.5% of the annual product revenue collected from the single tax levied on oil imports has to be paid for environmental services. Nonetheless, the main part (29%) of the revenue is destined for National Council of Roads.

The carbon tax is levied on the following products:

Table 3.9

Fuel tax per litre in colones (¢)

Regular gasoline	191.00
super gasoline/octane	199.75
Diesel	112.75
Asphalt	38.50
Asphalt emulsion	28.25
Bunker	1900
LPG	38.50
Jet A1 Fuel	114.25
Av Gas	191.00
Kerosene	55.25
Heavy Diesel (Diesel)	37.00
Heavy naphtha	27.00
Light naphtha	27.00

(Note: The amounts set forth herein, were updated by article 1 of the Decree).

Exempt from tax are products designed to supply international line carriers, commercial vessels or passengers on commercial airlines that operate internationally, the fuel used by the

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Red Cross Association of Costa Rica and the national fishing fleet involved in (sport) fishing. In addition diplomatic missions and international organisations were exempt.⁴⁹⁸

The tax is levied on imports or the entry of end products as well as domestic production, manufacture, distillation or refining, payable at the latest within the first fifteen calendar days of each month. One of the main taxpayers is the Costa Rican Petroleum Refinery Incorporated (RECOPE), either in its capacity as producer or importer. Exempt from paying this tax are products intended for export.⁴⁹⁹

Conservation, achieved by the use of payments for environmental services, provides among others watershed protection, flood control and maintenance of scenic beauty to preserve biodiversity which mitigates more carbon emissions than Costa Rica itself produced. To increase these funds another programme was added ten years ago. It also supports reforestation and forest preservation but is funded by the sale of carbon certificates to industrialised nations which help them to reduce their carbon emissions (this system is called Certifiable Tradable Offsets).⁵⁰⁰ Costa Rica pays the participating farmers a rate of this fund which has to be set each year and varies in relation to their land use.

Also in the Forest Law one will find other economic incentives regarding taxes such as a Certificate on Forest Conservation (exemption of payment of property tax and assets tax) and other incentives such as incentives for reforestation which comes with the same tax exemption (Article 22, 23 and 29 Forest Law No. 7575).

There are other incentives in clean production and in energy. For example, the Law on the Regulation of Rational Use of Energy No. 7447, its Regulation No. 25584 and the Law on the Promotion of Scientific and Technological Development No. 7169, refer to a list of materials and equipment exempt from tax.

⁴⁹⁸ Article 1.

⁴⁹⁹ Article 2.

⁵⁰⁰ Subak 'The case of Costa Rica's carbon commodity' Forest Trend Workshop Of the Natural Resources Defense Council Victoria BC 15 June 1999 p. 3 [Online] http://www.forest-trends.org/~forestr/documents/files/doc_688.pdf access on 22 February 2010.

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However, Costa Rica's regional leading role is *inter alia* due to its strategic move putting the sectors of energy, environment, mines and water all under one minister (centralisation).⁵⁰¹

Carlos M Rodríguez, the former minister of environment (2002-2006) said about it:

'The environment sector was able to influence the energy choices by saying: "Look, if you want cheap energy, the cheapest energy in the long-run is renewable energy. So let's not think just about the next six months; let's think of 25 years".'⁵⁰²

Today Costa Rica gets more than 95% of its energy from renewable energy.⁵⁰³

Costa Rica has achieved a lot in the field of carbon mitigation as well as renewable energy. To do so, the centralisation of the ministers was a big step since it reduces conflicts of interest. Of course, it could be equally argued that centralisation may actually create conflicts of interest within a single government department, for example between economic priorities and environmental protection. For the last decades Costa Rica has made the right decisions towards environmental protection while putting it before short-term economic priorities which helps giving positive thoughts for their future.

Nonetheless, the tax law should be reformed and outlined in one law to ease-up its monitoring. Furthermore, the tax should be extended to include coal, gas and electricity as well since it is currently only a fuel tax used to increase the 'general budget' (most of the money is used for the roads instead of increasing the support of the farmers or pay back systems).

20 South Africa

Currently South Africa produces about 1% of global carbon emissions.⁵⁰⁴ South Africa's GHG emissions, which were 9 tonnes/capita in 2005, were approximately twice as high as those of other developing countries. South Africa was above the global average of 5.8 tonnes and six times higher than the average emissions of sub-Saharan Africa which were about 1.4

⁵⁰¹ Friedman '(No) Drill, Baby, Drill' *The New York Times* published 11 April 2009 [Online] <http://www.nytimes.com/2009/04/12/opinion/12friedman.html> access on 4 March 2010.

⁵⁰² *Ibid.*

⁵⁰³ *Ibid.*

⁵⁰⁴ Taviv with Wise, van der Merwe and Winkler *The potential for, and costs of, reducing greenhouse gas emissions from non-energy sources in South Africa* University of Cape Town 2008 p. 1.

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tonnes.⁵⁰⁵ These emissions are high compared to some developed countries, such as Spain, (7.3 tonnes). The reason for this is that the South African are highly dependent on fossil fuel, mostly coal. Ninety-one per cent of fossil fuel is used for energy production and use.⁵⁰⁶ In this context it has to be mentioned that only 10% of the South African population is responsible for 90% of the emissions.⁵⁰⁷ The rest of the South African population belongs to the poor-to-middle income class which does not contribute to the majority of emissions. South Africa is participating in the Kyoto Protocol and as a non-Annex I country it does not have to fulfil carbon reduction targets. Nonetheless, as shown above, its emissions are high and there is a need to reduce them.

In this context several ideas have been suggested, *inter alia*, a carbon tax amongst emission trading and subsidies.⁵⁰⁸ A carbon tax has not yet been implemented even if, *inter alia*, Trevor Manuel⁵⁰⁹ saw the tax of 2 cent/kWh on non-renewable energy (primarily fossil fuel and nuclear energy) as a first carbon tax.⁵¹⁰ The implementation of this tax was announced for 2008 and was postponed until July 2009⁵¹¹ when it finally came into force. The levy is part of the Customs and Excise Act of 1964 and can be found under section 48 Part 3 of Schedule 1. The tax is payable by licensed electricity producers in South Africa. Exemptions can be made for their production process, when the electricity will be exported from South Africa or is lost subsequent to generation. It is interesting that the newly implemented levy is called an 'environmental levy' but does not exempt electricity manufactured from renewable energy. Furthermore, there is no special revenue usage determined, so the money goes into the general budget. This levy seems to be a source of income for the government rather than a real environmental tax, since it is neither tax neutral nor environmentally comprehensive. At least

⁵⁰⁵ World Resource Institute *Climate Analysis Indicators Tool Version 7.0* [Online] <http://cait.wri.org/cait.php?page=yearly> accessed on 4 March 2010.

⁵⁰⁶ Department of Environmental Affairs and Tourism *State of Air Report 2005 – A report on the state of the air in South Africa* Pretoria 2009 p. 34 [Online] <http://soer.deat.gov.za/newsDetailPage.aspx?m=66&amid=6024> accessed on 10 April 2010.

⁵⁰⁷ Kamaldien 'A carbon economy is not viable' *Mail & Guardian* published 14 October 2009 [Online] <http://www.mg.co.za/article/2009-10-14-a-carbon-economy-is-not-viable> accessed on 4 March 2010.

⁵⁰⁸ For more information see: Winkler and Marquard *Energy development and climate change in South Africa: Decarbonising Growth in South Africa* for UNDP's Human Development Report 2007/2008 Occasional paper 2007/40 p.20ff.

⁵⁰⁹ South Africa's Minister of Finance from 1996 until 2009.

⁵¹⁰ Winkler and Marquard *Analysis of the economic implications of a carbon tax* Energy Research Centre University of Cape Town February 2009 p. 8.

⁵¹¹ Donnelly 'New carbon tax on its way' *Mail & Guardian online* published 29 October 2008 [Online] <http://www.mg.co.za/article/2008-10-30-new-carbon-tax-on-its-way> accessed on 2 February 2010.

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the levy should be amended regarding exemptions for electricity produced from renewable energy.

A proposal for an ETR in South Africa was released in April 2006 by the National Treasury. One option was to extend the already existing ‘environmentally-related’ taxes and charges by reviewing the role of the instruments and improving the environmental outcomes whilst at the same time generating revenues.⁵¹² The idea behind it is shown in the following table:

Table: 3.10

Theme	Instrument	Incentive mechanism	Shortcomings and key technical considerations
Transport (National Government)	General fuel levy	<ul style="list-style-type: none"> Increases the price of transport fuels, thereby suppressing demand; Discourage vehicle use; Encourage the use of public transport / vehicle sharing; Encourage the development of fuel efficient technologies; and Could encourage the use of certain fuels over others. 	<ul style="list-style-type: none"> Not differentiable for time and location of infrastructure use; Relatively far removed from the main source of environmental externality; Complementary policies required to increase its effectiveness such as information campaigns; Potentially regressive.
	Vehicle customs and excise duties	<ul style="list-style-type: none"> Increase the price of certain vehicles (building on the idea of a luxury tax) thereby suppressing demand for passenger and light commercial vehicles; Encourage the use of public transport / vehicle sharing; Could encourage the use of selected types of vehicles / technologies through differential taxation. 	<ul style="list-style-type: none"> High information requirements on vehicle types and technologies; Difficult to link tax to the time and frequency of infrastructure use (if desirable);
Transport (Provincial Government)	Vehicle licensing fees	<ul style="list-style-type: none"> Increase vehicle ownership costs and therefore suppress vehicle demand; By altering the fee structure to include environmental criteria, appropriate incentives could be offered to vehicle users; Could be used to increase scrapping rate of older vehicles (i.e. differentiate fees according to the age of the vehicle). 	<ul style="list-style-type: none"> The environmental incentive is likely to be small; Must avoid over-complication of fee structure; and Potentially regressive.

Source: National Treasury *A framework for considering market-based instruments to support environmental fiscal reform in South Africa* draft policy paper National Treasury Tax Policy Chief Directorate Pretoria 2006 pp. 70-71 [Online] http://www.capecaction.org.za/uploads/Framework_for_enviro_fiscal_reform_Treasury_06.pdf accessed on 10 April 2010

⁵¹² National Treasury *A framework for considering market-based instruments to support environmental fiscal reform in South Africa* draft policy paper National Treasury Tax Policy Chief Directorate Pretoria 2006 p. 38ff [Online] http://www.capecaction.org.za/uploads/Framework_for_enviro_fiscal_reform_Treasury_06.pdf accessed on 10 April 2010.

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A problem concerning the fuel levy was that the fossil fuel industry was not allowed to pass on the price to the customers. In South Africa, both imported and domestically produced petrol are subject to petrol retail price control, regulated under the Petroleum Products Act. This means that in South Africa petrol can only be sold at the regulated retail price. This petrol price regulation means that the petrol pump price at all service stations in a pricing area must be the same, and no discounting is allowed. It follows that a tax levied downstream would increase the price of petrol determined under the Petroleum Products Act and as such could not be passed on to the consumers since that would exceed the determined retail price. Accordingly, such a tax could only be paid by the petrol producer or importer. If biofuel manufactured from renewable resources was exempt from the tax, it could be a good incentive for industries to change to clean production with renewable energy.

As shown above, Israel has already implemented a vehicle customs and excise duty. South Africa has considered that to get the required information on vehicle types and technologies is too costly. South Africa should consider the Israeli solution and how Israel gets the necessary information if it is interested in holding on to this tax possibility. Its realisation is possible and does not need to be too costly.⁵¹³

As another possibility, the draft envisages the option of developing new environmentally-related taxes. For examples see Table No.3.11.

⁵¹³ According to the news, South Africa's government plans a new once-off tax on passenger vehicles, paid at purchase, and related to the amount of carbon dioxide the vehicle emits. The proposal intends adding R75 to the purchase price of a car for every gram of CO₂ per kilometre it emits over 120g/km. (Parker *South Africa: Fuel Emissions* 4 August 2010 [Online] <http://allafrica.com/stories/201008040502.html> accessed on 10 August 2010.)

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Table: 3.11

Theme	Instrument	Incentive mechanism	Key technical considerations
Electricity	Electricity consumption tax	<ul style="list-style-type: none"> • Increase the price of electricity, thereby suppressing demand; • Indirectly reduce air pollution emissions; and • Encourage fuel efficiency and demand-side management. 	<ul style="list-style-type: none"> • Difficult to distinguish between different energy sources; • Relatively far removed from the main source of externality; • Complementary policies required to increase its environmental effectiveness; and • Potentially regressive although possibilities exist to reduce the economic burden for certain groups.
	Fossil fuel input tax	<ul style="list-style-type: none"> • Increase the price of certain fuels relative to others; • Encourage greater fuel efficiency and energy conversion ratios; and • Indirectly reduce air pollution emissions. 	<ul style="list-style-type: none"> • Difficult to reduce the economic burden of the tax for certain groups; and • May disadvantage domestically generated electricity (although imports are currently small) – boarder tax adjustments would be difficult.
Water Supply and Use	Taxes on water use	<ul style="list-style-type: none"> • Increase the price of water and suppress demand; and • Could be differentiated according to different users and contribute to re-allocation initiatives; 	<ul style="list-style-type: none"> • Potentially complex to administer and ensure reliable monitoring of water use; and • Alternative market-based instruments such as tradable water use permits may be more appropriate to perform allocative functions.
Waste Water	Effluent taxes	<ul style="list-style-type: none"> • Increase the price of water and encourage more sustainable use; and • Could encourage the reduction in both the volume and load of water effluent. 	<ul style="list-style-type: none"> • Potentially complex to administer; • Difficult to ensure reliable monitoring of water discharges; and • Difficult to capture all forms of water pollution, particularly from diffuse sources.

Source: National Treasury *A framework for considering market-based instruments to support environmental fiscal reform in South Africa* draft policy paper National Treasury Tax Policy Chief Directorate Pretoria 2006 p. 79 [Online] http://www.capecaction.org.za/uploads/Framework_for_enviro_fiscal_reform_Treasury_06.pdf accessed on 10 April 2010

When considering taxation of electricity, it is necessary to focus on the related restructuring of the electricity industry and the need for access to electricity by households which do not have the service yet. According to Eskom (the leading electricity producer), 28% of all households in South Africa in 2004 had not been electrified but universal access would be achieved by 2014.⁵¹⁴ Furthermore, the affordability of electricity for low-income households has to be kept in mind.

⁵¹⁴ Eskom *Electrification* [Online] http://www.eskom.co.za/live/content.php?Item_ID=2786 accessed on 1 July 2010.

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In South Africa at present, the concept of renewable energy is not economically viable, nor is an electricity tax, as it will have a negative effect on the poor and on economic growth. This was reflected in the average electricity price of 2007/2008, which started out at a rate of ZAR 0.198/kWh⁵¹⁵ and moved to about USD 0.06 (ZAR 0.4351/kWh).⁵¹⁶ But the production costs of wind energy (USD 0.07/kWh) and solar energy (USD 0.17) are expected to decrease in the next decade. Then a shift towards renewable energy might be viable.

As another possibility the framework suggested a fuel input tax rather than an electricity consumption tax at a national level. The reason for that was that a consumption tax would only achieve environmental outcomes via a reduction in demand for electricity, whereas a tax on fuel inputs used in the combustion process, would support carbon emission reduction by a change in the use of fossil fuel and would not necessarily reduce the demand for electricity itself. A fuel input tax would furthermore exclude electricity generated from renewable energy. This exclusion would be difficult and problematic to design in a consumption tax.

Nonetheless, the framework pointed out that even if the input tax was preferable from an environmental aspect, it was still necessary to consider distributional, competitive and administrative issues. Impacts on competitiveness, reduced tax rates, tax ceilings or even exemptions were mentioned in certain cases.

In literature⁵¹⁷ it has been pointed out that the income from the above mentioned taxes would be larger than the loss in sales revenue to Eskom. This additional revenue could be used for tax shifting programmes, renewable energy and research and development measures.

At the moment it appears that South Africa will not cope with its self-appointed leadership position in Africa on carbon emission mitigation. In November 2009, the Minister of Environment released a statement indicating that the emissions of South Africa would rise

⁵¹⁵ Pegels 'Renewable energy in South Africa: Potentials, barriers and options for support' *Energy Policy* 2010 vol. 38 issue 9 pp. 4945-4954 (4948).

⁵¹⁶ Eskom *Average Price Increases* [Online]

http://www.eskom.co.za/live/content.php?Item_ID=937&Revision=en/18 accessed 30 June 2010.

⁵¹⁷ Winkler *Cleaner energy, cooler climate: Developing sustainable energy solutions for South Africa* HSRC Press Cape Town 2009.

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over the next 16 years and a drop in emissions is only expected around 2035.⁵¹⁸ Emissions would rise from 450 ppm to approximately 550 ppm in 2020/2025. They would remain stable for the next 10 years and a decreased target was set for 2035 for which financial assistance for low-carbon initiatives and access and transference of technology, would be necessary.⁵¹⁹ The Minister of Energy stated that a developing country could not be expected to be bound to a reduced emission target considering its great developmental challenges. It is her opinion that to meet the country's developmental needs, leniency would be required.⁵²⁰

It was a surprise when South Africa offered to reduce the growth of its GHG emissions by 42% by 2025 on the opening day of the climate change conference in Copenhagen in 2009, on condition that the industrialised countries increased aid for poor nations to cope with climate change.⁵²¹ By 2020 South Africa would mitigate its emissions by 34%, less than is currently expected. Nonetheless, a rise in emissions to 2025 would continue, followed by a stabilisation decade and only a decline afterwards. However, South Africa's offer could lead to the first commitment by a major developing country (especially since in Cancun in 2010 a modest deal was reached by setting up a Green Climate Fund to help poor countries adopt mitigation measures. The fund commits rich countries to collect USD 100 billion a year by 2020. The fund will be governed by representatives of developed and developing countries, whereas the finances will be administered by the World Bank. For the operational part a committee will be established to invent its necessary institutions).

To achieve the reduction of emissions announced, South Africa urgently needs solutions and a carbon tax based on a fossil fuel input tax might be best (but should not be the only measure).

An electricity base tax would only be possible by subsidising poor households (even more than this currently occurs⁵²²), with a higher amount of free electricity paid by part of the revenue. In addition, other taxes could be reduced (shifted) and there would still be enough

⁵¹⁸ News24 *SA emissions to drop from 2035* 5 November 2009 [Online] http://www.news24.com/Content/SciTech/News/1132/319b19ac5ecd4155b2f6d7e7375164a4/05-11-2009-10-24/SA_emissions_to_drop_from_2035 accessed on 22 February 2010.

⁵¹⁹ *Ibid.*

⁵²⁰ *Ibid.*

⁵²¹ Business Report *South Africa offers to slash emissions for aid* 7 December 2009 [Online] http://www.busrep.co.za/index.php?from=rss_Business%20Report&fArticleId=5276938 accessed on 10 March 2010.

⁵²² Currently, poor households get a basic amount of electricity free, while different tariff structures already exist. It is paid by private consumers and industries that have higher consumption.

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money to invest in South Africa's research and development programme to help it to be independent of the technology and knowledge of other countries. Furthermore, to reduce the fear of competitive losses, energy-intensive industries could be given the option to apply for a tax exemption by committing to a energy reduction plan.

The potential impact of a carbon tax is uncertain in South Africa as it was in other countries. However, the economic models in other countries have documented the influence of such a tax quite precisely. Accordingly, it can be assumed that the models will be accurate in their estimations for South Africa. A couple of studies in the field of economy and energy taxes are already available.⁵²³ In these studies a carbon tax was shown to be very effective in mitigation of carbon emissions.

However, the National Treasury announced in 2008 after its draft of the 2006 policy paper, 'A framework for considering market-based instruments to support environmental fiscal reform in South Africa', that four mitigation measures would be looked at closely, namely: 'the use of emission charges and tradable permits, tax incentives for cleaner production technologies and a reform of the existing vehicle taxes to encourage fuel efficiency'.⁵²⁴

According to the Van Heerden et al.⁵²⁵ analysis, 'South Africans' energy corresponds to its capital' and the authors recommended recycling the energy tax venue in order to reduce food costs. A 'triple dividend' would be the result of a combination of the above and tax recycling, whereby more untrained employees would be needed.

⁵²³ For more details: a partial equilibrium model of the whole energy system was developed for the Long Term Mitigation Scenarios project; see: Winkler (edt) *Long Term Mitigation Scenario - Technical Report Department of Environmental Affairs and Tourism South Africa* Pretoria October 2007; Hughes with Haw, Winkler, Marquard and Mervin *Energy emissions: A modelling input into the Long Term Mitigation Scenarios process* Prepared by the Energy Research Centre for Department of Environment Affairs and Tourism Pretoria October 2007 [Online] <http://www.erc.uct.ac.za/Research/LTMS/LTMS-intro.htm> accessed on 10 March 2010, and the impact of a carbon tax was modelled in some detail, which gives some indication of how the energy system would respond, and at what price levels. Van Heerden with Gerlagh, Blignaut, Horridge, Hess, Mabugu and Mabugu 'Searching for triple dividends in South Africa: Fighting CO2 pollution and poverty while promoting growth' *The Energy Journal* 2006 Vol. 27 issue 2 pp. 113-141 also explored the economic implications of a carbon tax.

⁵²⁴ Manuel *Budget speech 2008* National Treasury Pretoria 20 February 2008 p. 23 [Online] <http://www.treasury.gov.za/documents/national%20budget/2008/speech/speech.pdf> accessed on 10 March 2010.

⁵²⁵ Van Heerden et al. *Op cit* Fn 523.

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It has to be questioned whether a change in the liquid fuels regulations would be necessary since currently the industry is not able to pass on the cost increases which would be incurred through the implementation of the tax. This would benefit the poor consumer but on the other hand would weaken the impact of the tax since the steering effect would only occur in the production companies (for example SASOL)⁵²⁶.

21 Conclusion

As in most cases with the introduction of a new tax, different problems emerge: unwillingness in the population to pay more taxes, the anxiety of industry about being uncompetitive as well as distributional problems. Different countries as well as the European Union have tried to consider and solve the problems with diverse approaches and results.

A major problem for the European Union was the introduction of its energy tax which took about twelve years. The first attempt to implement a fixed agreement failed since the Member States did not want to give up their sovereignty. There was a similar result when trying to implement a framework several years later, though for different reasons. The 1997 framework in its initial version proposed to levy the tax not only on oil but on all fossil fuels, including electricity. This time industry was nervous about the possible competitive impact. Finally the amended proposal, which was very woolly, with only small tax rates and weak increasing regulations was accepted in 2003 and came into force in 2004. Since it was necessary to implement emission mitigation measures, the Member States of the European Union agreed to a broad scope of taxation and all fuels and electricity have been included, but with only small increases and minimum rates.

Businesses and industry often suggest that they will reduce emissions on a voluntary basis but as seen in Switzerland's 'trust but verify'; the verification is now by law since the voluntary approach failed.

When choosing which tax solution has the right mitigation measures, it must have low administrative costs. To achieve this aim several countries have chosen similar and some contrary solutions. Which measures will be suitable cannot be measured conclusively and

⁵²⁶ Sasol is one of the largest energy and chemical industries within South Africa.

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each has to be individually researched for every country, since every country is different in its structure, needs and demands, together with its own target for reducing emissions. The tax subject in the United Kingdom for example is industry, commerce and the public sector. The CCL is levied according to the amounts of energy consumed. In comparison, private households are not a tax target. The tax subjects in Denmark and in most other countries in contrast are individuals and industry. In Denmark individuals are taxed more highly than industry. Taxpayers in Switzerland are households and industry, but the law does not differentiate between them in general.

The factor which all countries and their taxes have in common is the aim to reduce carbon emissions. The different approaches used, such as taxing fossil fuels upstream, downstream or a mixture of both, have been described, as well as the problems which have arisen with these measures. The most common approach has been a combination of upstream and downstream taxation. Denmark, for example, chose both primary and secondary energy sources as tax objects, with an exemption when the source was already used for power generation. Similar measures have been used in Germany and the European Union. The United Kingdom has only levied the tax on supply (tax object) instead of energy usage, as it is easier to differentiate between households and businesses and whether the user is domestic. Levying tax on the energy user makes the CCL a downstream tax. In comparison an upstream tax would have to be levied directly on the generators, which would have given them a direct incentive for changing to low emission energy sources such as renewable energy. Nonetheless, the downstream tax has achieved differentiation between consumers.

In the beginning Finland taxed electricity produced from fossil fuels by input before its tax reform in 1996. To avoid double taxation, electricity produced by coal or other fossil fuels was not taxed. This was an uncommon way of avoiding double taxation, as in general it is more common to tax electricity and not the inputs (fossil fuels) used for its manufacture. Finland only taxed specific electricity manufacturing processes and left out others; for example, wind energy. The tax was transformed from an input into an output tax, which included a consistent taxation of electricity consumption, levied on the final consumer. In conclusion, it can be said that the first version of the Finnish energy taxation was the way most preferred by exponents of an environmentally related energy tax reform, which was seen as the most effective one. It was levied on input which granted a precise distinction and

taxation of CO₂ emissions. However, this approach was, especially without tax exemptions for energy-intensive industries, non-competitive. The prevention of competition problems by the introduction of such a tax by only one state, or a small number of states, seems to be possible only through granting tax exemptions and tax shelter. This did not take place. Such an input tax would only be beneficial if it was implemented by all, or at least most of, the OECD countries in order to avoid competitive distortions. Unfortunately, it has to be realised that in an open energy market an input tax system weakens the competitiveness of the domestic energy producer, and the rest of the industry. (As seen above it was one of the reasons why the EU energy tax law took so long before implementation and was so watered down). According to this, the most effective way to internalise external effects in Finland was considered politically impossible in a global market.

It is advisable to implement the tax gradually as almost all countries have done, which allows taxpayers time to adjust their use of fossil fuels and for companies to change or to develop new techniques.

Administratively, it is wise to use existing structures, so as to avoid a new administration which brings complications and is expensive. Thus the energy tax has been implemented in all countries as an excise tax.

It is advisable not to use the revenue for the general budget, but to pay it back to the taxpayer in some way, so as to avoid major distributional effects. It might be best to implement a revenue neutral tax, but this has to be analysed for economic impact. Commonly the revenue has been used to reduce income tax or social contribution costs. Several regions in Spain have used it for environmental protection and clean-up. Murcia, however, the use of revenue for almost everything, seems to be too wide and as such, is neither economical nor predictable.

In addition, it has to be said that not everything can be achieved through carbon taxation. Denmark is one of the countries with the highest CO₂ taxation in the world. The taxes have successfully reduced CO₂ emissions, but a further increase to achieve more reduction would not be wise since there is a danger that this could lead to a cut in competitiveness and impose an additional burden on individuals.

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The other taxes discussed, such as the car tax in Israel or the surcharge in Zambia (see Appendix 7), are rather different. The Israeli tax has an interesting steering aspect which forces the producers of high emitting cars to change their products or deal with a decline in sales. The tax is expected to have a high environmental effect and as such it could be interesting for other countries to implement such a tax as well. The surcharge in Zambia is easy to implement but is a tax to increase the national budget rather than to save the environment and as such it does not fall under the classic carbon/energy taxes discussed in this thesis.

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V General Agreement on Tariffs and Trade and the World Trade Organization

This chapter briefly explains the development from the General Agreement on Tariffs and Trade (GATT) to the World Trade Organization (WTO). Then it describes what border tax adjustments (BTAs) are, how they have been used and why they could be used as an instrument to reduce the impact of international competitiveness related to the implementation of energy taxation. Section three examines whether the implementation of BTAs could be in conflict with the rules related to international trade (GATT and WTO). Finally this chapter will show the possibility of using post-Kyoto ideas for adapting WTO regulations.

1 The development from GATT to the WTO

GATT was established in 1947 in order to create a third institution in addition to the World Bank and the International Monetary Fund (IMF), shortly after the end of World War Two. Discussions started in December 1945 and attempted to minimise and secure custom tariffs. The result was an amalgamation of trade rules and 45,000 tariff concessions.⁵²⁷ The deal was signed by 23 countries on 30 October 1947 and came into being on 30 June 1948.⁵²⁸

The Charter of the International Trade Organisation (ITO) was ambitious but was agreed on in Havana in March 1948. Nevertheless, it was not possible to transpose it into the national legislation of the founding parties because of their fear that the ITO would be too involved in internal economic issues.⁵²⁹ Because of the announcement of the United States in 1950 that it would not ratify the agreement, its establishment has been considered to have failed. This made GATT, with only a few amendments, the only multilateral trade instrument for 47 years. GATT helped to ensure consistent trade expansion. Countries were able to trade with each other which led to global trade growth.

⁵²⁷ World Trade Organisation *Understanding the WTO* 4ed Lausanne 2008 p. 15.

⁵²⁸ *Ibid.*

⁵²⁹ *Ibid* p. 16.

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During the Uruguay Round⁵³⁰ the number of new members of GATT showed the worldwide interest in developing an instrument of economic and trade reform.⁵³¹ In the early 1980s, after over 30 years of GATT, world trade had changed and the need arose for a multilateral agreement, which included not only goods but agriculture, textiles and clothing, banking, telecommunications, government purchases, industrial standards and product safety, which led to the Uruguay Round (1986 - 1994), the Marrakesh Declaration of 15 April 1994 and the creation of the WTO. After more than seven years of deliberation, the WTO was agreed upon by most of the 123 participating ministers.⁵³² The content of the agreement was far reaching and included, *inter alia*, everything from household goods such as toothbrushes, to luxury goods such as pleasure boats. Telecommunication, banking, AIDS treatment and the genes to certain varieties of wild rice were included as well. As a result this became the most widespread negotiation of its time and possibly in history.⁵³³ The WTO came into effect on 1 January 1995 and replaced GATT as an international organisation.⁵³⁴ Nonetheless, GATT still exists as an umbrella treaty in respect of trade in goods, amended by the Uruguay Round. Pertaining to the changes in 1994 GATT 1994 (amended after the Uruguay Round) needs to be distinguished from GATT 1947, (the original agreement which is still the heart of GATT 1994). Unless specially marked, GATT in the following sections means GATT 1947.

2 WTO and the environment

Even if the word ‘environment’ was not used in the original GATT 1947 agreement, at least in the preamble of the agreement to establish the WTO the environment is considered:

‘...expanding the production and trade in goods and services, while allowing for the optimal use of the world’s resources in accordance with the objective of sustainable development ... in a manner consistent with respective needs and concerns at different levels of economic development’.

It has been argued⁵³⁵ that ‘sustainable development’ in the wording of the preamble would not mean ecologically sustainable development. Against this can be placed in Article XX of GATT, which includes environmental issues.

⁵³⁰ The Uruguay Round was the 8th round of multilateral trade regulation discussions which lasted from 1986 till 1994.

⁵³¹ *Op cit*, Fn. 527 p. 17.

⁵³² *Ibid* p. 18.

⁵³³ *Ibid*.

⁵³⁴ *Ibid* p. 19.

⁵³⁵ Gainard, Benoît and Martimort-Assou *WTO’s contribution to sustainable development governance: balancing opportunities and threats* IDDRI Conference, Paris, 20 & 21 October 2005.

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‘Nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures ... necessary to protect human, animal or plant life or health ... [or] ...relating to the conservation of exhaustible natural resources...’.

Furthermore, there have been strong debates concerning the admittance of sustainable development in the preamble of the WTO. The question being whether or not the WTO faces any legal obligation in attaining such a goal, and if so, whether these obligations should be affected by strong or weak conditions? Finally, it was concluded that the WTO has the responsibility to advocate for the growth of a global economy. It was also recognised that this could only be achieved by nurturing sustainable development, regardless of the strength or weakness of the hypotheses the WTO might be asked to rule upon.⁵³⁶

As we will see, the implementation of BTAs as mitigation measures depends on the relevant norms of the WTO, whereas seeing these rules with ‘green eyes’ could help the global environment and trade worldwide.

2.1 WTO rules and climate change

When governments establish measures to mitigate climate change they ought to study the regulations of the WTO, especially when they are thinking of implementing price-based measures, particularly taxes and tariffs, as well as subsidies, since the WTO regulations can play a role as to whether a climate change programme or regulation is legal or illegal. Consequently, these regulations should be considered and followed in the earliest stages of the design of mitigation tools.

Trade restrictions are limited by the WTO regulations, which only allow the achievement of certain policy objectives as long as a number of carefully crafted conditions are considered.⁵³⁷ For the implementation of BTAs the following rules and principles might be relevant:

⁵³⁶ Tisdell *Economics, Ecology and the Environment – Globalisation, WTO and Sustainable Development* Working Paper No. 46 The University of Queensland August 2000 p. 9.

⁵³⁷ WTO *The multilateral trading system and climate change* p. 7 [Online]
http://www.wto.org/english/tratop_e/envir_e/climate_change_e.pdf accessed 4 March 2010.

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- most favoured-nation principle
 - national treatment principle
 - disciplines on tariffs (border measures)
 - prohibition against border quotas
 - rules on subsidies
 - and eventually the rules on technical regulations and standards.

Should the BTA regulations be in conflict with the GATT/WTO regulations this could lead to a dispute settlement procedure before the WTO Panel first, and the Appellate Body in the second instance.⁵³⁸ Though the Panel itself has no direct enforcement powers, it can force permission from the applicant state to impose trade sanctions so long as the other state has not ceased its infraction.⁵³⁹ To avoid such procedures, the planning and developing of climate change instruments have to be achieved regarding their WTO capability.

2.2 Policy measures for addressing competitiveness concerns

As shown above, competitive issues can be a major problem when introducing environmentally related taxes such as energy/carbon taxes. The concern about carbon leakage is widespread, which comes along with:

1. the creation of ‘carbon havens’, i.e. countries with less stringent carbon policies which attract carbon-intensive industries, thereby endangering the global effectiveness of carbon-constraining environmental policies, and
2. the concern of job relocation, resulting from the relocation of industries to countries where climate change mitigation policies are less costly.⁵⁴⁰

To address the competitiveness problem, governments have used two methods. First, granting tax exemptions, as seen in Chapter Four, is widespread, especially for the most energy-

⁵³⁸ For more details see: Petersmann ‘International Trade Law and International Environmental Law: Environmental Taxes and Border Tax Adjustment in WTO Law and EU Law’ in Revesz with Sands and Stewart(ed) *Environmental Law the Economy and Sustainable Development* Cambridge University Press 2008 pp. 127-156.

⁵³⁹ GATT 1994 *Understanding on Rules and Procedures Governing the Settlement of Disputes* (in the following this is abbreviated as DSU) Art. 22.

⁵⁴⁰ Reinaud (2008) *Op cit*, Fn. 144 p. 27.

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intensive industries. Many countries have partly or entirely waived taxes on coal or other energy products used mainly by heavy-energy industries. In countries like Denmark, Germany and the United Kingdom, for example, substantial discounts and reduced energy or carbon tax rates are applied to industries related to energy or carbon taxes.

BTAs are the second instrument in use. This means that environmentally related taxes can be waived for exports and added to imports. It is common practice, for instance, in countries which levy domestic taxes on fossil fuel for fiscal purposes, but also use BTAs equal to the domestic tax, when importing such fuels.⁵⁴¹ Furthermore, BTAs have been used by the US government and their GATT conformity has been proven in two important Panels: United States – Taxes on petroleum and certain imported substances (Superfund)⁵⁴² and the Ozone Depleting Chemical Tax (ODC Tax) which was introduced to implement the Montreal Protocol on Substances that Deplete the Ozone Layer in the United States. (A deeper look at these Panel decisions will occur later in this Chapter).

BTAs have not yet been applied for taxes on energy inputs used in the production of final goods.⁵⁴³

3 Border tax adjustment

Price differences have always existed. During the Bush administration the price for heavy fuel oil for industry in the United States, was about one-fifth lower than the average price in some European countries.⁵⁴⁴ A similar problem could occur if not all countries worldwide implemented energy taxation. Accordingly, the introduction of a BTA would help to avoid carbon leakage caused by non-global implementation of carbon/energy taxes and will subsequently be examined.

⁵⁴¹ OECD *Economic/Financial Instruments: Taxation (i.e. Carbon/Energy)* Annex I Expert Group on the United Nations Framework Convention on Climate Change Working Paper No. 4 OECD/GD(97)188 OECD Paris 1997.

⁵⁴² Report of the Panel *United States – Taxes on petroleum and certain imported substances (Superfund)* (L/6175 - 34S/136) 5 June 1987 adopted on 17 June 1987.

⁵⁴³ Biermann and Brohm 'Implementing the Kyoto Protocol Without the United States: The Strategic Role of Energy Tax Adjustments at the Border' Global Governance Working Paper No. 5. January 2003 *Climate Policy* Vol. 4 2005 pp. 289-302(291).

⁵⁴⁴ For more details see: International Energy Agency *Key World Energy Statistics from the IEA 2001* Paris 2001 pp. 42–43 and authors' calculations.

The following paragraph explains what BTAs are, how they can be used to reduce the impact of international competitiveness and whether they are in accordance with international trade law.

3.1 Definition of border tax adjustment

The term BTA is understood as ‘the application of a domestic tax on imported goods while exempting exported goods from the tax in an effort to make the price of the exported goods competitive both nationally and internationally.’⁵⁴⁵ The term is used by the OECD which defines it as:

‘...any fiscal measures which put into effect, in whole or in part, the destination principle (i.e. which enable exported products to be relieved of some or all of the tax charged in the exporting country in respect of similar domestic products sold to consumers on the home market and which enable imported products sold to consumers to be charged with some or all of the tax charged in the importing country in respect of similar domestic products)’.⁵⁴⁶

The word ‘border’ might be inaccurate since it implies that the tax adjustment would happen at the border, when this is not so.⁵⁴⁷ As can be seen in the definition, only the import is taxed, not the export and thus there is no space for a tax adjustment. In addition the imported goods are taxed when the importers sell the products, which almost never occurs at the border.

If domestic and imported products are subject to separate arrangements, there is a matter of explicit discrimination, whereas the reverse case is that domestic and imported products are subject to the same tax, which might lead to an implicit discrimination. The explicit discrimination might be treated differently under the WTO regulations than the implicit discrimination. This has to be kept in mind in the subsequent analysis.

There are two possibilities of how and when a tax can be levied on traded goods. The ‘country of origin principle’ levies the tax on products in the country of their production. The ‘country of destination principle’ (already included in the OECD definition of BTA) requires taxing the products in the country of consumption. Fascinating in this respect, is that even though every

⁵⁴⁵ Bnet Business Dictionary *Business Definition for: Border Tax Adjustment* [Online]

<http://dictionary.bnet.com/definition/border+tax+adjustment.html> accessed on 22 February 2010.

⁵⁴⁶ GATT *Border Tax Adjustments – Report of the Working Party adopted on 2 December 1970 (L/3464)*

Working Party of GATT p. 1 [Online] <http://www.worldtradelaw.net/reports/gattpanels/bordertax.pdf> accessed on 4 March 2010.

⁵⁴⁷ *Ibid* para. 5.

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country has its own tax system, the goods of all countries can compete on the global market. This is due to the worldwide application of the ‘country of destination principle’ since it leads to competitive neutrality. Accordingly, the BTA would have to be levied only on imported goods in the countries of destination. And, because of the destination principle no double taxation would occur.

3.2 Historical and contemporary context of BTAs

BTAs have been used for a long time on excise taxes. The first US excise tax, levied on distilled spirits in 1791,⁵⁴⁸ was adjusted at the border by charging import duty and was waived concerning re-exports. In the late 19th century the application of BTAs was used in many intergovernmental agreements to prevent or guard against the protective use of border charges.⁵⁴⁹ The application of BTAs was not considered at the GATT negotiations and only became relevant in the late 1960s when the European Economic Union ordered its parties to replace their national ‘turnover taxes’, or sales taxes, with a value added tax (VAT).⁵⁵⁰ As a consequence, the discussion about BTAs came up within the Trade Committees of OECD and GATT. The reason for that was the purpose of harmonising indirect taxation within the European Economic Union (now the European Union) followed by other OECD countries and their increased use of BTAs to achieve this harmony. The United States also applied BTAs in its excise legislation as a means of maintaining its export industry.⁵⁵¹ In 1968 a Working Party on BTAs was established to focus on the harmonisation problem. The working group held twelve meetings between 1968 and 1970 and completed its work with a final report.⁵⁵²

The interest in BTAs is experiencing a revival through discussions about their application in the field of climate change mitigation. In an advisement for the Japanese government, it was proposed that BTA’s might potentially be used for global product exchange with regard to

⁵⁴⁸ Tax history museum 1777-1815 *The Revolutionary War to the War of 1812* [Online]

<http://www.taxanalysts.com/Museum/1777-1815.htm> accessed on 10 March 2010.

⁵⁴⁹ OECD, *Op cit*, Fn. 144 p. 92.

⁵⁵⁰ *Ibid*.

⁵⁵¹ Hoerner *The Role of Border Tax Adjustments in Environmental Taxation: Theory and U.S. Experience*

Working paper presented at the International Workshop on Market Based Instruments and International Trade of the Institute for Environmental Studies Amsterdam 19 March 1998.

⁵⁵² *Op cit*, Fn. 546.

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countries that did not implement corresponding aggressive tools to protect the environment.⁵⁵³ The discussion on whether it would be the right instrument is continuing in this field. In this thesis BTAs are seen as a possible method for implementing energy taxation at a global level while reducing carbon leakage.

3.3 The effect of BTAs

BTAs are import restrictions and as such interesting for countries which have introduced CO₂ taxes and/or carbon trading systems, since they are concerned that other industrialised countries, particularly those which have not ratified the Kyoto Protocol, or have not yet introduced CO₂ reduction measures, could fare better competitively than those who have. For example, the European Union apprehends that a competitiveness problem might occur if there is a lack of an international agreement for the post-Kyoto period. In the first half of 2007 the European Union agreed to a unilateral emission reduction of 20% of GHGs from the 1990 level by 2020 or, if there were other industrialised countries introducing similar reduction targets, then the European Union would raise its target up to 30% of the 1990 level. Such an abatement policy could endanger the competitiveness of the EU Member States. Currently, the European Union is thinking about two possible trade measures so as to avoid competitive disadvantages; BTA and integrated emission trading.⁵⁵⁴ This thesis only focuses on the tax aspect, and accordingly only analyses BTAs. If in the European Union no solution is found then the countries which are participating under the high reduction agreement might have to compete at an unequal level (the phenomenon of carbon leakage).

The positive effect of implementing BTAs on fossil fuels instead of, for example, the granting of exemptions, is that BTAs are, in general, consistent with the ‘polluter pays principle’. If the imported product was not taxed in the country of origin, a BTA would be consistent with the ‘polluter pays principle’ but when a tax has already been levied on the product in the country of origin, a BTA would lead to double taxation which is not in line with the ‘polluter pays principle’.

⁵⁵³ Ministry of the Environment Government of Japan *Utilization of Economic Instruments in Environmental Policies – Taxes and Charges I. Basic Concept Regarding Economic Instruments* [Online] <http://www.env.go.jp/en/policy/tax/econo/et1b.html> accessed on 4 March 2010.

⁵⁵⁴ An integrated emission trading regime is established when foreign producers purchase emission certificates for imports into the EU, while domestic producers do not pay a duty on exports.

3.4 Legality of BTAs

A BTA is used to restrict imports and, does not, in general, have anything to do with environmental protection but can be implemented to support environmental instruments. In the context of carbon mitigation it is also known as border carbon adjustment, to explain the context in which the instrument is used, which affects the rules of international trade. BTAs are embodied in the GATT and WTO regulations,⁵⁵⁵ as well as in numerous regional and bilateral trade agreements. This thesis only focuses on the relevant obligations contained in GATT/WTO but the ones in the other agreements are similar.

To analyse BTA, different rules and principles of the WTO regulations have to be looked at because BTAs are related to the norms restricting the opportunity of imposing internal taxes on imports, and also to the norms restricting the opportunity of refunding internal taxes upon export. In respect of imports the ‘most favoured nation principle’ and the ‘national treatment obligation’ have to be mentioned. For exports and their subsidies Articles XVI and VI of GATT, as well as some provisions of the Agreement on Subsidies and Countervailing Measures (ASCM) and the preamble of the Marrakesh Agreement have to be considered. Last but not least Article XX of GATT, which includes general exceptions, could play a role. Problems which could occur with the use of BTAs might be that not all are justified under the above mentioned rules.

3.4.1 Most favoured nation principle

According to the WTO agreement, members are not allowed to discriminate between their trading partners. Article I(1) of GATT rules that:

⁵⁵⁵ Should the BTAs be presented by the European Union in a multilateral environmental agreement (MEA) the affiliation between MEAs and WTO must be taken into account. Conventionally the submission of MEAs within the GATT will be dependent upon the member state’s status within the GATT. Should it be both, obligations under GATT shall be amongst both states impinged by MEA. However, matters may be complicated should one country not be a member state (of the MEA). In such a case I make mention of Article 35 of the Vienna Convention on the Law of Treaties: the *res inter alios tertius nec nocet nec prodest* principle. It is well to note also, that the United States, although it signed the Kyoto Protocol is not an active member, as the signing was not authorised and was later unendorsed by former US president Bush. Therefore, following Article 18 of the Vienna Convention, it is crucial to omit any agreement that undermines the intention and function of the Kyoto Protocol, as it was signed dependant on its ratification. But Article 18 also rules that once the member state, here the United States, declares not to become a party to the treaty then the obligations under it come to an end see: USCIB *WTO Rules and Procedures and Their Implication for the Kyoto Protocol – A Background Paper* 11/2002 [Online] <http://www.uscib.org/index.asp?DocumentID=2356> accessed on 20 March 2010. Nonetheless, the imposition of an energy tax is not only happening because of the Kyoto Protocol obligations but as a general protection of the environment and other generations as well, so no problems with GATT should occur.

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‘With respect to customs duties and charges of any kind imposed on or in connection with importation or exportation or imposed on the international transfer of payments for imports or exports, and with respect to the method of levying such duties and charges, any advantage, favour, privilege or immunity granted by any contracting party to any product originating in or destined for any other country shall be accorded immediately and unconditionally to the like product originating in or destined for the territories of all other contracting parties.’

This principle is better known as the ‘most favoured nation principle’ (MFN). Because of its importance it is stated in Article I of GATT. As long as the abolition of trade barriers is not in its entirety, the MFN principle plays a central role in the realisation of equal competitiveness.

However, the MFN allows some exemptions. The setting up of a free trade agreement between member states which applies only to goods traded within the participating group is exempt, or an exemption could be used to support developing countries by giving them special access to the markets of the participating member states.⁵⁵⁶ In addition, a member state may create barriers on products which are considered to have been traded unfairly by specific countries. Nonetheless, these exemptions are only allowed under strict conditions.

In the usual course of events MFN stands for opening markets or lowering trade barriers to all other member states regardless of whether they are rich or poor, strong or weak.⁵⁵⁷ Although MFN is the most important principle in the GATT/WTO it is only of subordinate importance in the appraisal of BTAs, since the first question in the examination of BTAs is whether there is discrimination of domestic products in comparison to foreign products, which is regulated in Article III of GATT, and, if there is any discrimination, whether it conforms with GATT regulations or not.

3.4.2 The national treatment obligation, Article III GATT

The function of GATT Article III is to prevent member states from bypassing the tariff allowance by biased internal tax-use or any other methods which may hinder the advantage of tariff reduction.⁵⁵⁸ It applies to all imported goods and is imposed at the national level. Domestic and foreign goods have to be treated the same. Article III(4) states that imported

⁵⁵⁶ WTO *Principles of the Trading System* [Online]

http://www.wto.org/english/thewto_e/whatis_e/tif_e/fact2_e.htm accessed on 22 February 2010.

⁵⁵⁷ *Ibid.*

⁵⁵⁸ Macrory with Appleton and Plummer *The World Trade Organization: Legal, Economic and Political Analysis Volume 1* Springer New York 2005 pp. 114, 115.

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goods, alongside domestic like-products are not allowed to be treated in a way which discriminates against them. In contrast to Article I(1), which aims to achieve the equal treatment of all foreign products, the national treatment obligation stands for non-discrimination of foreign products in comparison to like domestic products and as such it is the counterpart to MFN.

Article III(1) generally rules that charges and other regulations and requirements affecting internal sales are not allowed to lead to the protection of internal goods. Article III(2), which is important for the achievement of BTAs, reinforces Article III(1) for the application of internal taxes or charges.

‘The products of the territory of any contracting party imported into the territory of any other contracting party shall not be subject, directly or indirectly, to internal taxes or other internal charges of any kind in excess of those applied, directly or indirectly, to like domestic products. Moreover, no contracting party shall otherwise apply internal taxes or other internal charges to imported or domestic products in a manner contrary to the principles set forth in paragraph 1’⁵⁵⁹

Accordingly, imported products may not be taxed more highly than domestic goods.

Article III(2) has to be seen in the context of Article II(2)(a) which states that a member state is allowed to impose:

‘a charge equivalent to an internal tax imposed consistently with the provisions of paragraph 2 of Article III in respect of the like domestic product or in respect of an article from which the imported product has been manufactured or produced in whole or in part’.

The link to Article II(2) ensures that non-discrimination applies also to Article II(1) which means that member states may refrain from levying tariffs on the border but have the possibility of levying internal taxes so long as there is no discrimination against foreign products.

Accordingly, BTAs have to be classified as import duties or tariffs and tariff-like charges which fall under Article II(1).

To distinguish between the above mentioned measures the interpretative note ‘Ad’ clarifies that:

⁵⁵⁹ Article III(2) GATT 1947.

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‘...any internal tax or other internal charge, ... collected or enforced in the case of the imported product at the time or point of importation, is nevertheless to be regarded as an internal tax ... of the kind referred to in paragraph 1, and is accordingly subject to the provisions of Article III’.

Because of the interpretative note, it looks at first glance as if BTAs are among the group of internal taxes, because they can be levied on imported products at the time of the import. To ensure that classification, the examination of the classification has to be all-encompassing. In respect of Article III and its interpretative note, one has to examine what an internal tax is, what falls under the term ‘product’, what a ‘like’ product is and what the designation of the term ‘indirectly’ means, before finally classifying a BTA so that it achieves GATT conformity.

3.4.3 Internal Tax or Tariffs

Under GATT, there was an attempt to abolish non-tariff barriers, such as internal taxes, charges and government regulations. Hence, the use of these measures was made subject to the non-discrimination rules in Article I and III of GATT.

GATT distinguishes between tariffs and internal taxes and charges.⁵⁶⁰ This differentiation is vital as tariffs may only be hiked according to the Schedules of Concessions (Article II) though participants may have free reign over their own level of internal taxation. Additionally, the amount of products dealt with will differ from member state to member state, according to the Schedules of Concessions.⁵⁶¹ Therefore, should a product not be covered, the importing country has the right to impose a duty on the goods. This will stand should the imported goods not be comparable to the local product. However, should the importing member impose a tax, as opposed to the tariff, and this only on the imported goods, it would be in violation of Article III(2).⁵⁶²

To sum up; it is important which kind of measure is developed, so as to ensure that if the measure includes discrimination between imported and domestic products it should be

⁵⁶⁰ For simplification purposes internal taxes and charges will be treated as internal taxes. None of the WTO agreements delivers a definition which distinguishes between charges and taxes and it should not make a difference in the context of the analysis.

⁵⁶¹ Fauchald *Environmental Taxes and Trade Discrimination* Kluwer Law International London and Boston 1998 p. 93.

⁵⁶² *Ibid.*

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classified as a tariff. In contrast, if the measure does not include discrimination, it would be better to develop an internal tax. A BTA should not discriminate between domestic and imported products, rather it needs to ensure that both products are subject to energy taxation.

A tariff is set if the obligation is imposed on, or in connection with, importation.⁵⁶³ Following the argument *e contrario*, it is an internal tax when the obligation is not imposed on, or in connection with, importation. This, as consistent with Fauchald,⁵⁶⁴ means that the time and point of acquisition or importation may not be absolute for the allotment of the measure under Article II or III. Moreover, it is important that tariffs are ‘levied as a condition’ for the border crossing which are ‘only charged on imported products’, ‘without being in context with a domestic charge on a similar item’. For classification purposes it is necessary that all requirements which categorise the charge as a tariff are fulfilled at the same time. If the classification is difficult a description of the instrument may also be important.⁵⁶⁵

Because a BTA would not be levied as a condition for the border crossing, but to achieve equal treatment of polluters (users of fossil fuels) a BTA cannot be classified as a tariff. Instead it should, *de facto*, be categorised as an internal tax.

3.4.4 Distinctions between imports and exports

According to the Working Party on BTA of 1968, taxes which were not levied directly on products, but on the producer, were not eligible for an adjustment of the tax. But would BTAs be levied on the products or on the producer?

To examine whether BTAs are in line with GATT, one has to differentiate between two different types of measures; the refunds for exports; and taxes charged on imports. Regarding exports it has to be proven whether these refunds constitute an outlawed subsidy; for imports it has to be ensured that taxes charged represent no illegal discrimination. It is possible that the same criteria apply for both measures but for examination purposes both will be analysed separately.

⁵⁶³ Art. II.

⁵⁶⁴ *Op cit*, Fn. 561 p. 95.

⁵⁶⁵ Report of the Panel *United States – Measures Affecting the Importation, Internal Sale and Use of Tobacco (Tobacco Case)* (DS44/R) 12 August 1994 adopted on 4 October 1994 para. 76; in contrary the older Report of the Panel *EEC – Regulations on Imports of Parts and Components (Screwdriver Case)* (L/6657 - 37S/132) 22 March 1990 adopted on 16 May 1990 where the description was not decisive.

3.4.4.1 Imports

Article III(2) of GATT does not allow foreign products to be treated differently from like domestic products. Accordingly, it has to be considered whether the product is a ‘like product’ or not, and if this is the case, it has to be decided whether the imported item has been treated differently; disadvantaged in comparison to the like domestic product.

A BTA could be levied on final products; which would mean directly on fossil fuel or goods manufactured out of fossil fuels, (for instance on gasoline or petrol), or on products which have been manufactured by using fossil fuels in the production process, such as cement.

a Taxes on final products

According to GATT Article II(2)(a) it is legitimate to levy charges:

‘equivalent to an internal tax imposed consistently with the provisions of paragraph 2 of Article III in respect of the like domestic product or in respect of an article from which the imported product has been manufactured in whole or in part’.

As Article II(2)(a) indicates, BTAs are allowed with respect to taxes on inputs which are physically incorporated into the final item if the other requirements are fulfilled. Under Article III(2) there are two different approaches which would allow the imposition of BTAs on imports: as these products are ‘like products’ (first sentence), or, ‘directly competitive or substitutable’ goods (second sentence).

i. Article III(2) first sentence, first step

The examination of Article III(2) 1 takes place in two steps. First of all one has to determine whether the imported good is a ‘like product’ and if so, whether the tax is not ‘indirectly’ levied on the product. The final report of the Working Party on BTA (1970) only confirmed that charges on products could equal internal charges. ‘Taxes that were not directly levied on products were not eligible for tax adjustment’.⁵⁶⁶ Consequently, it is necessary to distinguish between direct and indirect taxes because direct taxes cannot be adjusted at the border. Since

⁵⁶⁶ *Op cit*, Fn. 546 para.14.

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there is no distinction rule in GATT or the WTO it can be looked for in other regulations of the WTO. The WTO Agreement on Subsidies on Countervailing Measures (ACSM) defines direct and indirect taxes as follows:

‘For the purpose of this Agreement: The term ‘direct taxes’ shall mean taxes on wages, profits, interests, rents, royalties, and all other forms of income, and taxes on the ownership of real property; The term ‘import charges’ shall mean tariffs, duties, and other fiscal charges not elsewhere enumerated in this note that are levied on imports; the term ‘indirect taxes’ shall mean sales, excise, turnover, value added, franchise, stamp, transfer, inventory and equipment taxes, border taxes and all taxes other than direct taxes and import charges’.⁵⁶⁷

Conditions and distinctions between direct and indirect taxes are dependent on the regulations of the destination principle which have been agreed to for BTA rules on export and import under GATT and the WTO.⁵⁶⁸ According to the destination principle an adjustment for direct taxes is not possible.⁵⁶⁹ The disparate approach springs from the fact that indirect taxes are transferred to the end consumer, thus they are demonstrated in the end price, as opposed to direct taxes.⁵⁷⁰ BTAs levied as indirect taxes act to protect competitive equality in global trade. An energy tax is an indirect tax when it is included in the price of fuels and as such shifted forward to the end consumer.

The term ‘like product’ is not defined by WTO law but has been the focus of several reports of GATT Working Parties as well as GATT and WTO Panels. In the 1970 Report of the Working Party on BTA it was suggested that:

‘...problems arising from the interpretation of the term should be examined on a case-by-case basis. This would allow a fair assessment in each case of the different elements that constitute a ‘similar’ product. Some criteria were suggested for determining, on a case-by-case basis, whether a product is ‘similar’: the product’s end-uses in a given market; consumers’ tastes and habits, which change from country to country, the product’s properties, nature and quality. It was observed, however that the term ‘like or similar products’ caused some uncertainty and that it would be desirable to improve on it; however, no improved term was arrived at’.⁵⁷¹

⁵⁶⁷ The note to litra (e) of Annex I.

⁵⁶⁸ WTO-Committee on Trade and Environment *Taxes and Charges for Environmental Purposes - Border Tax Adjustment* Note by the Secretariat 2 May 1997 WTO Document WT/CTE/W/47 para. 31; *Op cit* FN 553 para. 10.

⁵⁶⁹ It has to be mentioned that the term ‘direct and indirect taxes’ should not be mixed up with the wording in Article III(2) with reference to taxes ‘directly or indirectly’ to the product. It has a different meaning as will be explained later.

⁵⁷⁰ OECD ‘Environmental Taxes and Border Tax Adjustments’ Environment Policy Committee and Committee on Fiscal Affairs Joint Sessions on Taxation and Environment 2nd session COM/ENV/EPOC/DAFFE/CFA(94)31 OECD Paris 1994.

⁵⁷¹ *Op cit*, Fn. 546 para. 18.

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The Panel decisions in the context of whether an imported product is a like domestic product have been made over a period of time.⁵⁷² In the Tuna/Dolphin I Case,⁵⁷³ the Panel had to determine the term ‘like’ in the context of Article III(4).⁵⁷⁴ It came to the conclusion that differences in the production processes of a product could not be taken into account as long as the production process did not affect the product as such.⁵⁷⁵ According to the Shrimp/Turtle decision,⁵⁷⁶ which revolved around the prohibition imposed by the United States on the importation of shrimps and shrimp products caught by using technology harmful for sea turtles, the Appellate Body decided that process-based trade measures could still be accepted under Article XX if applied in a non-discriminatory way.⁵⁷⁷ In a further case,⁵⁷⁸ the Panel ruled that the term ‘like product’ did not mean that the products had to be identical. Moreover, it recalled the interpretation rules of the 1970 Working Group and stated that relevant factors might include: ‘the product's end-uses in a given market; consumers' tastes and habits, which change from country to country; the product's properties, nature and quality’.⁵⁷⁹ Besides that, the tariff classification of products under the harmonised system might also be relevant to an examination of ‘likeness’. Following the above-mentioned interpretations, fossil fuels and products manufactured out of them, such as gasoline, are similar to local fossil fuels, if available, and to domestically produced gasoline. Hence, these products seem to be like products even if the production processes differ.

But the result could be different when the customer's decision (as one of the applicable interpretation factors), is based on environmental matters; for instance levying a tax on fossil

⁵⁷² A detailed overview can be found in: OECD *Trade Principles and Concepts* OCDE/GD(95)141 OECD Paris 1995.

⁵⁷³ Report of the Panel *United States - Restriction on Imports of Tuna* (Tuna/Dolphin I) (DS21/R - 39S/155) 3 September 1991.

⁵⁷⁴ The Tuna/Dolphin I Case deals with an US embargo on Mexican tuna. Reason for the embargo was that the Mexican Tuna was caught by using purse-seine nets which also capture dolphins. The panel had to decide whether the Mexican tuna trapped by these nets and the US tuna caught by dolphin friendly methods were like products and whether the embargo was justified.

⁵⁷⁵ In this regard the process product standard lacks legal status under GATT law as the Panel Report, having been only promulgated and not adopted, since Mexico and the United States settled out of court.

⁵⁷⁶ Report of the Appellate Body *United States – Import Prohibition of Certain Shrimp and Shrimp Products* (Shrimp/Turtle) (WT/DS58/AB/R) 12 October 1998 adopted on 6 November 1998.

⁵⁷⁷ *Ibid.*

⁵⁷⁸ Report of the Panel *Japan – Taxes on Alcoholic Beverages* (Japan Alcohol Case) (WT/DS8/R, WT/DS10/R, WT/DS11/R) 11 July 1996 para. 6.21. The Panel had to deal with a Japanese law which taxed Japanese alcohol differently from foreign alcohol.

⁵⁷⁹ *Ibid* para. 6.18.

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fuel and not on biofuel.⁵⁸⁰ Environmental factors were part of cases like Tuna/Dolphin,⁵⁸¹ Shrimp/Turtle⁵⁸² and the European Communities – Asbestos case,⁵⁸³ In the Shrimp/Turtle decision the Appellate Body only formulated a balancing test but has retained jurisdiction to address the relationship between international trade law and international environmental law. The balancing test gives the Appellate Body the possibility to decide individually on a case-by-case base.

In the European Communities – Asbestos Case the Panel had to deal whether the French Decree which prohibited asbestos and products containing asbestos and included a ban on imports of such goods would violate GATT. It had to decide whether products could be like products on the basis of their associated health risk. In particular, the Panel and the Appellate Body had to decide whether Canadian products containing chrysotile asbestos fibres were ‘like’ domestic fibres produced from polyvinyl alcohol, cellulose and glass fibre (all called PCG fibres). This was affirmed by the Panel. The Appellate Body in contrast rejected the Panel’s conclusion and included the toxicity effect in the decision-making process of whether a product is ‘like’.

‘This carcinogenicity, or toxicity, constitutes, as we see it, a defining aspect of the physical properties of chrysotile asbestos. The evidence indicates that PCG fibres, in contrast, do not share these properties, at least to the same extent. We do not see how this highly significant physical difference cannot be a consideration in examining the physical properties of a product as part of a determination of “likeness” under Article III:4 of the GATT 1994’.⁵⁸⁴

Even though the decision was not based on health matters, it appears that these were at least a part of it. I appreciate the decision not only focusing on trade, but also including health aspects. Maybe one day environmental issues may be a fixed factor in distinguishing whether a product is a like product or not. In order to fight global warming, the WTO should include the carbon content of a product as a physical property. Currently it has not been decided by a WTO Panel whether biofuel would be a like product or not, but considered with the asbestos

⁵⁸⁰ Other possible cases with an environmental emphasis could be, for instance, charging more for organic fruits and vegetables than for those grown non-organically or by charging more for battery hen eggs and less for non-battery hen eggs.

⁵⁸¹ *Op cit*, Fn. 573. By joint agreement of the United States and Mexico, the report has not been submitted to the contracting Parties.

⁵⁸² *Op cit*, Fn. 576.

⁵⁸³ Report of the Appellate Body *European Communities – Measures Affecting Asbestos and Asbestos-Containing Products* (WT/DS135/AB/R) 12 March 2001 adopted on 5 April 2001.

⁵⁸⁴ *Ibid* para. 114.

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decision, the ingredients of biofuel can be seen as a different property, and as such, fossil fuel would not be a like product to biofuel.

ii. Second step of the achievement

If the products are like (such as fossil fuels), then in a second step it must be decided if the imported item has been taxed directly or indirectly in a way which disadvantages the product in comparison to the like domestic product. If this is the case then the norms do not conform with GATT.

According to the above, and the link between Article III(2) and Article III(1), it is deemed that charges only fall under the discrimination rule if they are protective. It is obvious that if there is no comparable domestic product there would also not be the necessity to enforce a BTA. This is also seen in the introductory notes to Article III(2):

‘A tax conforming to the requirements of the first sentence of paragraph 2 would be considered to be inconsistent with the provisions of the second sentence only in cases where competition was involved between, on the one hand, the taxed product and, on the other hand a directly competitive or sustainable product which was not similarly taxed.’

This means for an energy tax, if the country produces energy from fossil fuels itself, there would be a competitive and therefore a protective situation. If a country does not have a special energy source itself, for instance no coal resources, there could still be a competitive situation, when the final product is electricity, which can also be produced out of like products such as gas. However, this comes back to the question as to whether the product is a like product and belongs accordingly to the former ‘first step’ check point.

iii. Conclusion

What does the above mean in relation to energy taxation? Taxing the import of fossil products such as oil, gas and coal is product-related and as such legitimate. Also the charging of imported energy would be GATT-compatible as it is goods-related, as long as there is a comparable tax on domestic energy.

As we have learned from the Tuna/Dolphin I Panel decision differences in the production processes of a product cannot be taken into account if the production process does not affect

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the product itself. This outcome, translated into the discussion on energy taxes could lead to the result that the production of energy from renewable sources, or less carbon-intensive material, would not justify a higher tax on fossil fuel compared to a tax-free or tax reduced internal product manufactured from renewable energy. Currently it has not been decided by a WTO Panel whether biofuel would be a like product or not but in comparison with the Asbestos Decision the ingredients can be seen as different property and as such fossil fuel would not be a like product in comparison to biofuel. This would allow for a different treatment and a different tax rate between fossil fuels and biofuels. A statement of the WTO in this context would be appreciated. Nonetheless, the change in the meaning of the term ‘like product’ can be seen as an advance which could lead to the consequence that biofuel and fossil fuel should be treated differently if the other requirements are fulfilled.

b Taxes on energy input used in the production of final goods

The question here is how to assess the taxation of goods, mostly energy-intensive, in relation to their energy content. Such a tax might be product-related even if the energy content resulted from an earlier production stage. Decisive in this aspect is the consumption of resources in the production process, for example raw material and used fuel (or even the atmosphere ‘which is polluted by emissions and as such somehow consumed’⁵⁸⁵). As is the case with energy, the consumed pre-products are mostly not physically incorporated in the end product. This is also important for the taxation of energy-intensive sectors, such as cement, iron and steel, aluminium, pulp and paper, refineries and fertiliser.

i. Starting point

The question arises whether a BTA for pre-products is in compliance with WTO regulations; precisely, Article III(2) in connection with Article II(2) of GATT. It was discussed in particular by Goh⁵⁸⁶ that prior-stage taxation does not focus on the end product and as such an adjustment at the border would not be allowed. It is to be noted that a translation permitting the alteration of taxation of prior-stage products would not be supported by the wording of

⁵⁸⁵ Ruddigkeit *Border Tax Adjustment an der Schnittstelle von Welthandelsrecht und Klimaschutz vor dem Hintergrund des Europäischen Emissionszertifikatehandels* Institut für Wirtschaftsrecht Heft 89 Martin-Luther-Universität Halle-Wittenberg 2009 p. 9.

⁵⁸⁶ Goh ‘The World Trade Organization, Kyoto and Energy Tax Adjustments at the Border’ *Journal of World Trade* 2004 Vol. 38 issue 3 pp. 395-423.

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Article III(2).⁵⁸⁷ Moreover, such a tax would be a tax on production factors which is a direct tax and as such not adjustable.

This restrictive interpretation does not stand up to scrutiny. As shown above, Art III(2) is systematically linked to Article II(2)(a), which takes into account an ‘article from which the imported product has been manufactured or produced in whole or in part’. Accordingly, only the scope of the BTA is open to question.

ii. Interpretation of the adjustability of ‘taxes occultes’

The scope in question can be determined by Article II(2)(a), which states that ‘articles from which the imported product has been manufactured or produced in whole or in part’ and/or from the wording of Article III(2), that ‘the products ... shall not be subject ... to internal taxes ... in excess of those applied, directly or indirectly, to like domestic products’. Decisive in this context is the scope of the term ‘indirectly’.

Regarding the term ‘indirectly’, the question arises whether taxes on ‘inputs’ in prior-stage production are included in the scope of Article III(2). However, this is subject to reading and may prove a particular point in regard to the analysis of the ‘equality’ of aforementioned product.⁵⁸⁸

It is ambiguous whether all kinds of indirect taxes are adjustable at the border. In the case of taxing end products it has to be remembered that the means of production as well as energy have been taxed already by inputs, or process-related prior-stage taxes, or by taxes which have been levied at other stages in the production process.

According to the Working Party on BTA the status of ‘taxes occultes’⁵⁸⁹ which the OECD defined as ‘consumption taxes on capital equipment, auxiliary materials and services used in the transportation and production of other taxable goods’, as well as taxes on advertising, energy, machinery and transport, was unclear, hence the legality could not be examined.⁵⁹⁰

⁵⁸⁷ *Ibid* p. 410.

⁵⁸⁸ *Op cit*, Fn. 290 p. 334.

⁵⁸⁹ Which can be understood as ‘hidden taxes’.

⁵⁹⁰ *Op cit*, Fn. 546 para. 15.

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There are different opinions regarding taxing energy or carbon embodied in final products which do not incorporate the high amount of fuel they were produced with.⁵⁹¹ As an example, aluminium can be mentioned. For its production a large amount of electricity is necessary which might be taxed indirectly by levying an energy or carbon tax on fossil fuel inputs used for the manufacturing of aluminium.⁵⁹² Unfortunately, the GATT Working Party on BTA did not come to a solution in its report of 1970 because the ‘area of taxation was unclear’ and ‘its importance – as indicated by the scarcity of complaints reported in connection with adjustments of taxes occultes – was not such as to justify further examination’.⁵⁹³

The literature⁵⁹⁴ has shown two aspects which could speak against a legal adjustment of an embodied energy tax at the border. Primarily, it has been mentioned that levying matching taxes on energy-intensive products would not conform to GATT because these high energy traded products are not ‘like’ products in comparison to the fuel itself. Even if this was a problem of equality it could be argued that the comparison between fossil fuel and aluminium for example would not be necessary if the design and structure of the tax included energy-intensive products in its tax objects (which would be the case using a downstream tax). But if a different design and structure was chosen for the tax, such a comparison might be necessary (for example when having an upstream tax of fossil fuels in Europe and no energy tax in China, all pre-products, which were produced by the use of fossil fuels in China, would be taxed less than in Europe, which would lead to a distortion of competition, which BTAs aim to avoid).

⁵⁹¹ Several delegations to the Subcommittee on Trade and Environment of the Preparatory Committee for the WTO expressed the view that ‘adjustment of taxes or charges on unincorporated processes and production methods are not permitted’. See: *GATT News and Views from the General Agreement on Tariffs and Trade - [Trade and Environment] - Work Starts on Environmental Charges, Taxes and Product Requirements - Consultations Planned on Exports of Domestically Prohibited Goods and Possible WTO Relation with other Organizations* Document TE 010 p. 4 [Online] http://www.wto.org/gatt_docs/English/SULPDF/91810176.pdf accessed on 10 March 2010.

⁵⁹² If taxing traded goods such as aluminium, its import might be taxed on the same level as domestic aluminium (with the problem being to find a suitable rate, since for aluminium there might not exist a special rate under energy taxation). If the carbon content of prior-stage products and end products were taxed it could lead to double taxation. If only the end product aluminium was taxed then the different production methods and fossil fuel amounts used in the prior-stages would not be considered. But, taxing only the end product aluminium would open up possibilities of tax avoidance, especially in the context of the delivery of pre-products, the manufacturing of which is extremely energy-intensive. Accordingly, it would be necessary to know the carbon content of every pre-product or an estimation of it would be needed (since here it is the legal appreciation in question, rather than the administrative issue, about which more can be in Chapter 4 Section 3.5.2).

⁵⁹³ *Op cit*, Fn. 546 para. 15.

⁵⁹⁴ Hoerner and Muller *Carbon taxes for Climate Protection in a Competitive World* A paper prepared for the Swiss Federal Office for Foreign Economic Affairs by the Environmental Tax Program of the Center for Global Change University of Maryland College Park June 1996 p. 27; *Op cit*, Fn. 586 p. 395.

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Secondly, it has been argued that the refund of carbon or energy taxation would be banned by technical rules in the GATT subsidies code which bar the return of ‘prior stage cumulative indirect taxes’ to which carbon/energy taxes allegedly belong. In this context it has been discussed whether the ASCM should be part of the interpretation for imports and if so what the result would be.

Since it was not possible to find clarity regarding how to deal with taxing the inputs consumed in the production of the final product under Article III(2), the principles of interpretation will be consulted for assistance.

The Vienna Convention on the Law of Treaties, which can be seen as codification of customary law, requires as part of its principles of interpretation that first:

‘... a treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose’.⁵⁹⁵

Furthermore, Article 32 of the Vienna Convention states that:

‘... recourse may be had to supplementary means of interpretation, including the preparatory work of the treaty and the circumstances of its conclusion, in order to confirm the meaning resulting from the application of Article 31, or to determine the meaning when the interpretation according to Article 31 (a) leaves the meaning ambiguous or obscure; or (b) leads to a result which is manifestly absurd or unreasonable’.⁵⁹⁶

In compliance with the rules of interpretation, the following section is divided into four parts and will demonstrate literal, historical, systematic and teleological interpretations.

➤ **Literal interpretation**

Consistent with the literal terms of Article III(2), a BTA can be justified by GATT if domestic like products are indirectly charged with a similar tax. This could be the case by taxing the energy used, for instance, in the manufacturing of aluminium even if it is no longer contained in the end product.

⁵⁹⁵ Article 31(1) of the Vienna Convention on the Law of Treaties 1969 [Online]

http://untreaty.un.org/ilc/texts/instruments/english/conventions/1_1_1969.pdf accessed on 10 March 2010.

⁵⁹⁶ Article 32 of the Vienna Convention on the Law of Treaties 1969 [Online]

http://untreaty.un.org/ilc/texts/instruments/english/conventions/1_1_1969.pdf accessed on 10 March 2010.

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The word ‘indirectly’ may imply that the specified comparable duty should be imposed on the liable tax of the product, without which neither the imported nor domestic product could have been produced.⁵⁹⁷ According to this, the internal tax burden on inputs would be on the pre-production stage which would lead to the increase of the price on intermediate or end products. Similar imported end products would need to be taxed similarly by BTA. If so, then it could lead to a possible BTA for taxes which have been levied on input factors at any prior-stage of production.

But this coverage seems to be too wide since it could include a taxable adjustment, *inter alia*, on labour or assets. This broad interpretation could lead to a protection risk in many fields, which would be in opposition to the above mentioned aim of the rule; the avoidance of protectionism and trade obstacles.

Arguing briefly on this point it is necessary to focus on the ratio of adjustability of indirect taxes. Indirect taxes are linked to a specific item and are passed on to the consumer in the country of destination. Whether a prior-stage product is still incorporated in the end-product or not has no influence on the duty of the end consumer to pay for the tax levied on the incorporated end product. This is exactly the aim of environmentally related taxes; namely, to include the costs of the consumed resource used for the final good. Following this thought, an implementation of BTAs on final goods related to the incorporated resources, seems to be possible.

➤ Systematic interpretation

GATT Article II(2)(a) refers to Article III(2) and as such it has to be included in the systematic interpretation. Pursuant to Article II(2)(a) it is legitimate to levy charges comparable with internal taxes, in respect of an article from which the imported product has been manufactured.

According to the wording it can be said that products used in the production or manufacturing process are included, but it does not say anything about the scope. The use of

⁵⁹⁷ *Op cit*, Fn. 290 p. 334.

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the word ‘article’ might indicate that the tax can only be levied on products which are physically part of the final product, but the term cannot give an exact answer as to whether energy or carbon consumed can be adjusted by tax.

A similar term is used in GATT Article VI(4) for the return of taxes linked to subsidies. ‘Borne by products’ is similarly unclear and thereby does not answer the question. Since it might be helpful for the interpretation, the symmetry between regulations for imports and exports will be demonstrated. Logically a connection between BTAs on export and import is two sides of the same coin,⁵⁹⁸ which is necessary in order to follow the destination principle. This essential connection requires the inclusion of the rules for subsidies, as an aid to interpretation as to whether levying BTAs on inputs which are incorporated into the imports is possible.⁵⁹⁹

Paragraph (g) of Annex I to the ASCM, 1979, states that ‘the exemption or remission in respect of the production and distribution of exported products of indirect tax’ is generally allowed. Paragraph (h) indicates that the adjustment of prior-stage cumulative taxes on products and services, which are used in the production process, is only justified if the products and services are physically incorporated in the final product. Still, it is unclear whether energy taxation is affected by this provision. Attachment II of the ASCM, 1994, allows the adjustment of indirect taxes on pre-products. In its footnote 61 it refers to ‘inputs physically incorporated, energy, fuels and oil used in the production process and catalysts which are consumed in the course of their use to obtain the exported product’. As a result of this alteration of the ASCM, an adjustment of an indirect energy tax seems debatable, but finally possible. This has been seen differently by Brack et al.⁶⁰⁰ who argued that footnote 61 does not in fact apply to energy taxes. They have based their findings on the following arguments. The 1979 GATT Subsidies Code pointed to ‘goods that are physically incorporated in the exported product’. Moreover, the inputs have been defined by the code’s signatories as inputs which ‘are used in the production process and are physically present in the product exported’. The notaries all concluded that input is required with regard to the

⁵⁹⁸ *Op cit*, Fn. 543 p. 298.

⁵⁹⁹ *Ibid*; Demaret and Stewardson ‘Border tax adjustments under GATT and EC law and general implications for environmental taxes’ *Journal of World Trade* Vol. 28 issue 4 1994 pp.5-65 (31); different opinion: *Op cit*, Fn. 586 p. 412.

⁶⁰⁰ Brack with Grubb and Windram *International Trade and Climate Change Policies* Earthscan London 2000 p. 85f.

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product in the same way that it is required in the production process.⁶⁰¹ As mentioned by Brack et al. a broadening of the scope (of the 1994 ASCM) is not likely since this would have to include products that may no longer form a physical part of the end product and as such would be in direct contradiction to the free trading system. The arguments of Brack et al. are discussed exhaustively by Biermann/Brohm⁶⁰² under the Vienna interpretation regulations. They came to the conclusion that ‘it seems doubtful whether the legal interpretation [of Brack et al.] would prevail if, at some point in the future, the remission of European energy taxes on exported goods were to be challenged under the WTO dispute settlement system’. Following Biermann/Brohm’s argument, taxing the energy consumed in the production process seems to be possible.⁶⁰³

➤ Historical interpretation

Historically, the intention of the GATT negotiators was to allow BTAs for processes and products. The purpose of the Havana Charter (drafted for an International Trade Organisation and the predecessor of the GATT 1947) was to permit changes to be made on all taxes on the inputs to products, whether or not the product physically contained raw materials, process inputs or outputs.⁶⁰⁴ The first draft of Article III(2) with regards to taxes or internal changes stated that they ‘applied to charges in connection with like products’. However, this version could not be used because of the translation problems brought about in the translation to French.⁶⁰⁵ The term, ‘directly or indirectly’ was first introduced by the US negotiator, Oscar B. Ryder at the London Preparatory Committee as an alternative to the term, ‘on or in connection with’ to ease its translation into French.⁶⁰⁶ At the request of the Brazilian delegate Mr. Rodrigues, as to what the term ‘indirectly’ meant, Mr. Ryder explained that the wording

⁶⁰¹ GATT *Draft Guidelines on Physical Incorporation* Doc. SCM/W/74 Rev.1 of 26 April 1985 para. 4 [Online] http://www.wto.org/gatt_docs/English/SULPDF/91130156.pdf accessed on 10 April 2010 and its adoption see GATT *Minutes of the Meeting held on 3 June 1987* Doc. SCM/M/34/Corr.1 of 5 August 1987 [Online] http://www.wto.org/gatt_docs/English/SULPDF/91290140.pdf accessed on 10 April 2010.

⁶⁰² *Op cit*, Fn. 543 p. 296f. (Even if they are speaking about a United States trade representative, the argument is the same in the above mentioned case).

⁶⁰³ A different question is whether taxes occultes are prior-stage, cumulative, indirect taxes which will be examined under the section on exports.

⁶⁰⁴ *Op cit*, n. 594 p. 27.

⁶⁰⁵ *Ibid*.

⁶⁰⁶ *Op cit*, Fn. 551 p. 7.

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was to allow border adjustments on ‘tax, not a tax on product as such, but on the processing of a product, which is covered by the word “indirectly” here’.⁶⁰⁷

This understanding was in conflict to the Tuna/Dolphin Panel,⁶⁰⁸ which differentiated between products and their production process. It stated that measures affecting trade must be based on the nature of the product not on its manufacturing process. But this decision of the Panel was never adopted by the contracting parties.⁶⁰⁹ Furthermore, in the literature it was not accepted unanimously.⁶¹⁰ But this is more a point of teleological interpretation⁶¹¹. Despite that, following the historical interpretation, a BTA on energy taxes included in energy-intensive products would be covered even if the energy was not physically incorporated into the final product.

➤ Teleological interpretation

In order to confirm the conclusion that BTAs on prior-stage products consumed in the manufacturing process are justified, which has been already reached by using the other interpretation methods, relevant Panel decisions will be discussed. Certainly, it has to be admitted that in the older Panel decisions the content would not reflect the 1994 ASCM and GATT 1994.

- *Japan - Customs Duties*

According to the Japan - Customs Duties Panel Report⁶¹² some arguments, especially in the context of different tax methods/rates can be highlighted. Without discussing the entire panel decision which would be beyond the scope of this chapter, the conflict was based on imported alcoholic beverages which were treated identically to domestic beverages except that the latter fell into a lower tax category than most of the imported beverages. Indeed the tax law did not

⁶⁰⁷ United Nations Economic and Social Council *Second Session on the Preparatory Committee of the United Nations Conference on Trade and Employment* (EPC/T/A/PV/9) 5 June 1947 pp. 18-19.

⁶⁰⁸ *Op cit*, Fn. 573. By joint agreement of the United States and Mexico, the report has not been submitted to the contracting Parties.

⁶⁰⁹ *Op cit*, Fn. 551 p. 8.

⁶¹⁰ For a more extensive treatment of the legal issues concerning BTAs under GATT, see: Demaret and Stewardson *Op cit*, Fn. 599 p. 31;

⁶¹¹ This will be discussed further in the section on teleological interpretation.

⁶¹² Report of the Panel *Japan – Customs Duties, Taxes and Labelling Practices on Imported Wines and Alcoholic Beverages* (L/6216 - 34S/83) 13 October 1987 adopted on 10 November 1987.

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provide any clear, non-discriminatory reason for the different categories. The Panel came to the conclusion that not only the tax rates on final products were important but different characteristics of tax techniques and the government's motivation for the differentiation were also important.

'The Panel further found that the wording 'directly or indirectly' and 'internal taxes ... of any kind' implied that, in assessing whether there is tax discrimination, account is to be taken not only of the rate of the applicable internal tax but also of the taxation methods (e.g. different kinds of internal taxes, direct taxation of the finished product or indirect taxation by taxing the raw materials used in the product during the various stages of its production) and of the rules for the tax collection (e.g. basis assessment)'.⁶¹³

A point of interest is that even to resort to different tax methods is admissible, as long as there is no unequal treatment between domestic and foreign products. If the product had been manufactured in a country which levied the tax on carbon/energy, then the raw materials used in the product during the various stages of its production would have been taxed. Consequently, the same tax should be applied for imported products according to their energy/carbon consumption during production.

It is, furthermore, remarkable that the Panel designed a two-step test to determine whether a tax categorisation scheme discriminates. The two categories of taxable products should be directly competitive or substitutable and if this was so, then the categorisation had to be 'applied to imported or domestic products so as to afford protection to domestic production'. According to that examination system Japan's customs duties did discriminate against imports and did not, as such, conform to GATT.

How can the above-mentioned example be classified? The carbon or energy content in the product, whether the end product, or the intermediate, or the preliminary product, is decisive. Returning to the example of aluminium; if it had been produced entirely domestically, a carbon/energy tax would have been levied on its different production stages. The same amount of taxation should be levied on imported aluminium or its pre- or intermediate products, since the fossil fuel or energy used for the production of the product is a like product to domestically taxed fossil fuel or energy, even if it is not incorporated in the product to be sold. Furthermore, the tax would be levied on imported as well as domestic products and

⁶¹³ *Ibid* para. 5.8.

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as such would not discriminate in favour of the imports. Accordingly, a BTA on pre-products not incorporated in the end product would be in accordance with the WTO law.

- *United States - Superfund Tax*

The United States Superfund Amendments and Reauthorization Act of 1986 was designed as a system of raising taxes to fund the cleanup of toxic waste disposal sites and included a petroleum product excise, a corporate income tax surcharge, and a system of excises on taxable chemicals and substances. It was brought about to clean contamination when the parties responsible for the problem could not be established.⁶¹⁴ The tax was applied to chemical excises on first sale or the use of certain chemicals listed in a Schedule of the Act by the importer. The Superfund Tax was a tax on consumption, collected at the level of the manufacturer, and as such, subject to BTAs.

The tax rate was modest, only around maximum USD 5/tonne and varied by chemicals. The Superfund Tax applied also to untaxed substances, manufactured using taxed chemicals as feedstock, which were described in the tax code as 'taxable chemicals'.⁶¹⁵ Only imports were subject to the tax, which included at least 50% of the chemicals used to produce the final substance by weight or value.

The United States implemented the tax with the following three-tier system.

- If the importer had detailed information on the taxable chemicals which had been used in the production process then the taxes were based on the amount of tax which would have been paid on the taxable chemicals if the taxable substances had been produced in America.
- If it was not possible for the importer to deliver detailed information, a penalty rate of 5% of the value of the product was imposed.
- The Secretary of the Treasury Department was also allowed to issue regulations assessing the amount of taxed chemicals used to produce, for each taxable substance, which the product in the United States, under the predominant method of

⁶¹⁴ OECD *Op cit*, Fn. 144 p. 100.

⁶¹⁵ 26 USC 4662(1).

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manufacturing, would have used. If the product was exported, the exporter was allowed to claim a refund on the amount of the tax already paid (other side of the coin).

The European Community, Canada and Mexico have challenged the Superfund Tax before the GATT Panel. It was contended that the US tax was originated to raise money to clean-up pollution in America (as a result of chemicals used during the manufacturing process, not extending to international products manufactured abroad.)⁶¹⁶ In addition, chemicals which were manufactured in America had been exempted from the tax, although they could have caused pollution in America whilst being manufactured. Accordingly, the protest was based on the ‘polluter pays principle’. But the Panel did not focus on that argument in its decision; as this was not applicable to the decision regarding eligibility for the BTA under GATT.⁶¹⁷ Moreover, the decision was based on the point of ‘chemicals used as materials in the manufacturing or production of the imported substances’. Though it was not required that all the atoms comprised in the taxable chemicals to be actually incorporated into the final substance.⁶¹⁸ According to the Panel, the tax on the imported substances was still a ‘tax directly imposed on products’, which made it eligible for BTAs. Furthermore, the Panel referred to Article II(2)(a) of GATT and explained that a tariff concession did not prevent the levying of ‘a charge equivalent to an internal tax imposed consistently with the provision of paragraph 2 of Article III in respect of like domestic products or in respect of an article from which the imported product had been manufactured or produced in whole or in part’.⁶¹⁹ Moreover, the Panel pointed to the drafters of GATT 1947, who explained that ‘if a [charge] is imposed on perfume because it contains alcohol, the [charge] to be imposed must take into consideration the value of the alcohol and not the value of the whole’.⁶²⁰

According to the Panel, the tax rates were GATT-compatible. Only the BTA regulation determining the fallback of the 5% rule was declined, since it required higher taxes on imports than on similar domestic production.⁶²¹

⁶¹⁶ *Op cit*, Fn. 586 p. 400.

⁶¹⁷ *Op cit*, Fn. 542 para. 5.2.4.

⁶¹⁸ *Op cit*, Fn. 551 p.10.

⁶¹⁹ *Op cit*, Fn. 542 para 5.2.7.

⁶²⁰ *Ibid*.

⁶²¹ *Ibid* para 5.2.9.

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The Panel still did not say anything related to products which are physically incorporated in the final product. Nonetheless, it drew a positive picture regarding energy taxation. Even if the Panel did not say anything about the full consumption incorporated by manufacturing the pre-product in the final good, it showed that in a similar case levying the BTA was possible as long as the value of the inputs was taxed and not that of the end product. Accordingly, it supported the broader interpretation, which would lead to a positive result regarding taxing inputs which are not physically incorporated into the final item.

- *Argentina - Hides and Leather*

The Argentina - Hides and Leather Panel Report⁶²² includes an *obiter dictum* which seems to support the possibility for BTAs on inputs not physically incorporated into products. The case was about an extra VAT of 9% on leather products imported into Argentina. The Panel was dealing with a comparison of ‘actual tax burden’ levied on the foreign product and the ‘nominal tax burden’ levied on the domestic like product.⁶²³ To underline the scope of comparison, the Panel referred to the Japan - Customs Duties Panel decision and took into consideration the first sentence in Article III(2), that ‘on the basis of an overall assessment of the actual tax burden[s]’,⁶²⁴ the comparison between foreign and domestic products has to be carried out. The Panel rejected the Argentinean tax as not conforming to GATT.

The broad scope of ‘tax burden’ combined with the term ‘indirect taxation’ and the taxing of raw material used in the production of the ‘finished product’, would appear to provide scope for adjustments on ‘finished’ imports relating to taxes on inputs. Following the broad interpretation of the Panel here, increases the possibility that a carbon/energy taxation of inputs could be applicable for BTAs.

⁶²² Report of the Panel *Argentina – Measures Affecting the Export of Bovine Hides and the Import of Finished Leather (Argentina – Hides and Leather)* (WT/DS155/R) 19 December 2000 adopted 16 February 2001.

⁶²³ *Ibid* paras 11.182 – 11.184.

⁶²⁴ *Ibid*.

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- *Mexico – Taxes on Soft drinks*

In addition the Mexico – Taxes on Soft Drinks decision has to be mentioned.⁶²⁵ The Panel decided that a tax on soft drinks of which the ingredients were sugar cane instead of sugar beet, was also a tax indirectly levied on sugar cane. The Panel stated that as a requirement, the financial burden needed to fall on sugar cane. Looking at the financial burden as the taxable aspect of the finished product in the Panel Decision, the physical presence of the pre-product cannot be a suitable criterion. This would also lead to the assumption that it should be possible to tax inputs which are not physically incorporated into the good.

➤ **Conclusion**

Following the interpretation of the term ‘indirectly’ in the former paragraphs, a BTA on inputs (fossil fuel/energy) which are not physically incorporated into the final good would be justified. This would be a massive help for a global implementation of climate change mitigation measures.

3.4.4.2 Exports

As already explained, international trade consists of two sides: import and export. Both should be in symmetry with each other. On the export side there is the competitive impact of environmentally related taxes and charges on domestic industry, which could be avoided by refunding internal taxes or charges on products destined for export. The refund is supposed to avoid double taxation since the current tax-freeness of the product (export) lasts only until the product is taxed by the country of destination.

Where the consumption as an external effect is trans-boundary, it might be better to limit the scope for the reduction of environmentally related taxes. This can be explained by the anxiety regarding competitive loss which comes along with the ‘exemption’ of taxes on embodied inputs for BTA seen from an administrative and implementing point of view. As an example, the waiving of the amount of carbon taxes embedded in the pre-adjustment export price for

⁶²⁵ Report of the Panel *Mexico – Taxes Measures on Soft Drinks and other Beverages* (WT/DS308/R) 7 October 2005 adopted on 24 March 2006.

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paper can be mentioned. Since it is likely that different kinds of technologies for production in different states during the manufacturing process by diverse producers are used, the carbon content of the papers might vary. (Also the fact whether it is recycling or normal paper would lead to different results.)

The refund of taxes on exports could be seen as an outlawed subsidy. Even though this might be a problem of subsidies concerning export, it will be analysed here, in order to show import and export as a whole. In general, countries do not have to subsidise exports under the WTO regulations, except for agricultural goods. Accordingly, to levy BTAs on exports is therefore neither forbidden nor essential under the WTO, ASCM and GATT rules, as stated by footnote 1 of the ASCM:

‘In accordance with the provisions of Article XVI of GATT 1994 and the provisions of Annexes I through III of this Agreement, the exemption of exported product from duties or taxes borne by the like product when destined for domestic consumption, or the remission of such duties or taxes in amounts not in excess of those which have been accrued, shall not be deemed to be a subsidy’.

Pursuant to GATT Article XVI(4), contracting parties may not grant, directly or indirectly, any form of subsidy on the export of any product other than a primary product, which results in the sale of such products for export at a lower price than the comparable price charged for the like products to domestic buyers. If forbidden subsidies are granted, the importing state has the possibility, within the scope of the conditions in Article VI(3) and VI(6)(a), to impose countervailing duties on the imported product. The interpretative note to Article XVI of GATT 1994 contains three requirements which stipulate the treatment of BTAs on exported products.

1. Only those internal taxes which are actually levied on domestic products are eligible for exemption or remission upon export.
2. The exemption or remission of these internal taxes must not exceed the amounts which are levied on the domestic products.
3. The exported and domestic products must be alike.

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The necessity to levy stringent requirements for the treatment of BTAs on exports is emphasised by the fact that they could be used as a cover for primarily removing competitive disadvantages for domestic industry.

According to GATT Article VI(4) a countervailing duty must not be implemented where a product, destined for export, is exempted from duties or taxes borne by the like product, when destined for consumption in the region of origin or exportation, or such duties or taxes are refunded on exportation. The 1994 ASCM also mirrored these principles and is dealing with the availability of export rebates to taxes on a specific item or on inputs that have physically been incorporated into the product.

There is nothing to be said against the application of BTAs as long as the export is the final good and taxed as such. Problematic here is, once more, the classification and determination of taxes on energy inputs used in the production of final products. As seen in the section on imports, these input taxes fulfil the definition of taxes occultes since they are consumption taxes on auxiliary materials used in the transportation and production of other taxable goods.

Paragraph(h) of ASCM states that the adjustment of prior-stage cumulative taxes on products and services, which are used in the production process, is only justified if the products and services are physically incorporated in the final product. In this case the question arises whether tax occultes (here energy/carbon taxes) are prior-stage cumulative indirect (PSCI) taxes.

A PSCI tax is a tax which is a) an indirect tax, b) levied on a prior-stage and c) is cumulative. A tax is levied on a prior-stage if it is 'levied on goods or services which are used indirectly in manufacturing the product'.⁶²⁶ Energy or carbon taxes which are levied on a product which is incorporated in the final product are indirect prior-stage taxes. The question which has to be answered is whether these indirect prior-stage taxes are also cumulative. Cumulative taxes are 'multi-stage taxes levied where there is no mechanism for subsequent crediting of the tax if the goods or services subject to the tax at one stage of production are used in succeeding stages of production'.⁶²⁷ The reason for prohibiting PSCI taxes was to

⁶²⁶ GATT *Subsidies Code and Subsidies Code Annex* BISD 26S/56-83 Geneva GATT Secretariat 1980 note 1.

⁶²⁷ *Ibid.*

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prevent nations from subsidising their exports through excessive tax refunds. PSCI taxes may contain this abuse since it is often difficult to detect how many taxes were already paid in prior-stages of manufacturing. As we have seen above, only products physically incorporated into the exported good are exempt from the ban on PSCI taxes. This can be explained by the difficulties in determining how much of the incorporated products are embodied in the end product. The problem of refunding energy taxes and other taxes occultes was identified by the Working Party report on BTA of 1970. They decided that a BTA was in general not made for taxes occultes, 'except in countries having a cascade tax'.⁶²⁸

It can be agreed that there is an administrative and technical problem for companies and tax authorities in finding out how much energy is incorporated in an end product since energy is often consumed in many stages of manufacturing. (This question will be analysed in Chapter Five Section 3.5.2)

Even if taxes occultes have been compared with PSCI taxes, it is necessary to be clear that taxes occultes and PSCI taxes are not the same type of tax since tax occultes are not cumulative.⁶²⁹ Moreover, environmental excises can be compared to the VAT system, where the tax is only levied to the added value of the good at each stage of production. Energy taxes are never used in successive stages of production, which is a requirement for a cumulative tax. It is also not possible to compare taxes on amalgamated products with the classic PSCI or the cascade tax.⁶³⁰ Cascade taxes have been predominantly used in Europe⁶³¹ and levied against *ad valorem* on the transfer of goods as well as those utilised as inputs of production.⁶³² Cascade taxes are levied on the total value of the product of each transfer, in comparison to VAT⁶³³ where each manufacturer has to pay the tax only on the added value, which has taken place in addition to the former production or service level. Hence, VAT

⁶²⁸ GATT Report of the Working Party on Border Tax Adjustments GATT Basic Instruments and Selected Documents Volume 1- 42, Volume 18 Supplement 97 para. 15(a). p. 101.

⁶²⁹ *Op cit*, Fn. 594 p. 33.

⁶³⁰ *Ibid*.

⁶³¹ By the European Commission VAT directive, all European cascade taxes should have been replaced by VATs no later than 1970 see: Council of the European Economic Community *First Council Directive on Harmonisation of Member State Laws on Turnover Taxes* No. 67/227/EEC (1967). The ban had been postponed to 1972 see: Council of the European Economic Community *First Council Directive on Harmonization of Member State Laws on Turnover Taxes—Introduction of the Value-Added Tax in Member State* No. 69/463/EEC (1969).

⁶³² *Op cit*, Fn. 594 p. 33.

⁶³³ The European harmonised VAT is based on a destination tax system and hence involves taxes on imports and a rebate of taxes on exports.

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makes only the end consumer pay on the whole value of the product, in comparison to the cascade tax which accumulates, which makes it a multi-stage tax. Indeed, in general, energy is used in every stage of production, but if each unit of fuel is only taxed once this leads to the result that energy and carbon taxes are not cascade taxes.

Following the 1968 OECD Working Party on BTA practices,⁶³⁴ which was adopted by GATT, there were four different categories of taxes: ‘single-stage’ (e.g. sales) taxes, ‘multi-stage non-cumulative’ taxes (e.g. VATs), ‘multi-stage cumulative’ taxes (e.g. cascade taxes), and ‘specific consumption’ taxes (e.g. excise taxes). Under these categories taxes occultes are classified as specific consumption taxes since they are not only border tax adjustable at the last stage, as a multi-stage cumulative tax is. Even though energy is used in every stage of production, each unit of fuel is only taxed once.

The confusion surrounding taxes occultes and PSCI taxes was the result of nations applying both taxes simultaneously as one system.⁶³⁵ While the cascade taxes were in use, the border adjustment was implemented on the appraised average values. Generally taxes were included appraising the tax values under the one system. Moreover countries that did not have cascade taxes have generally not applied the BTAs to their taxes occultes.⁶³⁶ Furthermore, when collecting taxes occultes in a cascade system they transfer into cumulative taxes as a result of the increment in cost of intermediate products, as well as the actual tax being incorporated in the cost on which further stages of cascade taxes are collected.⁶³⁷ Nonetheless, this does not mean that taxes occultes can be transformed into cumulative taxes even if they are not collected as part of a cascade.

As seen above, taxes occultes, and carbon/energy taxes as a part of them, are dissimilar to PSCI taxes and therefore BTAs for them must be GATT conformable for both: products and the energy inputs incorporated in the final product.

⁶³⁴ OECD *Report on Tax Adjustments Applied to Exports and Import on OECD Member Countries* Paris 1968.

⁶³⁵ GATT *Consolidated Document on the Examination of Practices of Contracting Parties in Relation to Border Tax Adjustments* Restricted Document (L/3389) 6 May 1970.

⁶³⁶ *Op cit*, Fn. 594 p. 34.

⁶³⁷ *Ibid*.

That broad conclusion might lead to insecurity linked to transformation difficulties. Thus, with the taxation of imported products, a couple of hidden discriminations could be inherent; for example it is necessary that duty rates of imported and domestic goods are similar and need to include modality and abundance, as well as tax method and rate of raw material, additives and lubricants. Furthermore, there might be different production processes and methods used in different companies and branches. This could lead to the impossibility of designing and introducing a BTA on inputs not physically incorporated into the final good unless with it some protection measures were included.

3.4.5 Article XX GATT

If BTAs⁶³⁸ were found to be inconsistent with one of the core provisions under GATT or the ASCM they might still be justified pursuant to GATT Article XX. Article XX embraces a number of specific reasons when GATT rules might be exempted. Paragraphs (b) and (g) of Article XX are relevant for the protection of the environment. Pursuant to these paragraphs, member states may adopt policy measures that are inconsistent with GATT disciplines, but ‘necessary to protect human, animal or plant life or health’;⁶³⁹ or ‘relating to the conservation of exhaustible natural resources’.⁶⁴⁰ A further requirement of the Chapeau of Article XX is that the measure has not been ‘applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail’.

Additionally, it is necessary to have a deeper look at the protected properties in the two paragraphs of Article XX dealing with environmental matters.

Therefore, the requirement of Article XX must be given attention: a connection needs to be established between its settled climate change policy, and the measure at stake.⁶⁴¹ That means that the measure has to be either:

- necessary for the protection of human, animal or plant life or health (paragraph b), or
- relating to the conservation of exhaustible natural resources (paragraph g).

⁶³⁸ This is also valued for subsidies whose conformity with GATT/WTO can be found in Appendix 8.

⁶³⁹ Article XX(b).

⁶⁴⁰ Article XX(g).

⁶⁴¹ *Op cit*, Fn. 142 p. 108.

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3.4.5.1 Article XX (b) GATT

The protection of human, animal or plant life or health is necessary. If BTAs were implemented this would happen for different reasons. As we have seen, one reason is to avoid carbon leakage and competitive problems of those countries that have implemented carbon mitigation measures, such as an energy tax or ETS. Another reason is that with such a BTA it would be hoped to persuade countries to begin implementing mitigation measures themselves. The reduction measures, which some countries have already applied, have been implemented to avoid the catastrophic effects of climate change caused by man-made CO₂ emissions. Accordingly, the implementation of BTAs would occur *inter alia* to reduce carbon emissions and with this to protect human, animal and plant health. To show this a look at the WTO settlements will be taken.

In the Gasoline Case⁶⁴² policies aimed on climate change were not part of the decision but the decision still has to be mentioned as a hoped result for dispute settlement if carbon emissions and climate change issues become part of a dispute. The Gasoline Case revolved around the implementation of the United States domestic legislation known as the Clean Air Act of 1990, especially the norms to control toxic and other pollution caused by the combustion of gasoline manufactured in or imported into the United States. Here, the Panel decided that a policy to reduce air pollution coming from the consumption of gasoline, was a policy concerning the protection of human, animal and plant life or health as stated in Article XX(b).⁶⁴³ In addition the Panel pointed out that a policy to reduce the depletion of clean air was a policy to conserve a natural resource in the sense of Article XX(g).⁶⁴⁴ According to the above mentioned facts, carbon emission mitigation policies against polluting the air could also be included in Article XX(b).

For the determination whether a measure is ‘necessary’ a sum of factors shown by the Panel⁶⁴⁵ has to be balanced, including the contribution made by the environmental measure to the policy objective, the importance of the common ‘interests or values protected by the

⁶⁴² Report of the Panel *United States - Standards for Reformulated and Conventional Gasoline* (WT/DS2/R) 29 January 1996.

⁶⁴³ *Ibid* para. 6.21.

⁶⁴⁴ *Ibid* para. 6.37.

⁶⁴⁵ Report of the Panel *Brazil – Measures Affecting Imports of Retreaded Tyres* (Retreaded Tyres) (WT/DS332/R) 12 June 2007 para.5.10. The Panel had to deal with the question as to whether the Brazilian import ban on retreaded tyres was justified.

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measure’, and the impact of the measure on international trade. This necessity test, which moves towards a proportionality test, is a new approach first developed by the Korea – Beef Appellate Body.⁶⁴⁶ In this case the Appellate Body needed to decide whether the Korean regulatory scheme discriminated against imported beef by *inter alia*, confining sales of imported beef to specialised stores, limiting the manner of its display, and otherwise constraining the opportunities for the sale of imported beef.

If balancing leads to the conclusion that the measure is necessary (which is a basic prerequisite), the next step is to compare this finding with other possible measures (possibly less trade-limiting options) at the same time as offering a similar benefit to the purpose of the goal being sought.⁶⁴⁷ For example, the Appellate Body in European Community – Asbestos⁶⁴⁸ observed after its balancing procedure, that there was no reasonably available alternative to a trade prohibition, and called the measure which preserves human life and health as ‘vital and important in the highest degree’.⁶⁴⁹ Furthermore, it decided that the more vital or important the common interest or value of the protected good was, the easier it was to understand necessary measures designed to achieve those aims.⁶⁵⁰ The case is problematic if there is no possible statistical statement available about the endangering concentration of the potential activity (case of precaution).⁶⁵¹ This means for the climate change aspect that there has to be a significant relation between the trade measure and the environmental objective. The Appellate Body in Brazil – Retreaded Tyres,⁶⁵² determined that the results obtained from certain actions – for example, measures to mitigate global warming and climate change – can only be evaluated with the benefit of time.

Other equal appropriate measures instead of BTAs are currently not available. Nevertheless, even if there were other suitable measures available, climate change mitigation measures

⁶⁴⁶ Report of the Appellate Body *Korea – Measures Affecting Imports of Fresh, Chilled and Frozen Beef (Korea – Beef)* (WT/DS161/AB/R) and (WT/DS168/AB/R) 11 December 2000.

⁶⁴⁷ Report of the Appellate Body *Brazil – Measures Affecting Imports of Retreaded Tyres* (WT/DS332/AB/R) 3 December 2007 para. 178.

⁶⁴⁸ *Op cit*, Fn. 583.

⁶⁴⁹ *Ibid* para. 172.

⁶⁵⁰ *Ibid*.

⁶⁵¹ Report of the Appellate Body *EC Measures Concerning Meat and Meat Products (Hormones)* (WT/DS26/AB/R) 16 January 2008 para. 187; Cottier with Tuerk and Panizzon ‘Handel und Umwelt im Recht der WTO: Auf dem Weg zur praktischen Konkordanz’ *Zeitschrift für Umweltrecht Sonderheft* 2003 pp. 155-166 (160); Ekardt and Neumann ‘Liberalisierter Welthandel und Umweltschutz’ *Zeitschrift für Umweltpolitik und Umweltrecht* 2/2008 pp. 183-208 (208).

⁶⁵² *Op cit*, Fn. 647 para. 151.

should be seen as necessary as a basic prerequisite to what avoid worse case results and can then be compared with other measures which are mostly uncertain themselves. However, the uncertainty is more in the effects of global warming than in the extent of the measure (as there is at least a prognostic analysis). But one point is sure, climate change will happen in the near future since it is already on the doorstep.

3.4.5.2 Article XX (g) GATT

A measure is included in Article XX (g) if it is related to ‘the conservation of exhaustible natural resources if such measure is made effective in conjunction with restrictions on domestic production or consumption’. With BTA the exploitation of exhaustible resources cannot be stopped but at least could be slowed down. This reduction could be seen as a conservation of fossil fuels as exhaustible resources.

Similar to the necessity requirement in Paragraph (b), Paragraph (g) also asks for a close extent of the relationship between measures and protected properties which results from the wording ‘related to’. Accordingly, the measures have to be reasonably related to the aims of conservation and need to be ‘in conjunction with restrictions on domestic production or consumption’.⁶⁵³ The Appellate Body in the United States – Gasoline Case which dealt with the question whether the United States was applying rules that discriminated against gasoline imports decided that the chosen measure served to conserve clean air, and in relation to the second condition, the Body said that it fulfilled the ‘even handedness’ requirements as it applied to domestic and imported goods.⁶⁵⁴ Since it was affirmed in the Gasoline Case where the main aim was the control of toxic and other pollution caused by the combustion of gasoline, a similar decision could be given by avoidance of the combustion of all fossil fuels as exhaustible natural resources. This is among other aims, a target of mitigation measures. Accordingly BTAs would be covered by the legitimate aim listed in XX(g).

⁶⁵³ Report of the Appellate Body *United States - Standards for Reformulated and Conventional Gasoline (Gasoline)* (WT/DS2/AB/R) 29 April 1996 p.8.

⁶⁵⁴ *Ibid* p 21.

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3.4.5.3 *The Chapeau of Article XX GATT*⁶⁵⁵

According to the introductory clause of Article XX, measures only apply under this regulation when they do not constitute a ‘means of arbitrary or unjustifiable discrimination’ or a ‘disguised restriction on international trade’. At first glance, it seems similar to the non-discrimination principle in other GATT rules and accordingly, it seems to regulate the same thing twice over. But this is not so.

In order to accomplish the vindication of the measure it is imperative to make a distinction between the trade measures that are applied unilaterally and the ones applied multilaterally.⁶⁵⁶ In the Shrimp/Turtle Case the Appellate Body stated that conditions of market access, on whether exporting member states complied with a policy unilaterally prescribed by the importing country, were a common aspect of measures which failed to be included in the scope of Article XX exemptions.⁶⁵⁷

Pursuant to the decision in the Tuna/Dolphin I Case, the Panel stated that the scope of Article XX would only include protection of the environment in the member’s own territory, otherwise the multilateral trade system would be undermined.⁶⁵⁸ This opinion was overturned in the Shrimp/Turtle Case, where the Appellate Body agreed under Article XX(g) that the US rules would not only apply to turtles within the waters of the United States but also to those living beyond its national boundaries. Also in Tuna/Dolphin II, the Panel said that there were no boundaries for the scope of Article XX to protect only domestic properties.⁶⁵⁹ This might be an important point in the matter of carbon mitigation, as it is relevant for the protection of the atmosphere as a global common asset.⁶⁶⁰ Converting these requirements into the need of a country for implementing BTAs, it could be stated that BTAs have a protection effect for the environment worldwide, which does not speak against their implementation.

⁶⁵⁵ Because of the similarity of (b) and (g) in the Chapeau Article XX, they will be presented as one outcome.

⁶⁵⁶ Biermann with Böhm, Brohm, Dröge and Trabold *Verursacherprinzip - WTO-Recht und ausgewählte Instrumente* Umweltbundesamt Berlin December 1993 p. 53.

⁶⁵⁷ *Op cit*, Fn. 576 para. 15.

⁶⁵⁸ *Op cit*, Fn. 573 para. 5.25ff.

⁶⁵⁹ See Report of the Panel *United States – Restriction on Imports of Tuna* (Tuna/Dolphin II) (DS29/R) 16 June 1994 para 5.15ff. Tuna/Dolphin II revolved around an embargo implemented by the United States against countries who re-exported tuna from nations which were not allowed to export tuna into the United States because of the primary embargo (Tuna/Dolphin I).

⁶⁶⁰ Ekardt and Neumann *Op cit*, Fn. 651 p. 196.

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As seen above, it is necessary and important to differentiate between unilateral and multilateral measures. The question arises as to how a national measure, linked to global warming mitigation, might be seen. It could be seen as a unilateral measure but also as a measure covered by a multilateral agreement. Neither the UNFCCC nor the Kyoto Protocol require BTAs or other specific measures relevant to trade. But, member states are required to implement measures to achieve the aims of Kyoto, while keeping the trade system free and open. On the other hand, neither the UNFCCC nor the Kyoto Protocol have discussed BTA or other trade measures in detail. In the meantime, trade relevant measures such as ETS or energy taxes and subsidies are being used in several countries. This is suggestive of their conformity to GATT Article XX, as they have been implemented in the context of a multilateral environmental agreement. Moreover, BTAs have in general no unilateral, only multilateral effects, namely their application in those countries which have not implemented adequate carbon mitigation measures. Accordingly, the conformity linked to multilateralism can be affirmed. Countries are allowed to design measures which can be flexible for different situations in different countries. In this matter there are two decisions to be mentioned.

In the Shrimp/Turtle Case, the United States treated WTO member states differently, with the adaptation of a rule to protect the sea turtles cooperatively with some member states, but not with all. This was definitely a discriminating factor among WTO members, which was not justified.⁶⁶¹ A WTO member state must take into account that circumstances in other countries may be different, before necessitating other states to implement the same policies.⁶⁶² For example the United States has changed its regulations in order that other countries' policies need only be comparable in effectiveness.⁶⁶³ Thereafter the Appellate Body judged that the United States showed honest intention in its efforts to negotiate an international agreement regarding the protection of the sea turtle, including the complaint. Therefore the regulations were not applied in an unjustifiable or arbitrary manner.⁶⁶⁴

⁶⁶¹ *Op cit*, Fn. 576 para. 166.

⁶⁶² *Op cit*; Fn. 576 para. 164.

⁶⁶³ For example, in the shrimp regulation, the United States included a rule which allowed exporting countries to apply programmes not based on the mandatory use of turtle excluder devices, and offered technical assistance to develop the use of turtle excluder devices in third countries, see: Report of the Panel *United States – Import Prohibition of Certain Shrimp and Shrimp Products Recourse to Article 21.5 by Malaysia* (WT/DS58/RW) 15 June 2001 para. 5.142.

⁶⁶⁴ *Op cit*, Fn 576 para. 134.

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On the other hand, in the United States – Gasoline decision, the Appellate Body stated that the United States had not tried enough possibilities for entering into cooperative arrangements with affected countries, in order to reduce the administrative problems.⁶⁶⁵ However, in several climate change conferences a cooperative agreement worldwide could not be reached.

It has to be kept in mind that member states should still have the freedom to set their own levels of acceptable risk in the political economy (regulatory autonomy). In this context the Appellate Body has always repeated, for example, in the Korea – Beef Case in the context of Article XX(d): ‘It is not open to doubt that member states of the WTO have the right to determine for themselves the level of enforcement of their WTO-consistent laws and regulations’.⁶⁶⁶ According to part of the literature⁶⁶⁷ this regulatory autonomy would prohibit balancing, as it is, in general, an indication of the level of risk the member state is prepared to take and then seeks to check whether the measure is the least restrictive in its trade effects. Even if I do not agree with the opinion of the literature which wants to prohibit balancing acts, it has to be said that every balancing process, dealing with the comparison of presumed effects, is relative and vague and has to be made in good conscience. Even so, it does not decrease the regulatory autonomy of a member state; in fact it helps to find the most effective measure, which affects other countries as little as possible.

According to the above, especially following the Appellate Body in the Brazil – Retreaded Tyres Decision, it is unclear whether BTAs are necessary to protect human, animal and plant life or health. However, there is no other comparable measure currently available. Nevertheless, there will always be the insecurity caused by the balancing process, where the justification always depends on the individual case, the submission of relevant and powerful arguments and expert reports. Therefore the result cannot be anticipated, but there is the hope that BTAs are justified as mitigation measures.

3.5 Effectiveness, Complaints and the Burden of Proof

Although energy taxes are taxes occultes and not PSCI taxes, they still have a common problem: the questions relating to the administrative and monitoring compliance of energy

⁶⁶⁵ *Op cit*, Fn. 653 p. 26.

⁶⁶⁶ *Op cit*, Fn. 646 para. 176.

⁶⁶⁷ Weiler ‘Comment: Brazil – Measures Affecting Imports of Retreaded Tyres (DS322)’ Prepared for the ALI Project in the Case Law of the WTO *World Trade Review* 2009 Vol. 8 special issue 1 137–144 (139).

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taxes. Even if it was possible to find a way to administer and monitor energy taxes, for BTA the question arises how effective BTA would be from an environmental and economic point of view. These are currently hotly discussed questions which will only be described briefly.

3.5.1 Effectiveness aspects and the environmental advantage

3.5.1.1 Points to be focused on

The purpose of BTAs is, on the one hand, to address the competitive distortions, which are an effect of the partial implementation of global climate change policies. On the other hand the aim is to bring reluctant countries to the negotiating table in the climate change debates and negotiations to achieve mitigation measures (the threat of implementing BTAs).

Some problems in achieving these goals should be highlighted.

One problem comes with the scope of BTA. Should only raw materials such as paper, aluminium, etc. be taxed on import or should products manufactured out of these materials such as books, bicycles, etc. also be taxed?⁶⁶⁸ If only the raw materials were taxed then prices would rise as an input item for domestic producers, but the imported end product, like paper would not be taxed. This could lead to circumvention measures.

It is necessary to focus on the possibility of circumvention. For example, the United States imports approximately five million tonnes of steel from China annually and another two million tonnes from Japan.⁶⁶⁹ Houser et al. show that if the BTAs were only implemented on Chinese steel, there would be an increased flow from China to Japan before the steel was transported to the United States. This would not protect the United States steel producers. And it could happen in all energy-intensive sectors.

Thus, a solution through enough pressure on target countries to adopt stricter rules or to live with tough treaty obligations has to be found in order to avoid leakage and circumvention. Furthermore, the treaty would have to be administratively possible, which is difficult,

⁶⁶⁸ Cosbey *Carbon Tax Adjustment* a paper for Seminar on Trade and Climate Change June 2008 Copenhagen published August 2008 p. 5.

⁶⁶⁹ Houser with Bradley, Childs, Werksman and Heilmayr *Levelling the Carbon Playing Field: International Competition and US climate policy design* Peterson Institute for International Economics and World Resources Institute Washington DC 2008 p.56.

especially when the tax objects are a variety of prior-stage products. Hence the tax scope should be prevented from escalating which would make the administration of the BTA unfeasible.

3.5.1.2 Expected reaction of others, especially reluctant countries

It is difficult to gauge the reaction of other, especially reluctant countries to the climate change discussions, if one of the global main players, for example, the European Union or the United States, implemented BTAs on their energy or carbon taxes or CTS. Could that influence the climate mitigation negotiations and development processes? This would not necessarily happen in countries that do not have large trade flows to the implementing countries, but it might be different for countries with a high trade flow. Could it be helpful to encourage non-Annex B countries to sign up for honest commitments in the post-Kyoto era?

To focus on this matter or to get an idea at least, as to how BTAs could influence the behaviour of other countries, two cases of BTA which have had a big influence will be mentioned as possible mind openers and structure changers.

Because of international concerns about the depletion of the ozone layer caused by the increasing concentration of chlorofluorocarbons (CFCs) and brominated halons gases in the atmosphere, the Montreal Protocol on Substances that Deplete the Ozone Layer, was negotiated and came into force in the middle of 1989. The United States ratified it in April 1988 and, with that, bound itself to control the production and consumption of ozone-depleting chemicals (ODCs). The signatory countries were obliged firstly, to achieve a near-term reduction of CFC production and consumption down to the 1986 level and secondly, to reduce it further down to 80% and 50% of 1986 levels. Also the production and consumption of halons was limited to the 1986 levels, beginning in 1992. To achieve this aim the ODC Tax,⁶⁷⁰ including a BTA, was implemented. The ODC Tax has had the fascinating effect that it achieved an ordinary phase-out of ODC, and through the BTA regulation, the internal ODC industry was protected from foreign predation. Furthermore, it was a main reason for the United States becoming a leader in the development of commercially viable substitutes for

⁶⁷⁰ Enacted as section 7506 of the Revenue Reconciliation Act of 1989, new sections 4681 and 4682 of the Internal Revenue Code were implemented.

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ODCs.⁶⁷¹ It was very effective as an analysis in a UNEP report⁶⁷² from the end of 1998, the latest date for which full data are available, has shown. Production of the original CFCs had fallen by 95% in industrialised countries (the remaining production being devoted to essential use exemptions and exports to developing countries):

- Production of the original controlled halons had fallen by 99.8%.
- Production and consumption had risen in developing countries, but this was expected and allowed by the Montreal Protocol.
- Overall world production of CFCs had decreased by 88% and halons by 84% since 1986.

The political effect on other countries, on the other hand, can be shown by the Shrimp/Turtle regulations.⁶⁷³ The United States imposed a measure to ban imports of shrimps caught by killing endangered sea turtles. Countries, especially Malaysia, Pakistan, Thailand and India stated that this measure led to eco-imperialism, since America would determine how other countries managed their domestic affairs. In addition, they objected that it was only a protective measure, developed to confine exports and unduly shield US producers. Because of these reasons the regulation was submitted to the Dispute Settlement Body of the WTO by the four above mentioned countries, supported by third party participation of Australia, Ecuador, the European Community, Hong Kong (China) and Nigeria. When the Appellate Body denied the illegality of the regulation, the arguments of the losing countries went so far as to say that the 'Appellate Body had incorrectly overstepped its boundaries'.⁶⁷⁴

The Appellate Body decided that the first objective of the US regulations was to protect the environment and not their own producers. It is expected that the reaction of other nations on implementing BTAs especially poor countries and reluctant states would be similarly disaffected.

⁶⁷¹ *Op cit*, Fn. 551 p.15.

⁶⁷² UNEP *Production and Consumption of Ozone Depleting Substances under the Montreal Protocol: 1986-2000* Ozone Secretariat UNEP Nairobi April 2002 [Online] <http://www.unep.org/Ozone/pdfs/15-year-data-report.pdf> accessed on 4 March 2010.

⁶⁷³ *Op cit*, Fn.576; Report of the Appellate Body Report of the Appellate Body *United States – Import Prohibition of Certain Shrimp and Shrimp Products – Recourse to Article 21.5 of the DSU by Malaysia* (WT/DS58/AB/RW) adopted 21 November 2001.

⁶⁷⁴ *Op cit*, Fn. 668 p. 7.

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It is likely that there would be an impact on some developing countries' domestic policy-making processes in order not to lose one of their big trade partners. The question is, whether the impact on developing countries is desirable? In general a distinction is drawn between non-Annex B countries and developing countries. This distinction is a matter of fairness, supported as such by historical and legal reasons. The implementation of BTAs has been considered by those countries which have historically made, and still make, the most global damage in terms of climate change.⁶⁷⁵ For fairness sake some advantages should be given to developing countries.⁶⁷⁶ This was also determined in the Kyoto Protocol. This principle of common, but differentiated, responsibility and capability is inherent in Article 3(1) of the 1992 UNFCCC and in the 1992 Rio Declaration. These legal agreements have influenced world trade law, since they are widely ratified, multilateral treaties by WTO parties.

The consequences of the different treatment of developing countries in comparison to industrial countries could be avoided by global environmental facilities, created to compensate the additional costs for developing countries in realising the climate convention.⁶⁷⁷ A possible measure for avoiding carbon leakage to developing countries could be financial and technological assistance.

If the implementation of BTAs included developing countries, it might be possible to tax their traded items with a reduced tax rate (for example 50% of the normal tax rate and 75% for emerging nations. However the costs would have to be measured by economists for each country separately.)

The apprehensive reactions of Malaysia, Pakistan, Thailand and India in the Shrimp/Turtle Case led to the assumption that the implementation of a carbon or energy tax combined with BTAs would lead to similar or even stronger reactions. Accordingly, influence on trade could be expected. This trade influence would most likely lead to the implementation of carbon/energy taxes in countries, which have not implemented such taxes, especially when those countries were main traders. This would lead to a major environmental advantage since

⁶⁷⁵ Even if there has been a change in the percentage in the last twenty years.

⁶⁷⁶ Nonetheless, it should be remembered that there are developed countries, with a lower GDP than some developing countries, which are obliged to fulfil the Kyoto Protocol requirements. This should be included in the fairness consideration.

⁶⁷⁷ *Op cit*, Fn. 543.

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it would influence attitudes on dealing with energy and fossil fuels. (To avoid discrimination against developing and emerging countries, energy/carbon taxes could be levied with a lower tax rate.)

3.5.2 The appropriate level of energy tax adjustment at the border

As a general rule it can be said that every manufacturer has the right to produce his own amount of carbon emissions. Bearing this in mind, while considering the administrative feasibility of implementing any BTA, would appear to be the deathblow of BTA as a mitigation measure. It would only be possible if the producer were able (a problem especially in developing countries) and willing to show the exact amount of carbon in the goods (for instance on an invoice). This would depend on domestic legislation regulating carbon.

To achieve the aim of BTA by growing the support of nations in fighting climate change, BTA might only be applied at the extent to which the other nation made a comparable effort in addressing climate change policies.⁶⁷⁸ This would mean that firstly, the level of climate commitments of the other country, including its climate policy, would have to be assessed. This would mean considerable administrative effort in order to classify the climate measures of other countries. In this respect China can be mentioned as an example. As yet it has not put into practice a CTS or carbon tax. However, it has introduced renewable energy sources and increased energy efficiency (through monetary punishment and/or closing of energy-intensive production).⁶⁷⁹ These solutions are not included in the category of climate change measures of the Kyoto Protocol.⁶⁸⁰ Therefore, it is clearly a priority and challenge to construct a common measure that can be utilised to compare the policies of nations that introduce energy taxes and/or ETS including BTA. Even without this problem, it is still questionable whether a carbon tax can be designed to realise a fair and consistent BTA which would make its administration possible. The question can be underlined by the 1970 Report of the Working Party on BTAs. It stated that ‘countries adjusting taxes should, at all times, be prepared, if requested, to account for the reasons for adjustment, for the methods used, for the amount of compensation and to furnish proof thereof’.⁶⁸¹ If somebody hopes to find exact details in the

⁶⁷⁸ *Op cit*, Fn. 668 p. 6.

⁶⁷⁹ *Ibid*.

⁶⁸⁰ Since the mechanisms are, according to the Kyoto Protocol: Emissions trading – known as ‘the carbon market’, clean development mechanism (CDM) and joint implementation (JI).

⁶⁸¹ *Op cit*, Fn. 546 para 17.

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report as to whether BTAs would meet the requirements then he/she will be disappointed. An approach to this was made in the 1991 draft of the Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations, also called the 'Dunkel Draft'.⁶⁸² The Dunkel Draft was devised to nullify the actual inclusion exception to the ban on BTAs for PSCI taxes, and to supplant it with policies that allowed rebatement of PSCI taxes, providing that the export country had the means to confirm amounts of the charged goods used in the production.⁶⁸³ There is no reason why this regulation should not also apply to taxes occultes even if it only related to the export side and did not say anything about the import side. But as already mentioned, import and export are two sides of the same coin.

Concerning imports, one can look into some penal decisions which included administrable systems of charging taxed-goods which were contained in tradable goods. The most famous cases in this field were the Superfund Tax on traded chemicals and the ODC Tax on goods. As the Superfund Tax has already been summarised in the import section, this will focus on the ODC Tax.

As with the Superfund Tax, the ODC Tax, as an excise tax, was levied on the first sale or use. The ODC Tax included the same three-tiered system as the Superfund Tax. Furthermore, BTAs were applicable to all goods that contained or were produced with ODCs, unless the Secretary of the Treasury determined that only a '*de minimis*' amount of such products was used during the production process.⁶⁸⁴ The *de minimis* use was determined at one tenth of 1% of the importer's cost of acquiring the product.⁶⁸⁵ In comparison to the Superfund Tax the ODC Tax had a high tax rate which increased over the years. As an example, the taxed price of CFC-11 and CFC-12 was almost treble that of the untaxed price.⁶⁸⁶ Because of this high tax rate smuggling of these materials became widespread. This was an unwanted side effect and to avoid it several strategies were successfully put into place.

⁶⁸² GATT Draft Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations Restricted (MTN.TNC/W/FA) Geneva 20 December 1991. It was named by its chairman Arthur Dunkel.

⁶⁸³ *Op cit*, Fn. 594 p. 34.

⁶⁸⁴ 26 USCA 4682(c).

⁶⁸⁵ 26 CFR 52 4682-3(b)(2).

⁶⁸⁶ Hoerner 'Taxing Pollution' in Cook *Ozone Protection in the United States: Elements of Success* World Resources Institute Washington DC 1996 pp. 39-55 (46-47).

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The experience of the Superfund and ODC Taxes showed that it was possible to tax means of production. Nonetheless, there still remains the problem of obtaining the relevant data concerning the manufacturing processes used in the imported good, in the respective countries of origin. Manufactured products are generally developed from a host of raw materials and intermediate products, typically from several countries. Discovering the full carbon amount in these supply chains seems like an impossible mission. Accordingly, to exchange the real carbon value by benchmarking would be helpful. Nonetheless, it is still going to be a complex and difficult process to find guideline values or benchmarks for a tax on energy as a means always used in the production process.

A possibility for finding those guideline values can be seen in the cooperation between the International Organization for Standardization (ISO) and the legislative country. International Standards provide the technological and scientific basis for designing health, safety and environmental legislation. Accordingly, they are the technical means by which political trade agreements can be put into practice. The use of these standards could abolish the existing divergent national or regional standards which often represent technical barriers to trade. The standards could be based on air, water and soil quality, on emissions of gases and radiation and could serve as such to shield the environment. Standardisation would make it possible to compare technical means used in the production process and the amount of emissions emitted in this process, in many markets around the world, and would serve as a supporter of the WTO goals. Furthermore, international consensus on the standards would help developing countries gain technological know-how. By knowing the recognition features which the product had on the international market, developing countries would have an informed basis for making the right decisions when investing their scarce resources and thus avoid squandering them.⁶⁸⁷

3.5.2.1 Best available technology as a possible method

Another option for the importing country would be to assume that the imported product was made according to the ‘predominant method of production’ used in the country of import, or the current ‘best available technology’ (BAT) and to tax the product using this method as a

⁶⁸⁷ ISO Discover ISO [Online] http://www.iso.org/iso/about/discovers-iso_who-standards-benefits.html accessed on 22 February 2010.

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base.⁶⁸⁸ In this instance BAT may have a particular market share of the production of the goods involved.⁶⁸⁹ Hence, the tax rate would match the quantity of emissions which would have been emitted if all components had been produced with the BAT. On grounds of credibility, it has been recommended that elaboration of the BAT standards should be entrusted to an independent body which would receive all required information from the industry.⁶⁹⁰ Parts of the literature⁶⁹¹ have noted a similar method in the Superfund Case. There, the United States was allowed to impose an instalment of the amount that would be levied if the substance were produced ‘using the predominant method of production’.⁶⁹² Even the Panel could not find a breach of the national principle of treatment through the use of this method.⁶⁹³ Neuhoﬀ and Ismer studied the effect of the BAT method in their 2004 report amended in 2007.⁶⁹⁴ (The report is based on ETS. The distinctions between ETS and carbon taxes relating to BTAs are few if any). They compared two equal countries with an equal economy where country B had implemented an ETS and with it BTAs and country A had not, but had to pay BTA for importing goods into country B. They discussed which technology should be labelled as BAT and agreed on the world market of production rather than the home market.⁶⁹⁵ They came to the conclusion that BTA on the BAT levels had two countervailing effects: The increased price in country B would decrease its demand for goods and also the global demand, as well as the balance of global production; this in turn would result in both parties facing lower output levels.⁶⁹⁶ Secondly, manufacturers in country B who produced goods using different technologies to BAT would have to concentrate on the increased cost for emission allowance by region A for BTA. Their suggestion was for an indirect method that utilised a measure affiliated with the amount of carbon emissions during production processes.⁶⁹⁷ This would take into account that the manufacturing of basic materials is responsible for a large percentage of carbon emissions.⁶⁹⁸ After utilising the different basic materials for manufacturing, the BTA would be calculated by multiplying the quantities of the

⁶⁸⁸ Demaret and Stewardson *Op cit*, Fn. 599; Ismer and Neuhoﬀ ‘Border Tax Adjustment: A feasible way to Support Stringent Emission Trading’ *European Journal of Law and Economic* 2007 Vol. 24 issue 2 pp. 137-164(140).

⁶⁸⁹ *Op cit*, Fn. 142 p. 102.

⁶⁹⁰ Ismer and Neuhoﬀ *Op cit*, Fn. 688.

⁶⁹¹ Demaret and Stewardson *Op cit*, Fn. 599; *Op cit*, Fn. 543 p. 298.

⁶⁹² *Op cit*, Fn. 542 para. 2.6.

⁶⁹³ *Ibid* paras. 5.2.9-10.

⁶⁹⁴ See for more details: Ismer and Neuhoﬀ *Op cit*, Fn. 688.

⁶⁹⁵ *Ibid* p. 155.

⁶⁹⁶ *Ibid* p. 142.

⁶⁹⁷ *Ibid* p. 153.

⁶⁹⁸ *Ibid*.

different production means of the manufactured article. Electricity might be treated differently, as it can be produced with a very low carbon emission (renewable energy) as well as the opposite (coal).

To promote the application of BAT, the literature⁶⁹⁹ has suggested a reduction in the amount of products for which a BTA is possible, whereas the best way applicable is seen in adjusting the production of energy-intensive goods to the environmentally friendliest production method.

If indeed details were given about the amount of energy incorporated in the product, an 'energy-added tax' which should work similarly to the European VAT system could be charged.⁷⁰⁰ Here, a tax on prior-stage products, for example, energy and fuel, could be shown as separate entries on the invoice for the export. It would also be essential in this case that the necessary information about the production process was delivered (see US Superfund Tax and ODC Tax).

The optimal solution would be one where no BTAs were necessary. This would be the case in an international harmonisation of energy taxes, based on the country of origin principle. Unfortunately, global economics and politics are currently neither able nor willing to accept this idea.

3.5.2.2 *Economic aspect of BTA*

In their study, Neuhoﬀ and Ismer came to the conclusion that BTA was an economically feasible approach to address the leakage problem, whereas they recommended a processed-material approach to implement the scheme.

Another report on the economic influence of BTA,⁷⁰¹ also in the ETS field, came to a different conclusion. Here the central question was the implementation of the Kyoto Protocol with or without BTAs, which were compared. In their approach Peterson and Schleich used

⁶⁹⁹ *Op cit*, Fn. 594 p. 43; *Op cit*, Fn. 600 pp.75ff.

⁷⁰⁰ *Op cit*, Fn. 594 p. 21.

⁷⁰¹ Peterson and Schleich *Economic and environmental effects of border tax adjustments* Fraunhofer-Institute for Systems and Innovation Research in the series Working Paper Sustainable and Innovation No. S1/2007 Karlsruhe 2007.

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more detailed facts than the general approach of Ismer and Neuhoﬀ. Their conclusion was based on the structure of ETS but could be easily translated into energy taxes. As discussed before, another alternative is that carbon taxes could focus more on energy-intensive sectors. The Peterson and Schleich study revealed that BTA would cause higher levels of output, from energy-intensive industries;⁷⁰² accompanied by a sufficient change in carbon reduction of sectors which were not included in the BTA, for example, households, so as to achieve regional emission goals. This in turn would lead to an increase in carbon taxes and a decrease in competitiveness in non-BTA sectors.⁷⁰³ The result could be different if all industries were subject to BTA. This could be an achievable aim for a carbon tax (without ETS).

The greatest effect of BTA, economically and environmentally, would be achieved with a BTA based on the carbon content of the good.⁷⁰⁴ Then the result would be that exporters would receive higher subsidies than the additional costs, since manufacturing in the European Union seems to be less carbon-intensive than in other areas (for instance China and India).⁷⁰⁵ Here the carbon leakage would comprise 8-13% of the emission reduction of Annex B countries.⁷⁰⁶ The result in the European Union, in terms of carbon content, would remain at 20% if the BTA was based on average carbon content (with BAT delivering a similar result).⁷⁰⁷

Other research⁷⁰⁸ has focused on whether BTA could stop carbon leakage in the cement industry. Compared to the business-as-usual scenario, the implementation of the Kyoto Protocol and a carbon price of EUR 15 a tonne in Annex B countries (except Australia and United States) without a BTA, would decrease carbon emissions (about 20% in these countries) based on a reduction in cement consumption of -7.5% in 2010, induced by a cut in domestic consumption and a loss in competitiveness.⁷⁰⁹ To avoid a loss in competitiveness Petersen and Schleich tested two scenarios in an attempt to find an efficient way of solving the leakage caused by BTAs. The more ambitious BTA limited the loss in production of Annex B countries by 7.5% instead of only 2% without BTA, whereas the leakage increased

⁷⁰² *Ibid* p. 24.

⁷⁰³ *Ibid* p. 23ff.

⁷⁰⁴ *Ibid* p. 20.

⁷⁰⁵ *Ibid* p. 22.

⁷⁰⁶ *Ibid* p. 25.

⁷⁰⁷ *Ibid* p. 22ff.

⁷⁰⁸ Demailly and Quirion *Op cit*, Fn. 144.

⁷⁰⁹ *Ibid*, p. 9.

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in BTA countries, while emissions in the rest of the world decreased.⁷¹⁰ To avoid calling BTA an over-protectionist measure,⁷¹¹ a less ambitious BTA was tested which would prevent the effect of leakage but would lead to a slightly higher increase in cement prices.⁷¹²

The scenarios described above led to different results, which might be the case because of various debatable assumptions and databases used, whose reliability is not always guaranteed. As I am no economist it would be difficult to decide which research result might be more accurate. As a supporter of carbon taxation, I believe that it is necessary to find a solution against carbon leakage, which could also reduce emissions, so I hope that the pro-BTA studies are accurate. However, the difficulties shown above are the reason for the ongoing debate over the usefulness or otherwise of BTA. These difficulties furthermore demonstrate that in this field a lot more work is still required to prevent carbon leakage and mitigate carbon emissions.

4 Conclusion and suggestions for improvement

Energy taxes (understood in the thesis as energy and/or carbon taxes) have not been implemented in many countries especially for energy-intensive industries, or have only been implemented with tax exemptions or subsidies for particular sectors. This chapter has dealt with BTA as a measure of avoiding competitive disadvantages and carbon leakage while focusing on carbon emission reduction.

Despite limited case law and some ambiguities in treaty law, BTAs for energy taxes are in general justified under the WTO regulations. Nonetheless, every nation that wants to implement BTAs has to prove its regulations individually, regarding its WTO conformity. As mentioned above, it is necessary to distinguish between direct and indirect taxation as a result of the country of destination principle. Additionally, it has to be admitted that particularly in the ‘field of taxes on energy inputs used in the production of final goods’, especially when they are entirely incorporated in the final good, some clear words of the WTO either by a working party or committee would be helpful to stop the discussion on conformity. Moreover,

⁷¹⁰ *Ibid*, p. 14.

⁷¹¹ If BTA was seen as an over-protectionist measure then countries like India, which would be affected by this, would take whatever means were available so as to prevent this unfair trade practice if it was introduced.

⁷¹² Demailly and Quirion *Op cit*, Fn. 144 pp. 14-15.

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it would be helpful to integrate environmental and health differences in the production process, as well as in the product itself, as a defining aspect of the physical property differences, in the discussion as to whether a product is a like product or not.

However, when implementing BTAs the WTO regulations have to be considered in individual cases since small differences can lead to inconsistency. Whether and to what extent the inconsistency would be justified in the application of Article XX can only be assumed. It can be stated that in general there is a tendency towards approving the application of BTA in comparison to other measures, but that does not mean that any particular BTA regulation would be justified.

Despite the general WTO-conformity of BTAs linked to energy taxes, it would be a challenge for governments to implement such border taxes, as it is still a case-by-case decision whether the tax will conform to WTO. Accordingly, guidelines in this field would be helpful.

Furthermore, additional research is needed concerning the implementation of BTA and its effectiveness, while considering the administrative costs and also BTA feasibility in helping the environment. Besides that, research on available alternatives to BTA would be helpful, especially in relation to fairness in respect of developing countries.

The political dimension of the implementation of BTA seems to be the most critical aspect of a successful implementation. Is the implementation really necessary or are there other ways and means? Pertaining to the above, there are other pricing mechanisms for carbon, such as compensation to emissions-intensive industries, exemptions, shifting of the tax burden to householders instead of industry, etc. (However these mechanisms are all internal and do not influence other countries and thus do not have a global steering effect). After all, the aim of negotiations on an international level would be to ensure that countries cooperate on emission mitigation – would the cooperative tactic be undermined by a perceived implementation of trade barriers? I do not think so. It is environmentally necessary to reduce carbon emissions, which is acknowledged worldwide. Of course, as already mentioned, the optimal solution would be a situation where adjustment measures in general would not be necessary. Thus, harmonising environmental taxes worldwide would eliminate the need for BTAs. But this

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would require international cooperation as well as a globally harmonised approach in energy policy. Hopefully something can be achieved in the post-Kyoto negotiations.

Klemperer⁷¹³ made a thought-provoking argument against the critics of energy taxes, including import taxes, by suggesting that free trade would not be damaged by carbon tax, as the absence of charging carbon emissions is a contribution that would be compensated by import taxes. As seen in Appendix 8, subsidies as a climate change measure seem to be consistent with GATT and sometimes the better solution, especially in the scientific field, for renewable energy and carbon capture system measures. They could always be an additional measure. In this context it has to be said again that subsidies seem to conform to GATT, but any doubt concerning their justification should be removed. This could be achieved, for example, by guidelines from a working party, in order to clarify the questions when an actionable subsidy is specific.

⁷¹³ Klemperer *What is the top priority on Climate Change?* University of Oxford Discussion Paper No. 7141 January 2009 p. 5.

VI Realising a global CO₂ taxation⁷¹⁴

Chapter Six deals with the possibility, and the realisation, of international carbon taxation. It will show whether it is possible to find a fair tax. In this regard the following axioms have to be taken into account:

- Taxes should be apportioned according to people's income and wealth.
- Taxes need to be fixed, not random or of varying amount.
- Taxes should be enforced in a user friendly manner.
- A minimum cost with regards to the implementation of the tax, and enforcement thereof, should be pursued.⁷¹⁵

Developing and launching a new tax is never easy. An environmental tax has to come close to the optimal tax, which should achieve the steering effect envisaged, without crushing the taxpayer to death. Furthermore, the tax should operate invisibly, be understandable and transparent, fair and based on democratic structures. In addition, the desirable attributes should be achieved without harming economic activities. The tax also has to be levied cost effectively and without any loopholes. This chapter tries to develop an approach towards introducing an international carbon tax framework.

While there is no claim here that the proposed tax regime is perfect, it may help to find a global solution. The text will be restricted to those areas and aspects which the author has considered as being indispensable for understanding the proposed model.

Taxes, as any legal constructions, have to be observed and reviewed regularly to be effective. The proposal presented in this thesis develops this idea further and illustrates possible designs for a revenue and disbursement model. The proposal is designed for international discussion and further development.

⁷¹⁴ Just as a reminder: CO₂ taxation is a CO₂ specific version of energy taxation. Since it is used here not as a tax levied on CO₂ emissions themselves, it does not belong to the emissions taxation group but to the group where the energy source is used for a specific duty. Nonetheless, in general both terms will be used further on as having the same meaning.

⁷¹⁵ *Op cit* Fn. 85 p. 5.

In addition the proposal will consider likely economic effects of such taxation and the possibility of mixing an emission charge with other schemes to limit emissions, in particular cap and trade schemes.

1 Possibility of realisation

As shown in Chapter Four, a number of industrial nations have already introduced carbon/energy taxes. These taxes have had a positive influence on carbon emissions and also on economic development and growth. Nonetheless, the introduction of such a tax in only a few countries is problematic. The main problem is that if the tax brings with it significantly higher energy costs than competitors have in other countries, then, without adjustments, it hinders the competitively exposed industries.

The question which arises here is: would it be possible to bring together all countries to agree to sign an international energy tax? The reasons for having an international tax are, *inter alia*, the competitive and the leakage aspects. Climate change is an international problem which does not stop at borders and accordingly an international approach is essential. As discussed in the previous chapters, a carbon tax is likely to increase prices. Even if companies avoid taxes by using substitutions for their production and transport this might still result in higher production costs. The unfortunate result for countries that choose to impose carbon taxes, is a likely loss in popularity as future industrial locations.⁷¹⁶

Carbon leakage is a common problem since it might stop or reduce pollution in one country, but increase it in other countries. At the moment, under the Kyoto Protocol it happens that the leakage effect pushes developing countries into higher growth in carbon-intensive industries, and with this, higher emissions than they might have had, which makes it more difficult for them to join an international agreement later. China can be mentioned as an example. It demands that the United States and Europe should pay for part of its CO₂ costs as they are the largest group of consumers, especially of carbon-intensive products manufactured in China.

To avoid the competitive problem and leakage it is reasonable to have an international tax than domestic taxes. The simultaneous introduction of energy taxation on an international

⁷¹⁶ OECD *Taxation and the Environment: Complementary Policies* Paris 1993 p.72.

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basis would counteract carbon leakage and competitive anxieties, by the mitigation of cutting down a comparable level of emissions.

But are states likely to be willing to submit their economic interests to an international environmental regime? As seen at the Climate Conference in Copenhagen in December 2009 it is unlikely that all nations would be willing to join the framework of an international energy tax by taking part in introducing a carbon tax in their countries. Nonetheless, as shown in Chapter Five, there are means available that could make these countries pay their share, which would make it economically wise for them to implement a carbon tax system themselves. This is also a reason why China wants to implement an energy tax. (See Chapter Four). Then again, the Climate Conference in Cancun in December 2010 instilled hope that an international agreement could be found. That does not mean that it will necessarily be an international carbon tax up front, but the signs are positive that at least a replacement of the Kyoto Protocol seems to be possible as a first step. This positive effect is supported by the statement of the UN Security Council on 20 July 2011, where it was concerned that climate change might in the long run be a threat to peace. This intervention by the most powerful UN body gives hope for further progress in global mitigation, although this statement was non-binding.

2 Development of the tax

In the context of developing a tax, there are several questions that have to be answered. What will be taxed? How will the tax be administered and monitored? How will the revenue be used? As already mentioned, the creation and design of a tax depends on many factors and demands numerous details.⁷¹⁷ The term ‘tax’ is used here as a mandatory charge on a recipient, defined by public law and does not include any rights to any service in return. For the design of such a tax, some market relevant elements should be taken into account such as price elasticity, availability of alternatives, potential for technological innovation, abatement costs, the competitive situation of the market, and the market structure.⁷¹⁸ On the other hand environmentally relevant factors also have to be considered, for instance the extent of the damage or the specific accumulation of detrimental emissions.⁷¹⁹ Formulation of an

⁷¹⁷ Even if a framework cannot be as detailed as a complex agreement, its development would still require various details and factors.

⁷¹⁸ See also Smith ‘Green’ Taxes and Charges: Policy and Practice in Britain and Germany The Institute for Fiscal Studies London 1995 p.18-19.

⁷¹⁹ *Op cit*, Fn. 92 p.19.

agreement would require several points be taken into consideration during the planning stages.⁷²⁰

- i. Firstly, what is the goal of the agreement? Environmental and economic parameters need to be defined in order to develop the measures to either support or avoid them.
- ii. In order to impose the tax, the activity to be taxed needs to be identified, in order that the levy may reach the target.
- iii. Next, the person on whom the tax will be imposed needs to be identified, in order that the levy is paid by the target.
- iv. The correct tax system should be decided upon and brought to bear. There are many systems to choose from: a domestic or international tax, a fixed tax, energy or carbon taxes as well as an ETR. Along with these, income taxes, excise and property taxes may be levied.
- v. Furthermore, the correct rate of taxation needs to be considered. For this a conclusive economic assessment is required: one that includes short-, middle- and long-term outlooks. Future adjustments of tax rates should not be excluded when determining the tax rate.
- vi. There is also the question of exemptions and/or subsidies. One has to keep in mind that industry has the power to sway government in this regard, so as to keep industry in the country. With international legislation one would hope to avoid or minimise this. Furthermore, neutralisation of subsidies via other laws should be avoided.
- vii. It is most efficient to utilise existing tax authorities and to maintain a low number of collection points as an administrative structure.
- viii. A system for the control and checking of emissions and environmental damages needs to be implemented with a direct correlation to the tax level. With advances in technology and fluctuations in reduction targets, changes may be required from time to time. The monitoring costs would be minimal as measurement equipment has already been adopted by many companies. However independent auditors are of course required for random data collection to keep the system honest. This cost should be kept to a minimum, recoverable by revenue.

⁷²⁰ See also: Tuyet 'Environmental Protection Through Taxation: Designing a Green Tax' *Tax Notes International* 22 January 2007 pp. 273-290 (281).

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- ix. The implementation of a BTA needs to be taken into account in order to guarantee that all countries are in fact introducing and collecting this tax. Therefore compliance, enforcement and possible penalties need to be assured.
 - x. Primary uses of revenue need to be the financing and maintaining of administration and monitoring. Further revenue usage should be decided upon in advance, so that there might be clarity for the taxpayers, i.e. tax shifting, compensation, reduction of budget deficits, earmarking or cleanups.
 - xi. Possibilities for changing the agreement as a matter of fiscal reality would have to be faced. Finally, would the tax achieve the goal, would costs be increased or would mitigation requiring tax adjustments be achieved?

2.1 Objectives and principles

The different targets, environmental as well as economic, have to be defined in order to develop the measures that support the aims. The main aim would be the mitigation of carbon emissions in order to stop, or at least reduce global warming to a certain level. To achieve this goal, mitigation measures should match the mitigation aim - to prevent damage from increasing emissions, which would have catastrophic effects, especially in vulnerable developing countries. Current projection of the annual cost of mitigation measures for adapting to climate change is roughly between 10 and 40 billion USD, according to UNFCCC and the World Bank.⁷²¹

The proposed establishment of the tax scheme should be based on the ‘principle of common but differentiated responsibilities’ and on the ‘polluter pays principle’, with a levy on CO₂ emissions. Therefore, the overall goal would be to strengthen the capability and willingness of the parties of UNFCCC to address the challenges of introducing and financing climate change policies. It would be necessary that the scheme was a global system, fair and legally binding on all nations, and which did not violate international law. It would have to be designed for overcoming obstacles to the implementation of effective climate policy measures, particularly those which might mitigate a warming climate.

⁷²¹ Schwank with Lückge, Iten and Mauch *Funding Scheme for Bali Action Plan – A Swiss Proposal for global solidarity in financing adaption* Bali Paper updated for SB28 Bonn Federal Office for the Environment Berne 2008 p. 5.

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In this context the objects of the Kyoto Protocol, determined in Article 2(1)(a), can be mentioned:

‘Implement and [...] further elaborate policies and measures in accordance with its national circumstances, such as:

- (i) Enhancement of energy efficiency in relevant sectors of the national economy;
- (ii) Protection and enhancement of sinks and reservoirs of greenhouse gases not controlled by the Montreal Protocol, taking into account its commitments under relevant international environmental agreements; promotion of sustainable forest management practices, afforestation and reforestation;
- (iii) Promotion of sustainable forms of agriculture in light of climate change considerations;
- (iv) Research on, and promotion, development and increased use of, new and renewable forms of energy, of carbon dioxide sequestration technologies and of advanced and innovative environmentally sound technologies;
- (v) Progressive reduction or phasing out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors that run counter to the objective of the Convention and application of market instruments;
- (vi) Encouragement of appropriate reforms in relevant sectors aimed at promoting policies and measures which limit or reduce emissions of greenhouse gases not controlled by the Montreal Protocol;
- (vii) Measures to limit and/or reduce emissions of greenhouse gases not controlled by the Montreal Protocol in the transport sector;
- (viii) Limitation and/or reduction of methane emissions through recovery and use in waste management, as well as in the production, transport and distribution of energy’

This scheme should be permanent, unlike the Kyoto Protocol with its reduction period of only five years (2008 to 2012). Since global warming is a long-term problem, short-term solutions may be good, but long-term solutions are essential as it is necessary to change behaviour permanently, by changing the current status of technology, knowledge and education of the world’s population.

2.2 Targeted action to be taxed

Action would be targeted towards the consumption of goods and services by companies and households worldwide, which include fossil fuels in their production or activities. In order to achieve a rethink in the minds of as many people as possible and with this a change in their behaviour, it would be necessary to reach both users and manufacturers. The best, and in my opinion the only way currently, would be by putting a price on their behaviour. Accordingly, if we want to reduce the pollution emitted, it would be essential to increase the price of the polluting activities. This would be possible through a cap and trade system, which caps and trades emissions allowed by permits issued (indirect approach), or by taxing CO₂ emissions (direct approach). Here the focus is on direct taxation.⁷²²

⁷²² A combination will be discussed later.

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To implement the tax it would be necessary to identify the action which has to be taxed in order to achieve the target. As already mentioned, the aim of the tax is the reduction of anthropogenic CO₂. All nations should ensure that their aggregate anthropogenic CO₂ equivalent and the other emissions of the GHGs listed, *inter alia*, in Annex A of the Kyoto Protocol (and potentially listed in the subsequent regulation) would not exceed their targets. The reason for this is that climate change is a global crisis which does not stop at geographic boundaries. Accordingly, any carbon tax system should be as wide-ranging as possible. Nonetheless, it is not necessary, but desirable, that the scheme would cover all countries. However, it would be essential that those countries whose emissions pollute most of the world should be covered under the scheme. The per capita use of emissions should be decisive for the tax base as well as the economic situation of the country. In addition, the emissions taxed should include all the significant GHGs. This thesis will only focus on CO₂, as the most important GHG quantitative-wise.⁷²³

Besides taxation on CO₂ emissions, a tax on deforestation would be the next step, but it would include difficulties. Thus it would be easiest to find substitutes on which to levy the tax (basis of taxation). Cooper⁷²⁴ for instance suggested calculating the waste wood, from which the approximate carbon emissions could be derived. Furthermore, he suggested not differentiating between timber of different kinds. Within the country of origin/export the applicable amount (inclusive of costs incurred for forest clearing and commercial ranching) on timber, ought to be levied. In the taxation of slash and burn agriculture in poor countries Cooper saw a problem, because, in general, they have no or weak property rights, but according to him this would only account for the minority of emissions from changes in land use and would not be so serious, since the abandoned fields would usually revert to heavy vegetative cover over time. Deforestation has to be reduced as it increases CO₂ emissions and with it global warming. Accordingly, Cooper's idea and point of departure is welcome from an environmental aspect. Monitoring and the classification of measurements might be difficult to achieve, but would be necessary for long-term reduction. The outcome of the Climate Conference in Cancun was really helpful in agreeing on REDD (UN Reducing Emissions from Deforestation and Forest Degradation); a framework to reduce emissions from

⁷²³ An expansion to include other gases would be more or less easily possible (except for the case of methane).

⁷²⁴ Cooper *The Case for Charges on Greenhouse Gas Emissions* Harvard Project on International Climate Agreements Discussion Paper 08-10 Cambridge Massachusetts October 2008 p. 7.

deforestation as well as forest degradation. This will be achieved by paying (or monetarily incentivising) developing countries for keeping the timber instead of cutting it. The problem with this will be the financial implications.

It is essential that the carbon tax should serve the purpose of limiting emissions of carbon resulting from burning of fossil fuels. Accordingly, the tax should produce a more effective use of energy by supporting the use of alternative, in particular renewable, sources. In this context it has to be mentioned that the consumption of renewable energy should not be taxed.

2.3 Targeted person to tax

To implement a tax it is necessary to identify the person whose action has to be taxed in order to achieve the target. It could be said that every user of electricity and fossil fuels would be a targeted person. Nonetheless, companies, in contrast to final consumers, have a direct influence on the method of fabrication and, with it, on the amount of emissions and should also be targets.

2.4 The right tax system

There are different possibilities available for levying a tax; such as domestic or international taxes, framework or fixed tax agreements, a single carbon tax or an entire environmental tax reform. Furthermore, it is questionable which form of tax system chosen would be best; for example taxes on income, excise, or property? To achieve the correct tax rate, economic assessments are necessary which include forecasts on a short-, middle- and long-term basis.

Climate change is a common global problem, and therefore, to achieve success, a collaborative approach involving many or all nations is essential. Because of the general concerns of nations about their competitive problems when implementing taxes, among other things, it is not in the economic interest of individual countries to take unilateral action. Accordingly, cooperative approaches are necessary and global approaches desired. In this regard, it has to be mentioned that the countries listed in Annex I of the 1992 UNFCCC include too few of the current main polluting countries. Additionally, the document has not reflected the change in the polluting nations within the last two decades. It is essential that a dependable global climate change mitigation agreement should be even-handed; which means

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that industrialised countries have to accept their responsibilities for the GHG emissions of the last century. On the other hand, emerging nations, with rapidly growing economies, have to get involved. In addition, all countries have to change their emitting behaviour to being less carbon-intensive or even carbon-free.

Table: 5.1

	1990	2005	2010	2020	2030
World	21.2	28.1	31.1	37.0	42.3
North America	5.8	7.0	7.1	7.6	8.3
USA	5.0	6.0	6.0	6.4	6.9
OECD Europe	4.1	4.4	4.5	4.8	4.8
OECD Asia	1.5	2.2	2.2	2.3	2.4
Japan	1.0	1.2	1.2	1.2	1.2
Total OECD	11.4	13.6	13.8	14.7	15.5
Total Non-OECD	9.8	14.5	17.3	22.3	26.8
Russia	2.4	1.7	1.8	2.0	2.1
China	2.2	5.3	6.9	9.5	12.0
India	0.6	1.2	1.3	1.8	2.2
Brazil	0.2	0.4	0.5	0.5	0.6
Other	4.4	5.9	6.8	8.5	9.8

^a From fossil fuels

Source: EIA, *International Energy Outlook, 2008*, Table A10 (only includes the emissions from fossil fuels without the emissions of deforestation)

Countries like the United States would have to be included, as well as the fast growing industrial countries, which are already some of the biggest polluters (especially when deforestation is taken into account): namely, China, India, Brazil, South Africa, Indonesia, Korea and Mexico. Although these countries are not included in the Kyoto Protocol's binding targets, as developing countries, they will soon outdo the entire emissions of the industrialised world.⁷²⁵ China's total emissions have already exceeded those of the United States, with a tendency towards even faster growth than America's emissions in the near future and, if deforestation is included in the calculation, Indonesia is the third largest emitting country, followed by Brazil and Russia.⁷²⁶

⁷²⁵ Aldy and Starvin *Designing the Post-Kyoto Climate Regime: Lessons from the Harvard Project on International Climate Agreements – An Interim: Progress Report for the 14th Conference of the Parties, Framework Convention on Climate Change Poznan 2008* p. 3.

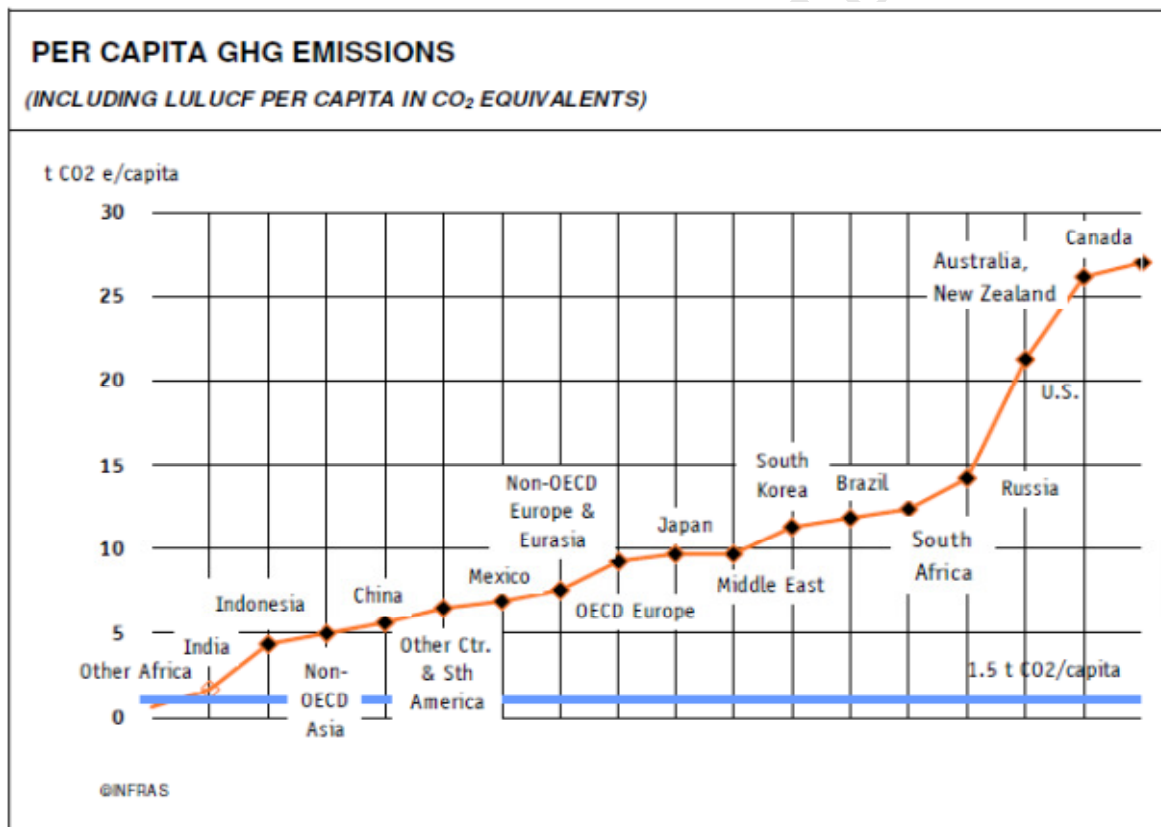
⁷²⁶ Blanford with Richels, and Rutherford *Revised Emissions Growth Projections for China: Why Post-Kyoto Climate Policy Must Look East* Discussion Paper 08-06 Harvard Project on International Climate Agreements Belfer Center for Science and International Affairs Harvard Kennedy School September 2008 p. 1.

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These facts show that the equality factors of the Kyoto Protocol, and reality, have changed within the last two decades. Accordingly, the two classifications under the Kyoto Protocol need an update, in particular concerning the aspect of common but differentiated responsibility, since several non-Annex I countries (especially the United States and the above mentioned developing countries among others) have higher per capita incomes than the poorest of the Annex I countries which have commitments under the Kyoto Protocol. In addition, approximately 40 non-Annex I countries were categorised more highly on the Human Development Index in 2009 than the lowest placed Annex I nations.⁷²⁷ In this context the per capita rate as a more objective factor can be seen below.

Figure No. 5.1:



Source: CO₂ emissions: Energy Information Administration, other GHGs and LULUCF: UNFCCC database. The countries or groups of countries analysed are listed in a sequence of increasing per capita emissions.

⁷²⁷ Idea taken from Joseph Aldy, Former Co-Director of the Cambridge Harvard Project on International Climate Agreements.

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2.4.1 Conceptual differences between national and international measures

As we have seen above, an international tax is recommended. In general all common taxes are national taxes since states want to have sovereignty over their public revenue and are not interested in sharing their budget information with other nations. There are no precedents for international taxation measures. Only in economic associations such as the European Union are there common rules available in the field of excise taxes. Nonetheless, every country has its own tax rates and tax system. According to the Commission there is ‘no need for an across the board harmonisation of Member States’ tax systems.’⁷²⁸ As long as the Member States respect the EU regulations then they are free to choose the tax system which is most convenient for them. On the other hand all EU proposals and rules need to consider sovereignty and the principles of subsidiarity and proportionality and only if there is no effective result does a common solution have to be found and action taken.⁷²⁹ However, the elimination of tax obstacles to all forms of cross-border economic activity is a major aim of the Community and has been practised already regarding company tax, VAT, excise duties and car tax.⁷³⁰

When an economic association such as the European Union has problems with common taxes and considers that national taxes cater better to the individual needs, interests and situations of the Member States it demonstrates the difficulties which an international tax regime would bring. Nonetheless, it is necessary to achieve a global aim and as such to implement mitigation measures worldwide.

2.4.2 Treaty or framework

Implementing an international, coordinated carbon tax, entails a decision from each nation to take part in the system. Generally, this would require a global conference of nations where a convention is negotiated. It would then be necessary for the nations to sign and ratify the agreement. To achieve a working agreement it would be essential that enough countries agree to take part. It would not be necessary to have a given number of nations, but the countries which produce most of the emissions would have to pay a certain minimum portion of the global tax base.

⁷²⁸ European Commission *EU Tax Policy Strategy* [Online]

http://ec.europa.eu/taxation_customs/taxation/gen_info/tax_policy/index_en.htm accessed on 29 June 2010.

⁷²⁹ *Ibid.*

⁷³⁰ *Ibid.*

The question which comes up next is whether the international energy tax should be a fixed tax system or a framework? Since states are not likely to be willing to submit their economic interests to an international regime, and in order to include all the different needs of countries, and respect their sovereignty, it would be easier and fairer to introduce a framework. For example, different tax rates for different countries might be necessary in order to achieve the steering effect, which would be easier to classify in a framework than in a fixed agreement for every country. In addition, as shown in Chapter Three, the revenue would be spent differently in different countries reaching the most equal levels and avoid distributional effects. As seen in Chapter Four even the European Union has had problems finding an acceptable solution for all its Member States. First its aim was to find a fixed agreement which was declined by numerous Members but also the first attempt to introduce a framework but preserve the ‘principle of subsidiarity’ failed. Even the determination of the compensation of the revenue to individual Member States was seen as abandoning tax neutrality.

Accordingly, it would be necessary to give the different nations as much freedom and leeway as possible to make individual decisions that complied with the overall concept. This would also require a framework, instead of a fixed agreement, which should be lean but effective, with international governance and administrative structures in place to oversee national implementation and take further action if necessary. It can only be hoped that the implementation of an international framework would not take as long as the European framework which took twelve years. With so many more nations involved it would, however, be likely that the process would take considerably longer.

2.4.3 Single carbon tax or ecological tax reform

As shown in Chapter Four, in general there are two possibilities regarding the implementation of ecological taxation: either through the introduction of a single carbon tax, or a complete ecological tax reform. The reformation of the whole tax system would mean that not just a carbon tax, but many other ecological taxes would be introduced. At the same time political measures and regulatory changes would accompany the tax reforms. In general this reformation would be useful to do but would be the decision of each country. The disadvantage of an entire tax reform is that a lot of changes would be necessary and this could create greater interference in the sovereignty of countries and would require a longer period of

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time for implementation. Here I will only focus on the development of an international tax framework model.

Germany introduced its ETR in 1999. Its concern was to combine environmental protection, in particular the mitigation of GHG emissions, with the reduction of labour costs, especially the reduction of the statutory pension contributions, in order to increase employment. To do so it changed several existing laws. But this was a long process with wide public discussions. Nonetheless, the reform took place and with it emissions have been reduced, as well as labour costs, which has led to less unemployment and Germany playing a leading role in the combat of climate change worldwide.

2.4.4 Deeper look at the tax system in question

Besides the above mentioned, it has to be decided which kind of tax should be developed. A tax similar to an excise tax in the form of a downstream/upstream tax should be looked at.

By looking up the term ‘excise tax’ in one of the search engines on the internet, many definitions came up, *inter alia* the following three:

- It is a tax that is measured by the amount of business done (not on property or income from real estate).⁷³¹
- ‘A tax levied on the purchase of a specific type of good or service, such as tobacco products or air transportation services.’⁷³²
- ‘A tax applied to the consumption of a particular type of good, such as alcohol or tobacco. Excise taxes apply at the same rates to domestic or imported goods. They must not be mixed up with customs duties which apply to imports only.’⁷³³

In addition Black’s Law Dictionary has defined it as, ‘A tax imposed on the manufacture, sale, or use of goods (such as a cigarette tax), or on an occupation or activity (such as a licence tax or an attorney occupation fee).’⁷³⁴

⁷³¹ [Online] <http://wordnetweb.princeton.edu/perl/webwn?s=excise%20tax> accessed on 4 March 2010.

⁷³² Glossary [Online] <http://www.cbo.gov/budget/glossary.shtml> accessed on 22 February 2010.

⁷³³ [Online] http://www.gsone.org/1/productssolutions/ecom/xml/implementation/tmg_2_4/XML-Guidelines/Order/h31.htm?/1/productssolutions/ecom/xml/implementation/tmg_2_4/XML-Guidelines/Order/h34q.htm accessed on 10 March 2010.

⁷³⁴ Garner *Black’s Law Dictionary* 8th ed. USA 2004 p. 605.

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An excise tax would work for fossil fuel and for the end products, as these are specific types of goods which are purchased business-wise and will be consumed. But the question which arises is where to place the tax charge? Who in the value chain will be the taxpayer? Before the charge is levied the goods might have already been traded, transported and might have been stored untaxed and only taxed afterwards. The trader is responsible for the registration, collection gathering and accounting of taxable goods,⁷³⁵ according to Article 8 of the European Council Directive (2008/118/EC) in regards to general agreements for products liable to excise duty.⁷³⁶ This already common system should be used for carbon taxation as well, since it is probable that all nations where the tax could be introduced have a similar system already and other nations could introduce such a system in a short period of time, as the knowledge in building up such a system is globally available. One advantage of this system is that the storage of fossil fuels could be tax-free if not already taxed at the refinery, mine, etc. level. At the moment of use, either for international trade or locally, the tax would be levied either from the local government or by the destination country.⁷³⁷ Taxing at this level would have the advantage of having only a limited number of taxable goods and with that a reasonable control over the identities of the goods (fossil fuels) through registration. Details can be found in Chapter Six section 2.4.6.

2.4.5 Essentiality of the proportion of carbon content

It is essential that a carbon tax is levied on fossil fuels in proportion to their carbon content. As seen in previous chapters, fossil fuels contain, and their burning releases, different amounts of CO₂ emissions, depending on the nature and property of the fuel and the burning technique. Accordingly, a tax has to be levied on each product, linked to the different amount of carbon it releases. For example, coal is used in its natural form, sometimes turned into gas or liquid. However petroleum can be used as gas, naphtha, fuel oils, crude-kerosene and lubricating oils as well as its distilled residue.⁷³⁸

Since it is not clear how the fossil fuel would be used, the moment of taxation is crucial. If taxed upstream, oil, gas and coal would each be taxed by its own carbon content and not by

⁷³⁵ *Op cit*, Fn. 241 p. 21.

⁷³⁶ Entered into force on 15 January 2009. It has applied across the EU since 1 April 2010. Directive 92/12/EEC was repealed on 1 April 2010.

⁷³⁷ It would mean that fossil fuels, which are delivered to gas stations and the final user, have been taxed already.

⁷³⁸ *Op cit*, Fn. 241 p. 22.

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the carbon content of the processed product. This would make its administration easier but would maybe tax the wrong carbon content. A downstream tax, on the other hand, would bring about more administrative work, since every processed product would be a tax object according to its carbon content, which can vary.

Denmark, for example, implemented its CO₂ component tax in 1992, with its assessment basis a 'tonne of CO₂'. As such it ensured that the different fossil fuels had been taxed according to their carbon content. Finland, in comparison, changed from an input to an output tax since its competitiveness was more important than the 'environmentally ideal tax solution'.

The European Union taxes oil, gas and coal upstream on its input, to ease the administration of the tax, and electricity on its output. In doing so double taxation has been avoided through only taxing fossil fuels when they are used as fuel for heating purposes, not as raw material in chemical reductions or in electrolytic or metallurgical processes.

2.4.6 The time of taxation

As shown in the previous section a tax can be levied upstream, downstream or by using a mix of both. This section will deal with the economic and practical implications of adopting a traditional downstream compliance point for limiting CO₂ emissions, versus an upstream compliance approach that targets the carbon content of fossil fuels.

One advantage of an excise tax system is that storage of fossil fuels could be tax-free if not already taxed at the refinery, mine, etc level. At the moment of use, either for international trade or locally, the tax could be levied either by the local government or by the destination country.⁷³⁹ Taxing at this level would have the advantage of having only a limited number of taxable goods and with it a control over the identities of the goods (fossil fuels) through registration.

A paper by Global Utmaning⁷⁴⁰ rightly points out that the option of placing taxes on the producer would indicate that most of the tax collection would take place in the small number of countries with significant production and export of oil, coal and natural gas. This variant

⁷³⁹ It would mean that fossil fuels which are delivered to gas stations and the final user have been taxed already.

⁷⁴⁰ *Op cit*, Fn. 241.

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would produce several problems. Firstly, most of the tax collection would take place in the OPEC⁷⁴¹ and/or GECF countries,⁷⁴² which are likely to see the revenue as their own instead of part of an international coordinated tax. Furthermore, the political systems in some of these countries are weak or have a lack of democracy with weak domestic administration and are susceptible to high levels of corruption.

Then again, levying the tax closer to the end user would enhance the transport of untaxed goods, which might enlarge the risk of losing such goods before they could be taxed. This risk would be amplified because of the increased number of parties involved, which would also increase the risk of corruption, and accordingly requires a sophisticated monitoring system.

The easiest solution would be as follows: the taxation should take place at the moment of use of the fossil fuels. Administratively, this would mean levying the tax upstream, which would mean the refinery input for oil,⁷⁴³ mines for coal as well as pipeline collection places or storage points, within the country of origin. If the fossil fuel should be exported, there would not be a tax charged on it, but the country of destination would have to tax the import. Another possibility would be a downstream tax, levied at large emitters such as power plants, cement industries etc.

An aspect of levying a downstream tax could be that the fossil fuel industry might not be allowed to pass the price down to the customers. (In South Africa, nationally produced petrol, and foreign produced petrol are subject to petrol retail price controls, regulated in the Petroleum Products Act. This means that in South Africa nationally produced petrol cannot be sold at a price different from the regulated retail price. This petrol price regulation means that the petrol pump price at all service stations in a pricing area must be the same, and no discounting is allowed. It follows that a tax levied downstream would increase the price of petrol determined by the Petroleum Products Act but this could not be passed on to the customers since that would exceed the determined retail price. Accordingly, such a tax would only be paid by the petrol producer or importer.) This could be a good incentive for industries

⁷⁴¹ (Organization of the Petroleum Exporting Countries) namely: Algeria, Angola, United Arab Emirates, Indonesia, Iraq, Iran, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia and Venezuela.

⁷⁴² The Gas Exporting Countries Forum (GECF) was formed in 2001 and encompasses Algeria, Bolivia, Brunei, Egypt, Indonesia, Iran, Libya, Malaysia, Nigeria, Qatar, Russia, Trinidad and Tobago, United Arab Emirates and Venezuela. Equatorial Guinea and Norway participate as observers.

⁷⁴³ Including bunker oil and other crude oil.

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to change to cleaner production with renewable energy, if fuel manufactured from renewable sources were exempt from the tax.

A tax could also be levied for each tonne of carbon that was contained in the fuel a supplier (producer/exporter/distributor) sold and would be emitted when the fuel was burned. The supplying firms would have to report their amount of sales and the carbon content of the fuels they had sold. This would impose more administrative work on the supplying companies. It would also be necessary that all fuels were covered by the regulations, which means that all imported fossil fuel would have to be charged as well. For manageability it would be best if the tax was levied at the moment of importation or by applying it to large emitters. A problem arises here because not all fossil fuels sold are combusted. The non-combustion fuels would have to be identified and exempted from tax or the tax has to be refunded (for example petroleum for the manufacturing of tyres or plastic). This tax would affect about 150 oil refineries, 1,460 coal mines, and 530 natural gas processing plants in the United States alone.⁷⁴⁴

Levying the tax downstream is possible when taxing the end user of fossil fuels. Its implementation would be more difficult and would require a more complex administrative apparatus. Nonetheless, it might be possible, since several of the power manufacturers have equipment in place which constantly monitors carbon emissions.⁷⁴⁵ However, implementation outside this area could be difficult, as all the companies to be taxed would be required to identify their emissions, an arduous task.⁷⁴⁶ Similarly, in the European Union's ETS, it has happened that authorities have given greater allowances to industries (mostly cement, steel and iron) than they had projected which has led to unexpectedly large price swings.⁷⁴⁷ This phenomenon is not unknown; it also took place when the Acid Rain Programme in America started and similar data problems occurred.⁷⁴⁸ Two years were spent resolving inconsistencies in the data.⁷⁴⁹ In countries with weaker administrative systems it could take much longer.

⁷⁴⁴ Congress of the United States Congressional Budget Office *A CBO study - Policy Options for Reducing CO₂ Emissions* The Congress of the United States 2008 p. 15.

⁷⁴⁵ *Ibid.*

⁷⁴⁶ *Ibid.*

⁷⁴⁷ *Ibid* pp. 15-16.

⁷⁴⁸ *Ibid* p. 16.

⁷⁴⁹ *Ibid.*

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An alternative could be a dual system (a mix of upstream and downstream taxes) also called a hybrid system. The reason for such a mixed system is that a downstream system, which would have political and environmental advantages (since it taxes the right amount of carbon emissions), would not include all emission sources, and as such would not be completely satisfactory, either environmentally or economically. The advantage of a downstream approach in comparison to an upstream approach is the possibility of greater technical innovation, political feasibility and the recognition that industry supports a direct regulation (downstream) rather than a price change (upstream).⁷⁵⁰ When implementing a hybrid system, it is necessary to avoid loopholes and double taxation. Hargrave⁷⁵¹ (in his report which was directed at emission trading but applies similarly to taxation) saw the best way of implementing a hybrid system as taxing coal downstream, natural gas at the moment when local distribution companies sold the fuel to smaller sources, and oil, which was not already taxed downstream, should be charged upstream. This system would force the local distribution companies for gas and oil refineries to discover who the ultimate consumers of their products would be. Therefore, they would need to establish accounting systems to facilitate this process. Such a mixed system would quadruple the tax facilities needed compared to an upstream tax.⁷⁵² But these facilities would still be fewer than those an entire downstream tax would need which would make it more cost effective.

Another important point has to be mentioned: countries with an upstream tax on fossil fuel suppliers would need to exempt fossil fuels purchased from nations with a downstream tax, in order to avoid double taxation.

As seen in Chapter Four, countries which have implemented an energy tax have mostly done it upstream. The United Kingdom has levied the tax on supply (tax object) instead of end energy usage, as it is easier to differentiate between households and businesses (tax subjects are only businesses and industry but not individuals). Levying the tax on businesses and industry makes the CCL a downstream tax.

⁷⁵⁰ Chetty with Looney and Kroft *Salience and Taxation: Theory and Evidence* August 2008 p. 36f.

⁷⁵¹ Hargrave *An Upstream/Downstream Hybrid Approach to Greenhouse Gas Emissions Trading* Center for Clean Air Policy USA 2000 p. 17.

⁷⁵² *Ibid.*

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Before its tax reform in 1996, Finland taxed electricity produced from fossil fuels by the fuel input. To avoid double taxation, the electricity itself produced by coal or other fossil fuels was not taxed. This was an uncommon way of avoiding double taxation, as in general it is more common to tax electricity and not the inputs (fossil fuels) used for its manufacturing. To avoid double taxation in these cases the fossil fuels used for the production of electricity are exempt from taxation. Finland only taxed specific electricity manufacturing processes and left out others, for example, wind energy. The tax was transformed from an input into an output tax, which included a consistent taxation of electricity consumption, levied on the final consumer. In conclusion, it can be said that the first version of the Finnish energy taxation was the way seen as the most effective and preferred by exponents of an environmentally related energy tax reform. However, this approach, especially without tax exemptions for the energy-intensive industries, is considered non-competitive. Such input tax would only be beneficial if it was implemented by all, or at least most of, the OECD countries together, to avoid competitive distortions.

Finally, the taxation system preferred would be the choice of each member state since it has sovereign rights.

2.5 The right amount of tax

Determining the correct or most satisfactory rate of tax would be the next step. In this context the ideal balance would have to be found between the tax rate, which should be high enough to develop its steering function, and on the other hand, avoiding the distortion of competition, while simultaneously taking the different achievement potential of different nations into consideration. Therefore, in developing such a tax it should be noted that possible adjustments in the future might be necessary.

A global introduction of mitigation measures would seem to be difficult or impossible unless these were consistent with developing countries' demand for continued economic growth. According to the latest poverty report,⁷⁵³ about 320-443 million people are living in chronic poverty. These people will remain poor for much or all of their lives and their children are

⁷⁵³ Chronic Poverty Research Centre *The Chronic Poverty Report 2008-09* [Online] <http://www.chronicpoverty.org/publications/details/the-chronic-poverty-report-2008-09> accessed on 22 February 2010.

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likely to inherit poverty.⁷⁵⁴ This poverty entails ‘deprivations, including hunger, under nutrition, illiteracy, lack of access to safe drinking water and basic health services, social discrimination, physical insecurity and political exclusion’.⁷⁵⁵ Taking China as an example, there are about 300 million people living below the World Bank’s ‘one dollar-a-day’ poverty line,⁷⁵⁶ and as such it is not surprising that in the preamble of their National Climate Change Programme the Chinese followed the lead of Article 4(7) of the UNFCCC, which names as its first and overriding priorities, ‘economic and social development and poverty eradication’.

Important for the introduction of an international mitigation measure is that equity has to be respected in relation to the energy and financial means of each country as it is a priority to provide access to energy as a basic requirement for human dignity.⁷⁵⁷

There are some opinions⁷⁵⁸ in literature that suggest it would be necessary to set an international carbon tax at the same level globally. The argument for this would be the achievement of global cost effectiveness. However, developing countries would not be able to implement a tax with a standardised tax rate without serious financial support from developed countries (and would therefore not accept it at least in the first instance). And yet this would be a necessity in order to attain distributional equity.⁷⁵⁹ Accordingly, the question arises whether a standardised tax rate would really be necessary?

As shown in Chapter Three, in a carbon tax, the marginal costs of abatement activities should be equivalent to the tax rate itself. Also discussed in Chapter Three was that the problem which occurs in this context is that the sum of the total costs is only minimised where the marginal damage and the marginal abatement costs are equal, and allocation efficiency exists. This is a problem because of the derivation difficulty of the marginal damage and abatement of the individual costs. Consequently, it is necessary to stick to an alternative, which might be found in an arbitrary standard. In this context the sustainable level at the least cost has to be found. This means that monitoring and enforcement of taxation on fossil fuels would be lower

⁷⁵⁴ *Ibid.*

⁷⁵⁵ *Ibid.*

⁷⁵⁶ Ravallion and Chen *China is poorer than we thought, but no less successful in the fight against poverty* World Bank Policy Research Working Paper 4621 Washington DC Mai 2008 p. 4.

⁷⁵⁷ Para 18 of the Johannesburg Declaration on Sustainable Development UN Doc. A/CONF.1999/L.6/Rev.3 (4 September 2002).

⁷⁵⁸ *Op cit*, Fn. 725 p. 6.

⁷⁵⁹ *Op cit*, Fn. 725 p. 6.

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if some input was used, apart from emissions alone, to determine the level of taxes needed.⁷⁶⁰ What would this mean for an international tax rate? Is a uniform/standardised tax rate necessary or could different tax rates for different countries, set in the context of their per capita emissions and Gross National Income (GNI), exist? Through regular adjustments of the tax rate it would mean that if a nation became richer, its tax rate would rise and if nations became poorer or suffered economic crises, the tax rate might be reduced.

Switzerland has presented a four pillar system of different tax rates in its proposal⁷⁶¹ for a financial solution for adaptation measures. The levy which they want to charge is for coping with adaptation arrangements of climate change which will consist of a small fee on CO₂ emissions. This low level tax is not designed as an economic incentive to mitigate CO₂ emissions, but rather to generate revenue for financing climate change measures in line with the ‘polluter pays principle’. Nonetheless, this is an interesting idea which could be helpful for the development of an initiative within the current spectrum.

Every year on 1 July the World Bank classifies its 187 member countries and all other economies with populations of more than 30,000 into different economy groups for operational and analytical purposes.⁷⁶² The main criterion for the annual World Bank’s analysis is the GNI⁷⁶³, no longer the GNP. The different categories which the World Bank uses for the different economies are low-income, middle-income (the middle-income category is divided again into lower and upper middle) and high-income.

⁷⁶⁰ *Op cit*, Fn. 117 p. 418.

⁷⁶¹ *Op cit*, Fn. 721.

⁷⁶² The World Bank *Country Classifications* [Online]

<http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0..contentMDK:20420458~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html> accessed on 22 February 2010.

⁷⁶³ ‘The differences are: GNI in constant prices, which differs from GNP in that it also includes a terms of trade adjustment; and gross capital formation which now includes a third category of capital formation: net acquisition of valuables. Included in gross capital formation under the 1993 System of National Accounts are capital outlays on defence establishments that may be used by the general public, such as schools, airfields, and hospitals. These expenses were treated as consumption in the earlier version of the System of National Accounts.’ The World Bank *Data – Change in Terminology* [Online]

<http://web.worldbank.org/external/default/main?contentMDK=20451503&menuPK=64133156&pagePK=64133150&piPK=64133175&theSitePK=239419> accessed 30 June 2010.

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The classifications are established on the operational lending categories of the Bank which are, among others, civil work preferences and the International Development Association (IDA)⁷⁶⁴ eligibility.

In low-income countries the 2009 GNI per capita is USD 995 or less, in lower middle-income it is USD 996 – USD 3,945, in upper middle-income it is USD 3,946 – USD 12,195 and high-income, USD 12,196 or more.⁷⁶⁵ The country classification table of 1 July 2010 can be found in Appendix no 8.

In this context we have to look at the world population and its different classifications. There is a small high-income category, a growing middle-income category and the lower-income category.⁷⁶⁶ The middle-income category in developing countries is growing quickly, and with it the need for more energy, mostly produced by the combustion of fossil fuels. This is understandable as the industrialised world has shown a way of living (lifestyle) which will be copied to an extent. Coal in these countries is the cheapest energy source and the most used. This leads to an emissions growth in the near future which can only be reduced by changing to a more sustainable path. In the short-term it has to be recognised that the average population in developing countries is more interested in economic growth than in future global environmental conditions.⁷⁶⁷ This leads to a progressivity factor which expects and obliges richer nations to change their behaviour, and to make efforts towards moving into a more sustainable world (role model function) and with this, mitigating emissions in relation to their 'business as usual' emissions.

Another point is the gradual equalisation (regarding the historical aspect) of countries, which means that the rich industrialised countries are mostly responsible for the carbon emissions

⁷⁶⁴ According to the World Bank International Development Association (IDA), countries are 'those that had a per capita income in 2009 of less than USD 1,165 and lack the financial ability to borrow from IBRD. IDA loans are deeply concessional interest-free loans and grants for programmes aimed at boosting economic growth and improving living conditions. International Bank for Reconstruction and Development (IBRD) loans are nonconcessional. Blend countries (countries which are eligible for IBRD and IDA loans) are eligible for IBRD loans because they are financially creditworthy'. See: *Op cit*, Fn. 762.

⁷⁶⁵ *Ibid.*

⁷⁶⁶ One of the Millennium Developing Goals which should be achieved in 2015 is to eradicate extreme poverty and hunger. Its main target is to halve, between 1990 and 2015, the proportion of people whose income is less than \$1 a day.

⁷⁶⁷ Victor 'Climate Accession Deals: New Strategies for Taming Growth of Greenhouse Gases in Developing Countries.' Discussion Paper 08-18, Cambridge, Mass.: Harvard Project on International Climate Agreements November 2008 p. 1.

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currently in the atmosphere. The pollution has happened through their development as industrialised nations within the last two centuries. Developing countries are calling for a higher reduction of GHGs in the developed countries because of the above. This is problematic, because the developed nations had no idea at the time of the aftermath of their coal-based industrialisation. The effects have only been known for the last four decades. In the last two decades most of the industrialised nations had already started to reduce their emissions. According to a study by Müller et al.,⁷⁶⁸ if deforestation was taken into account, industrialised countries would only be responsible for 55% of the increasing emissions since 1890, and the other 45% has been caused by developing countries. It is a common opinion that the industrialised nations have to pay more. According to a study by Cao⁷⁶⁹ the factor of gradual equalisation between industrialised and developing nations has moved during each decade of the second half of the 21st century, slightly in the direction of a global average on per capita emissions in each country.⁷⁷⁰ Nonetheless, this factor would be difficult to integrate into a global tax, but could be taken into consideration through a gradually increasing tax rate, which should be revised at regular intervals; for example, every decade, since it is currently the case that the wealthiest countries would have to pay the highest taxes (as table 5.2 shows). As soon as the historical imbalances were adjusted this should change into a per capita tax, because a per capita tax rate is essential if one is to consider the common but differentiated responsibilities principle.

Bearing the different income classifications, needs, historical responsibilities and possibilities in mind, different tax rates would seem to be a fair solution.

As a suggestion for different tax rates, the following table is an illustrative example:

⁷⁶⁸ Mueller with Hoehne and Ellerman *Differentiating (Historic) Responsibilities for Climate Change* Summary Report (2007) p. 14ff [Online]

<http://www.oxfordclimatepolicy.org/publications/documents/DifferentiatingResponsibility.pdf> accessed on 10 April 2010.

⁷⁶⁹ Cao 'Reconciling Human Development and Climate Protection' Discussion Paper 08-25, Cambridge, Mass.: Harvard Project on International Climate Agreements, November 2008.

⁷⁷⁰ Other authors see the gradual equalising factor as given but as happening within a shorter time period. For example, 2020 was estimated in the report of Jacoby with Babiker, Paltsev, and Reilly *Sharing the Burden of GHG Reductions*: Discussion Paper 08-09, Cambridge, Mass.: Harvard Project on International Climate Agreements October 2008.

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Table 5.2:

tax rate/tonne	USD 2	USD 4	USD 6	USD 8	USD 10
income/emissions	low income	lower middle income & low emissions	lower middle income & high emissions	upper middle income & high emissions	high income
income/emissions			upper middle income & low emissions		

Differing tax rates do not seem to be popular as an idea, but they are possible. Economic assessments would be necessary, but it could be a possible solution. The tax rates in the table above are just for demonstration purposes and would need precise economic assessments.

The problem with different tax rates in different countries is, as always, the possibility of leakage and problems concerning competitiveness. These problems could be handled if countries used the tax revenues correctly. That would mean, first of all, that each country would use its own revenue collected. Countries with a higher tax would collect higher revenues, which could reduce, for example, their income taxes. Ultimately this would lead to similar production prices to those prior to the energy tax. As a result of this, the tax should not lead to carbon leakage itself, but instead should encourage industries to change their techniques and reduce their emissions in exchange for a greater decrease in their production costs. If carbon leakage occurred it would only happen on a small scale and should not influence the competitiveness of companies in different countries too much (taxes are not the only reason for a company to produce in a country). For example, if a company moved to manufacture in a low-income country, it would only pay the lower tax until the country's income increased and with that the country would be categorised in a higher tax group. They would move, for example, from being a lower income country into a lower middle-income country. With this the tax rate would increase simultaneously.

Furthermore, it would be possible to introduce tax exemptions for energy-intensive industries if necessary. These tax exemptions could be similar to the exemptions, for example, in the United Kingdom, which has a 100% first year offset against profits, for corporation tax and for investments made in energy saving technologies by companies. Switzerland offers tax

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exemptions for energy-intensive industry and agriculture if an adequate emissions reduction plan is submitted and fulfilled. The action plan for emission reduction should be on a standardised global level to avoid leakage and competitive problems.

It is essential, because of the serious damage to the global climate, that all nations should move to a less carbon-intensive way of living, especially as we are moving into a time when all fossil fuels will be exploited and used. Accordingly, exemptions for energy-intensive industry should only be a transitional solution, in order to give those companies time to prepare themselves for the post-fossil-fuel era. (There is a problem with exemptions which will be discussed in its own section).

Products which comprise fossil fuels, such as tyres and plastic should be treated similarly. On the one hand they should not be taxed for the part of fossil fuel they consist of, as they are not combusted and are only a production ingredient. Nonetheless, it might be meaningful to implement an interim ruling for such products, so as to prepare the industry for the post-fossil-fuel era.

Latecomer nations, such as the United States for example, which did not agree to binding targets under Kyoto, could be given a latecomer factor. The latecomer determinant, should in theory exempt latecomers from the punishment of having higher targets set, as well as from receiving incentives to increase emissions before signing the agreement (Interim Report of the Harvard Project on International Climate Agreements).⁷⁷¹ One suggestion would be for the gradual introduction of reductions, in order to account for their additional emissions since 1990. As long as the mitigation action dropped emissions down to their estimated 1990 level within a certain time, a gradual adjustment should be appropriate.

However, the individual targets have to be determined in a separate scheme from that of the tax framework since taxes are the means to achieve these targets and the targets themselves should be regulated in an additional agreement.

⁷⁷¹ *Op cit*, Fn. 725 p. xiii.

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Initially the tax should be gradually increased over a period of three years so as to keep the macroeconomic impacts of the tax low, give companies a chance to reduce their emissions and give countries the chance to prepare for the tax, its administration and monitoring.

The tax would determine minimum rates for the relevant income grades. However, it has to be kept in mind that the tax should affect behaviour sufficiently, and should not be subject to unwarranted adjustments. Accordingly, countries should have the option of applying higher levels of taxation if necessary and/or desired. In this context it has to be kept in mind that some nations have already introduced carbon or energy taxation at a unilateral level, using higher taxes.

Fuel for vessels and planes, which move globally, should be taxed at an international standardised middle tax rate to avoid fuel tourism, which, especially on flights with intermediate stops, would cause even more damage. Awareness of the possibility of fraud would be necessary in the field of shipping, where oil fuels for vessels might also be sold as vehicle fuels or for heating purposes.

2.6 Exemptions from taxation and subsidies

Another question to be considered is concerning the necessity and possibility of exemptions. Industries often have the capability to influence governments in order to receive exemptions or subsidies in order to keep the industry in the country. With international legislation, fewer exemptions would be possible since competitive and leakage problems would be smaller. In addition, counteracting subsidies in other laws should be abolished. To achieve the aims of the Johannesburg Declaration on Sustainable Development in supplying access to energy as a basic requirement for human dignity, a tax allowance might be helpful.

2.6.1 Tax allowance or tax exemption level

To cover the aspect of the common but differentiated responsibilities principle, it is necessary to think about a general tax allowance. The allowance should benefit all countries for their basic needs of emissions which could be set at about 1.5 tCO₂/capita.⁷⁷² This would lead to the result that parties with emissions below this level would be exempted from levying a

⁷⁷² It seems to be a reasonable amount, which should cover the general needs of a country. This is also the allowance suggested by the Swiss proposal of an adaptation scheme: *Op cit*, Fn. 721 p. 6.

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carbon tax. Countries that polluted more than the permissible amount, would have to levy their tax rates on emissions above the tax allowance.

To simplify the administration of the tax it would also be possible to take the 1.5 tCO₂/capita as a tax exemption level, which means that the countries having higher emissions would have to pay taxes from their first emission onwards.⁷⁷³ Countries which consistently crossed the critical mark of 1.5 tCO₂/capita within a certain period, for example, three years in a row, would be given this time as an implementation period, where the tax would only have to be paid voluntarily. This would help countries build up an adequate tax system within this period, through implementing the necessary legislation and a fiscal administration if not already available. It might also encourage countries to continue using coal or other high carbon containing fuels for the first emissions of 1.5 tCO₂/capita. This would be understandable, and on one hand justified for countries like South Africa, with high coal deposits and reserves. South Africa is classified under the World Bank's rate in the upper middle-income category, but has many poor people, living in townships, unable to afford electricity and a fresh water supply. Furthermore, a lot of people are living in sparsely inhabited areas where electricity and water connections are not available and heating with coal would be easiest. Accordingly, taking South Africa as an example, a general tax allowance, primarily for the poor, would be preferable to an exemption, but would increase the fiscal administration burden. Nonetheless, the allowance should only provide a basic amount and there should be enough of incentives to change technology towards the reduction of coal combustion emissions.

It would be a good idea to use the 1.5 tCO₂/capita allowance in all countries as a free allowance in order to fight poverty. This would create a problem with equity, as the heating needs are different in individual countries (more heating necessary in countries with long and cold winters than in countries with almost constant warm temperatures). However, the international tax allowance could be used to support energy usage, for example, in public hospitals, schools and other social institutions in each country.

⁷⁷³ Also suggested in the Swiss suggestion of an adaptation scheme: *Op cit*, Fn. 721 p. 23.

2.6.2 Exemption rules

The development of exemption regulations would present difficulties and would not always lead to fair solutions but the regulations would often be a compromise between governments and industry. Most of the problems could occur as a result of separate tax rates for different users, various fields of use and the creation of taxes in different countries.⁷⁷⁴ Tax reductions might be useful in the agricultural field and energy-intensive sectors at least in the first years of introduction, since those sectors would be the main persons concerned. However, exemptions would have to be as few as possible since they would lead to unequal taxation between different sectors, persons and countries.

Furthermore, misuse would be possible; for example the fuel for agricultural machinery and heating could also be used for machinery and heating in other sectors, and as car fuel. However, this would be a monitoring problem and could be avoided or at least limited, by giving the fuel different colours for the different purposes for which it would be used.

Exemptions would depend on the choice of taxation (upstream, downstream or a mix of both). Since this would be the choice of the individual country, exemption rules would fall into the same category. Most of the countries which have introduced a carbon tax, as well as the European Union, have exemptions or substantial rate reductions for energy-intensive industries in their regulations. Since the introduction of carbon taxation would take place on an international level, a full exemption of the energy-intensive industries, which eliminated the competitive burden, would not be necessary. But as already mentioned it would be important to introduce exemptions or reduced rates for the energy-intensive industries to avoid a financial collapse and to give those sectors the opportunity to adjust their technology to that which was less carbon-intensive. This could be done through agreements between the energy-intensive industries and the individual countries. Even so it would be in the interest of individual countries that the agreements should be controlled by a uniform, international authority, in order to avoid differences between the individual countries thus leading to carbon leakage. Those agreements with their partial exemptions should be adjusted regularly, and after an adjustment and changeover period, exemptions should be completely removed.

⁷⁷⁴ *Op cit*, Fn. 241 p. 21.

Tax incentives within other taxes could be environmentally attractive to encourage the development of more efficient processes and techniques so as to move away from high-carbon products.

Exemptions would increase the administrative burden. The exemption of some industries, especially the energy-intensive industries, could influence the public's opinion of a fair tax which might constrain its political operability. Accordingly, exemptions in this field would have to be introduced carefully and wisely.

Administratively, exemptions in the agricultural and energy-intensive sector should be claimed back by those industries, through tax refunds and should not be given in advance, since it would make the administration too difficult for the seller and could lead to incorrect use and uncertainty especially for the taxpayers. Accordingly, the waiver or reduction should only take place after the purchase of taxed goods, through refunding parts of, or the entire carbon tax paid by the consumer.

2.7 Administration

In order to administer the tax, it would be easier and cheaper to use the existing tax authorities in countries. As mentioned in Chapter Six, section 2.4.4, an excise tax system is already operational in most countries in the world, and could easily be extended for the administration of energy taxation. Furthermore, the administrative structures are already in existence in OECD countries as these already have a form of energy tax.⁷⁷⁵ As a result one can say that those countries which do not comprise the OECD, but are responsible for the lion's share of emissions, have comparable administrative capabilities, for establishing an internal energy tax.⁷⁷⁶ Of course countries that are currently experiencing internal conflicts have problems with efficient administration, as do 'failed states', which exist without any effective public administration.⁷⁷⁷ North Korea, for example has no market economy mechanisms.⁷⁷⁸

⁷⁷⁵ *Ibid* p. 25.

⁷⁷⁶ *Ibid*.

⁷⁷⁷ *Ibid*.

⁷⁷⁸ *Ibid*.

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Using existing local administrative capacities should be possible for most of the participating countries. If it is impossible for one of the poorest countries to build up such an administration, international support, through knowledge sharing and financial aid (for example, the International Monetary Fund (IMF)) should be possible. But, the poorest countries, in general, have low emissions, so that (at least in the short-term) it would not have a significant effect on emission mitigation if no tax was implemented.

Difficulties could occur in countries with a high level of corruption. As these countries have problems with all kinds of taxation, it is not to be expected that this would change with energy taxation. However, this cannot be used as a reason for not implementing an international energy tax system, as this problem could occur in all sectors where money is involved (for example, it might be similar to a cap and trade system).

It would be useful to keep the number of collection points low. If the tax was implemented as an upstream tax it would already be levied on the supplier of the energy source, or the electricity, and as such it would be substantially cheaper than a downstream tax which would be levied on the *de facto* carbon emissions. Also, such a downstream tax would cause administrative problems and be nearly impossible to implement, because of the gaps in the technical sophistication necessary, especially in developing countries, and would be barely affordable.

However, the framework should not include special rules for the administration of the tax, though a guideline could be useful. If administration rules were included, this would indeed lead to a uniform application and administration of the tax, which could increase cooperation between states but would represent a major interference with their sovereignty.

2.8 Monitoring and compliance

A monitoring system would have to be implemented to control the emissions, and with it the environmental damage which was linked to the tax level. Because of new techniques used by industry or/and changes in the reduction targets, there would be the need for periodical adjustments. The costs of monitoring could be kept low through using the measurement techniques, which some companies have already installed, to collect the data of their outputs.

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Nonetheless, it would be necessary to have independent auditors who would take random samples of the data received from the companies. It would have to be ensured that the costs of the auditors were minimal and could be paid from the revenue collected. Cooper⁷⁷⁹ suggests that the IMF could be helpful in monitoring the implementation of the tax in signatory nations. The IMF has 187 countries as its members and it provides policy advice and financing to those members with economic difficulties. Furthermore, it supports developing countries by helping them to achieve macroeconomic stability and reduce poverty.⁷⁸⁰ Accordingly, the IMF is an international, independent institution which would be eligible to train and instruct people and to send them out as independent auditors. Furthermore, the IMF has a fiscal sector which understands the tax systems of almost every member. This would make the IMF the right centre for reporting on whether the different countries implementing the tax agreement had passed the essential legislation and had the necessary administrative regulations and authorities in place. In addition, in order to minimise corruption, the IMF might be able to calculate the approximate revenues which should be collected in individual nations. The IMF should also be an acceptable auditor for China, as it is a member of the IMF. At the climate change conference in Copenhagen in 2009, China made it clear that it would not trust the United States for monitoring purposes on mitigation aims. But monitoring by the IMF as an international, independent institution would hopefully be acceptable.

Cooper⁷⁸¹ suggests, along with data about fossil fuel imports, that satellites could be used to monitor power plants and any other large generators of heat or deforestation. This would be helpful but also more costly.

Special monitoring rules could be set by regulation. If taxpayers did not comply with the tax regulations penalties should be implemented. If countries, on the other hand, did not comply with the implementation of their tax then enforcement measures and also penalties would be necessary.

⁷⁷⁹ *Op cit*, Fn. 724 pp. 5/6.

⁷⁸⁰ International Monetary Fund (IMF) *Overview* [Online] <http://www.imf.org/external/about/overview.htm> accessed on 22 February 2010.

⁷⁸¹ *Op cit*, Fn. 724 p. 7.

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2.9 Enforcement and penalties

To ensure that every country participated, the introduction of a BTA should be considered. This would not apply to countries whose emissions were below the tax allowance of 1.5 tCO₂. However, it would be necessary to avoid carbon leakage and competitive imbalances. As discussed in Chapter Five, BTAs are a good enforcement measure and could be implemented as a suitable punishment, since BTAs should be seen as an encouragement for most nations to comply with the framework.

Penalties for taxpayers who reneged on paying or collecting the imposed tax should be implemented. The Kyoto Protocol did not include any adequate penalties for nations that were not able or willing to comply with their commitments. Accordingly, it is no wonder that some countries' emissions have grown so rapidly since 1990 that it now seems impossible for them to fulfil their mitigation aims. To avoid countries ignoring their commitments, enforcement measures would be necessary, since the voluntary basis under the Kyoto Protocol has not succeeded. Penalties could be imposed if a nation did not fulfil its mitigation responsibilities or did not fulfil them to a significant level. As possible penalties, either fines or countervailing duties on exports could be suggested. (These could be set by special regulations.) In cases of major non-compliance both punishments could be imposed.

Informal consultations, and if necessary, formal international panels should be established, so as to give nations the assurance of both, a hearing and a fair and equal process, before such punishments are imposed. The determination as to whether a state or a taxpayer has complied with the rules could be done by monitoring through the IMF and additional tax investigators trained by IMF and the national tax offices.

2.10 Revenue usage

A trustworthy, global, carbon tax agreement would have to be cost-effective on the one hand and should bring significant technological innovations in the form of changes and transfers on the other. Furthermore, it would be essential that the revenues be used to finance administration and monitoring. It would also be essential for each individual country to keep the revenue, since none of the high tax countries would agree to adjust/share their tax revenue

with small tax countries/developing countries because they would need to make the revenue tax neutral by giving it back to their taxpayers.

Any remaining revenue (after deducting administration and monitoring costs) could be used for different measures such as tax shifting, the reduction of budget deficits, earmarking, compensation, cleanups or increased expenditure on particular public programmes.

The economic and environmental effect of the tax would have to be examined in each country individually. There are different possibilities, such as steering polluters' behaviour by taxing bad behaviour and recompensing good. In general it should be said that carbon taxes should not have the aim of raising revenues; this would only be a side effect. In most cases, however, there would be residual revenues which could be used for different situations. Prevalent uses for residual revenues are as follows:⁷⁸²

- i. Tax shifting is a familiar choice. It implies that revenue attained via carbon tax be utilised to minimise or replace other taxes, avoiding an added tax burden.⁷⁸³ (Often used in high-income economies, e.g. Sweden where it was introduced in 1991.)
- ii. More applicable for developing countries would be the implementation of tax dividends, however this has been adopted by developed countries as well (see section 5.1 in Chapter Three). This implies that the revenue will be recycled back to the population.
- iii. Cutbacks on budget deficits would be helpful to countries with large debts, provided that the funds or parts thereof (for the period of assessment) be utilised to adjust the shortfall in government budget.⁷⁸⁴
- iv. Continued investment in specific public programmes can be done. Environmental expenditure costs which are imposed on the public could also be paid by taxpayers as a part of the polluter pays principle. This can be supported with grants/subsidies for especially environmentally friendly behaviour, as illustrated by regions of Spain.
- v. Further shown by Spain, is the utilisation of clean-ups for protecting and conserving nature.

⁷⁸² *Op cit*, Fn. 720 p. 279.

⁷⁸³ *Op cit*, Fn. 92 p.65.

⁷⁸⁴ With a decrease of the deficit and its consequential interest, governments could use the increased budget for other listed possibilities such as tax shifting, for example.

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- vi. Another popular thought is compensating victims of harmful pollution.⁷⁸⁵
- vii. Also typical is earmarking the revenue.⁷⁸⁶ In this context, a large amount of the income is allocated for environmental programmes.⁷⁸⁷ This allocation should be organised in advance to avoid unwanted debate afterwards. Since the tax income varies it is impossible to decide on a fixed sum being allocated to a specific projects or programmes. As such a proportional allotment can be made, but this may not fund the entire project or programme. The consequence is an ineffective allotment of funds, if the allotment is either too high or too low, resulting in ineffective planning and spending. However, taxpayers are comfortable with this system as they know that money is being spent on economically valuable and pollution reduction programmes.

It would be important to determine the use of the revenue in advance (best time before its introduction) which gives the taxpayer transparency and an idea where his money goes. For example, the introduction of the ETR in Germany, with its elements of reducing social contributions and levying tax on fossil fuels, was not accepted as a transparent policy. Individuals criticised the government by stating that they had not been given adequate information. Several information campaigns had been launched but they could not explain why the revenue allocation occurred the way it did. Despite the willingness of the German population to pay for the protection of the environment and the mitigation of climate change, the tax was seen as another means to fill the treasury. The reason for that was the lack of - or only partial - understanding of the tax dividends which led to a belief that the dividends would not be disposed to fight unemployment while saving the environment.

As a result of this experience it is clear that taxpayers would need to be enlightened about the facts and consequences of a global tax. There should be information and updates, as well as an annual assessment and statistics about the emission reduction linked to unemployment figures. Furthermore, a separate column of the monthly reduction of the social contribution on payslips might help in demonstrating that the tax was revenue neutral. This would be a

⁷⁸⁵ Oates 'Green taxes: Can we protect the environment and improve the tax system at the same time?' *Southern Economic Journal* 1995 Vol. 61 pp. 914–922 (916).

⁷⁸⁶ *Op cit*, Fn. 92 p. 65.

⁷⁸⁷ *Ibid*, p. 76.

decision of the individual country in its design and implementation but should be recommended nonetheless.

2.11 *Structural effects of taxation*

The taxation of carbon is an economic tool and it has to be used as such. It could lead to consequences which might not have been envisaged in the beginning; for instance individuals who work in cities might have to move to downtown areas as a result of higher fuel prices and the increase in the cost of public transport. Or those house owners, who bought their houses relying on consistently low energy prices, might need to sell their houses or invest in insulation measures. Accordingly, it would be necessary to assess the tax and its possible aftermath before introduction. Changes should be predicted and if environmentally positive, they should be supported by incentives, such as, for example, an income tax reduction for insulation measures for private homes. Similar incentives and solutions might be considered for the industrial sector, although this belongs in the framework, such as a suggestion to support research and development and new technologies but these incentives would be the political decision of the individual member states.

2.12 *Possibility to change the agreement as a point of fiscal reality*

The fiscal reality has to be faced. In this context the question arises, what if the tax does not achieve its aim? The possibility of adjusting the tax from time to time because of increasing costs and/or the monitoring of the mitigation aims and the adjustment of new techniques, as well as tax evasion models, would need to be considered. In addition, it would be necessary to monitor the changes which came about with the gradual introduction of the tax and its short-, medium- and long-term consequences. If the framework only worked in part or not at all, there would have to be the possibility of adjusting the framework.

It is uncertain with which tax rates the different nations would implement the tax. As it is uncertain how many countries would sign and ratify the framework, it is unforeseeable how much GHG emissions would be mitigated. Accordingly, it would be important to include a clause in the framework which would ensure that it only came into force if a significant number of emitters signed and ratified the framework. Otherwise, countries would not ratify the agreement since they would have serious reservations about competitive disadvantages.

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Since the tax would be revenue neutral in most nations this would not be the case, but it would be difficult to explain this to politicians and populations.

In several countries that have already introduced carbon taxes it has been clear that by implementing the tax gradually, the short-term response might be comparatively low, as energy utilisation is part of the production and service industry and a high standard of comfort in life involves energy usage, but the long-term response has brought about a change in polluters' behaviour.

- Industry would react by using other raw materials if possible and by manufacturing energy-saving commodities. In future an alteration in their manufacturing techniques could be expected to lower their energy consumption. This effect would be similar to the effect of the oil crises in the 1970s and 1990s when the price of oil increased significantly. This tax would lead to the replacement of high-emitting fuels by either low-emitting fuels or preferably, renewable energies. This process would gain momentum through the change in demand from consumers to lower energy-intensive products and renewable energy.
- Households would reduce their energy use in order to reduce their expenses, which would mean a direct cut in energy and fossil fuel consumption, since the costs for these products would have increased. Furthermore, it would increase householders' awareness of the need for the installation of insulation and the purchase of low-energy cars, eco-buildings and other consumables, shifting their support to low emission products.

It would be essential that countries included incentives to decrease emissions, both through developing new, clean technologies and processes and by shifting towards less carbon-intensive consumption. It would be expected that the behaviour of producers and end consumers would change and the demand for low-emission energy and renewable energy would increase. If the decrease in emissions and the increase in use of renewable energy were not as high as expected and necessary, then the adoption of further and additional measures might be necessary. The above makes an adjustment clause in the framework necessary.

In a worst case scenario, the framework would have to have a clause which ensured that the convention could be rescheduled if too many of the members were not prepared to commit themselves to the duties encompassed in the framework.

2.13 *Co-existence of different mitigation measures*

In several countries such as Australia, New Zealand and the Member States of the European Union, CTSs have been, or will be, implemented. It is questionable whether the CTS and the global tax could co-exist or if it might be necessary to adopt only one of the systems.

In some European countries, such as Germany, tax and CTS co-exist already. Nonetheless, both systems have gaps in some parts and overlap in others. This is not ideal and contradicts a fair and distributive system. Accordingly, the parallel usage of both systems should be planned wisely, which would lead to adjustments in both systems. In my opinion it would be easier just to have one comprehensive system (tax) and with its implementation the other system (CTS) should be abolished.

A lot of overlapping occurs in the energy sector at the moment, for instance electrically powered rail transport receiving a reduction in electricity tax whilst concurrently coming under the EU emissions trading.⁷⁸⁸ Another example is electricity generators, who are affected by the trading system as well as the end user by electricity tax.⁷⁸⁹ Similar overlapping happens in other energy sectors and energy-intensive areas.

The parallel usage of both systems has been examined in the literature. Cooper,⁷⁹⁰ for example, (certainly based on a standardised tax rate) agreed that co-existence was possible but only if some necessary conditions were fulfilled. These would include the condition that the average trading price for CTS was not less than the carbon charge. This would mean that the global average price would need to be orientated on the highest carbon tax rate, in the above mentioned example, the tax rate of USD 10. Furthermore, if the price for CTS fell below the global tax rate by a certain margin for a particular time period, countervailing charges on

⁷⁸⁸ Schlegelmilch and Bunse 'Ecological Tax Reform and Emission Trading – Can they work together in Practice? An empirical Analysis for Germany' in Chalifour with Milne, Ashiabor, Deketelaere, and Kreiser (edt) *Critical issues in environmental taxation international and comparative perspectives Volume V* Oxford University Press 2008 pp. 183-203(196).

⁷⁸⁹ *Ibid* p. 197.

⁷⁹⁰ *Op cit*, Fn. 724 p.21f.

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imports from countries with a low permit trading price might be necessary. Moreover, waiving taxes on exports should not be condoned and countries with CTS should not grant emission permits at no cost (grandfathering) but auction them.

Another possibility could be that businesses and industries which were part of the CTS should pay a smaller energy tax for the participating part and the normal tax rate for the non-participating part of their businesses.⁷⁹¹

Another point to keep in mind would be how to deal with the carbon/energy taxes or charges already in place. The internationally agreed charge would be over and above these and, as such, could lead to double taxation. Accordingly, countries would need to adjust their existing regulations to suit the new framework; but this should not lead to the reduction of such taxes in the countries where such taxation is already implemented.

A parallel set of supporting incentive regulations, such as tax reduction for climate friendly insulation, would be a plus to encourage investments in renewable and less carbon-intensive energy products.

3 Conclusion

As seen in this chapter, an energy tax is ecologically and economically worthwhile and should be introduced globally. Nonetheless, there are several issues which would have to be considered during its development, such as whether it should be international or national, binding or not, a framework or a fixed agreement, and the choice of the tax itself. Since there has not been a precedent for an international tax and it is not likely that states will be willing to submit their economic interests to an international regime without ensuring their sovereignty, only a framework can be recommended. Nonetheless, since climate change is a global problem, a worldwide solution in the form of a framework is considered necessary.

Countries considering the implementation of such a tax would have to consider the amount of the tax and whether to tax upstream, downstream or use a mixture of both variants. This would have an influence on possible exemptions and on the administration and monitoring of

⁷⁹¹ *Op cit*, Fn. 788 p. 201.

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the tax. In contrast to the Kyoto Protocol, the framework would have to include penalties in the event of non-compliance, and also methods of enforcing the regulations. The tax could be introduced in addition to a trading system but that would have to be examined economically in advance. According to the sovereignty of individual states the use of the revenue, as well as most of the other tax related decisions, would come under their own jurisdiction and have to be examined individually regarding their short-, middle- and long-term effects. The population would have to be enlightened about the advantages and effects of the tax in order to avoid the major problem of unpopularity or misunderstanding. As the tax would entail payments and a financial loss, politicians and populations might be suspicious about it. However, if the monitoring, compliance and enforcement were led by an international institution such as the IMF, it might encourage more countries to implement the international framework.

VII Summary and Conclusion

The nations of the world are confronted with great challenges in determining and implementing efficient and effective policies and instruments for the mitigation of climate change. These instruments have to be fair at historical, demographical and distributional levels.

Chapter Three has shown the three most popular mitigation measures in place: regulations, emission trading and taxation. The utilisation of taxes in contrast to regulations, would allow for more flexibility to producers and consumers, with less financial cuts. The use of taxation to reduce CO₂ aims to discourage the consumption of goods and services, which create environmental costs and to encourage producers to develop alternative production methods and products, which are less harmful. With this the ‘polluter pays principle’ should be considered, since the emitter would need to pay for its emissions.

Arguments against implementing energy taxes are, *inter alia*, that such taxes would be regressive and the competitive capability within the global trade market of those countries which have been implementing such a tax would be lost. But none of these fears are necessary. The level of regressivity, for example, would be dependent on the revenue usage. Competitive capability could be avoided by introducing BTAs (as has been shown in detail in Chapter Five).

Carbon taxes, contrary to regulations, would allow individuals and industry to weigh up the costs and benefits of their behaviour and give them individual choices, which regulations would not. Regulations would be less flexible and only provide parameters for people. However, regulations would be the most appropriate measures for ensuring transparency, monitoring and the enforcement of penalties. As such they should either be part of the framework or be designed as special rules in addition to the international carbon tax; if necessary for and by every country itself. The most acceptable and effective ways to achieve proper transparency, monitoring and penalties should be areas of further research.

Carbon taxes and emission trading both create a price on carbon. The trading system does it through guaranteeing a certain level of emissions but has no certainty regarding costs. A tax system limits the costs of emission reduction if these costs rise unexpectedly, but cannot

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guarantee the reduction of a certain level of carbon. The major advantage of a tax system over a cap and trade solution, is that the trading system would only focus on carbon-intensive emitters, whereas a tax could include both emitters and consumers (depending on exemptions and waivers). Furthermore, a tax system is more flexible and would be able to deal more easily with market changes. In addition a carbon tax would include revenue which could be used in a tax neutral way so that the average person would not have to suffer a higher cost of living.

According to several studies, CO₂ taxation in developed countries is slightly regressive but most analyses on developing countries came to the conclusion that carbon taxes would be progressive in those countries. An energy tax would be more acceptable to taxpayers if the likely progressivity/regressivity of its implementation were examined in every country which was thinking about the introduction of a carbon tax.

For the implementation of an international carbon tax the principle of common but differentiated responsibilities would have to be adhered to, which would especially benefit developing countries. In this context, future analytical work should be done in every country in the world, on its current carbon emissions and its carbon emission development within the last century. This should be done so that an adequate overview would make it easier to agree upon the right contribution from each country.

The taxation of energy is an appropriate approach to address the aim of climate change mitigation. Several countries have already introduced energy taxes and charges to fulfil their reduction commitments under the Kyoto Protocol.

Chapter Four demonstrated the difficulties which different countries and the European Union needed to face while planning the implementation of energy taxes. Moreover, it showed the different approaches with critical analyses of these solutions.

The introduction of its energy tax was a major process for the European Union, which took about twelve years. Several attempts failed since consensus between Members could not be reached. Their emphasis on their sovereignty was a key problem. Accordingly, the proposals moved from a fixed agreement to a framework, which was also rejected; because industry was

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concerned about the competitive impact of the proposed tax. Finally, the amended proposal came into force in 2004. Its scope is broad, since all fuels and electricity are covered but comprises only small increases in its already minor minimum rates. The scope of a global approach should be subject to examination if possible, even if this was small and patchy. If the scope could then be reconsidered over a period of time, for instance every three years, it might be possible to broaden it so that the tax rates/targets of the members would become higher.

Businesses and industry prefer reducing emissions on a voluntary basis, but, as seen in Switzerland, this is not as successful as the implementation of taxes.

Administrative costs have to be low if taxes are chosen as the right mitigation measure. To achieve this, countries have chosen differing solutions. These solutions cannot be measured conclusively here, since every country is different in its structure, needs and demands with its own reduction targets.

In the United Kingdom for example taxpayers are industry, commerce and the public sectors. The CCL is levied according to the amounts of energy consumed. Private households are not a tax target. The tax subjects in Denmark and in most other countries in comparison, are individuals and industry, and in Denmark individuals are taxed more highly than industry. Taxpayers in Switzerland, in contrary, are households and industry, and in general the law does not differentiate between them. Nonetheless, in implementing a global tax, studies would have to be undertaken regarding prospective administration costs during the introduction and implementation of such a tax comparing the costs of administration with those of an ETS. These would demonstrate the expected competitive ability of carbon taxes compared to ETS.

A reduction in carbon emissions is the aim of all the taxes under discussion. The different approaches used, such as taxing fossil fuels upstream, downstream or a mixture of both, have been discussed, as well as the problems which occur through the use of these measures. The downstream solution comes with high administration costs and mirrors the carbon content of the tax objects fairly precisely. The upstream approach eases administration but is accompanied by the question as to whether it is justified to levy BTAs on items which were used in prior stages but are not incorporated in the product as such. Furthermore, this

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approach does not reflect the exact carbon content contained in the products but facilitates tax-freedom for renewable fuels and electricity. The challenge in a global approach would be to find an adequate solution for each and every country; and one that did not lead to double taxation. This would need further research.

The most common approach has been a combination of upstream and downstream taxation. Denmark, for example, has chosen both primary and secondary energy sources as tax objects. When the source has already been used for power generation, it is exempt. Similar solutions have been used, *inter alia*, in Germany and the European Union. The United Kingdom, in comparison, has levied the tax on supply (tax object) instead of energy usage as it is easier to differentiate between households and businesses and whether the user is domestic.

Before 1996 Finland taxed electricity produced from fossil fuels on its input and, to avoid double taxation, did not tax the electricity itself. This method was preferred by exponents of an environmentally related energy tax reform and considered most effective. It was levied on input which granted a precise distinction and taxation of CO₂ emissions. However, this approach was, especially without tax exemptions for the energy-intensive industries, non-competitive. The prevention of competitive problems by the introduction of such a tax by only one state, or a small number of states, would appear to be possible only by granting tax exemptions and tax shelters, but this did not take place. Such an input tax could only be beneficial if it was implemented by all, or at least most of the OECD countries together, to avoid competitive distortions. Unfortunately, it has to be realised that in an open energy market an input tax system weakens the competitiveness of the domestic energy producer and the rest of industry. Nonetheless, how many implementing countries would be necessary to make such an approach feasible without considerable tax exemptions, would be of interest in further planning.

A tax on carbon emissions should be implemented gradually, so that taxpayers have a period in which to adjust their reliance on fossil fuels and for companies to change or develop their techniques. Since almost all countries have an excise tax system already in place it would be the appropriate system to choose.

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The revenue from this taxation should not be included in the general budget; instead it should be paid back to the taxpayers so as to avoid major distributional effects. It might be best to implement a revenue neutral tax but that would have to be analysed for its economic impact on potential member countries. Commonly revenue has been used to reduce income tax or social contribution costs. It has been important to determine the use of the revenue in advance, in order to avoid uncertainty among the public and to ensure precise calculations and investment security for the receiver.

Not everything can be achieved through national carbon taxes. As an example, Denmark is one of the countries with the highest CO₂ taxation in the world. The taxes have successfully reduced CO₂ emissions, but a further tax increase to achieve more reduction is currently not wise because of the likelihood that it would reduce Denmark's competitiveness.

Other taxes, such as the car tax in India or the surcharge in Zambia⁷⁹² differ. The Indian tax has an interesting steering aspect which has forced the producers of high emitting cars to change their products or deal with a decline in sales. The tax is expected to have a high environmental effect and as such it could be interesting for other countries to consider.

Carbon leakage is a problem which occurs when climate change measures are introduced partially and not globally. Subsidies and BTAs could be useful in preventing this. BTAs are, in general, justified by the WTO laws but guidelines by WTO, especially in the field of the implementation of BTAs and their scope, would be useful and appreciated. This would be a challenge for WTO and an appropriate subject for further directives.

BTAs would be difficult to implement globally, especially in respect of the administrative complexity, but would be possible in individual circumstances. It has to be kept in mind that the more detailed and complex the domestic tax determination is, the greater is the danger that it may lead to unequal treatment of domestic and foreign goods. By increasing the scope of import taxation – in the absence of necessary information about the imported energy tax objects – simplifications and lump sums in the tax assessment are necessary; but could be justified when the lump sums for example are similar to the regulations used by the United States in its Superfund Tax (except for the surcharge).

⁷⁹² See Appendix 7.

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The implementation of BTAs serves currently only as a theoretical solution and it is to be hoped that it stays like this, but implementation would be more likely if all major emitters did not introduce mitigation measures which were comparable in effectiveness to those already implemented. Accordingly, the possibility of designing a model BTA should be examined.

At an environmental forum in October 2007 the President of France, Nicolas Sarkozy, called for a carbon tax and a European levy on imports from countries outside the Kyoto Protocol.⁷⁹³

Climate change is global. As such, the implementation of a global energy tax framework has been suggested in this thesis. The suggested framework would appear to be most promising, as sovereign nations cannot be compelled to act against their interests, which would make the implementation of a treaty complicated. Implementing a framework would still grant every nation the option of designing its own legislation within the norms of the framework.

To satisfy the common but differentiated responsibility principle, it would be necessary either to have different tax rates or, when implementing equal tax rates, to include high adjustment payments. Chapter Six focused on the possibility of different tax rates in respect of the different historical and current emissions in proportion to per capita emissions.

The tax should be implemented gradually to give countries and their industries the opportunity to adjust their systems within a fixed time period.

Moreover, a graduated tax rate could combine the different per capita emissions with the ‘common but differentiated responsibility principle’, since the richest countries generally have the highest per capita emissions. The different tax rates would start with a low tax for low-income countries, a middle tax for middle-income countries and a high tax for high-income countries, while the tax rates and the classifications for them could also be tied on a per capita emission base combined with income, as in future the proportions between pollution and income might change. The challenge here would be finding the right tax rate for each country

⁷⁹³ Agence France Presse (AFP) *Climate change Sarkozy backs carbon tax, EU levy on non-Kyoto imports* [Online] <http://afp.google.com/article/ALeqM5gx9Wyu07XJiydxsqseJmVdX3-MoQ> accessed on 4 March 2010.

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because even if countries fell into the category of middle-income countries it might be difficult to compare each of these countries. This should be the subject of future investigation.

As global warming will be a constant problem, stable solutions would have to be found, with the possibility of changing the framework to adapt to new situations and reconcile with the ‘polluter pays principle’.

Revenue can and has been used in a number of ways: for example a reduction of the income tax rate or the social contributions or public health insurance, etc. For developing countries it seems to make more sense to pay the tax back to the poor or use it to reduce state debts. This should be subject to further examination. The examination should, *inter alia*, include whether the approach would be feasible and practicable, who would be the receiver, what would be the criteria for payments, how could the administration be realised and how could corruption/criminality be avoided.

The revenue usage would have to be economically assessed in advance in order to find the best solution for each country. Most importantly, which cannot be stated enough, is a determination, in advance, to avoid insecurity and non-transparency which would make the implementation of a tax less acceptable. A small part of the tax would need to be used for administration and monitoring purposes.

Furthermore, it would be essential to include enforcement and penalty measures and an adjustment clause so that if the desired aim was not fulfilled, an adjustment would be necessary. The instrument of regulations would appear to be an adequate measure in this context.

The introduction of a new tax would be bound to cause different problems. Particular challenges would be a reluctance to pay more taxes, concerns of industry regarding competitiveness, and the problem of distribution. Understandably, too, developing countries would not want to forego their economic progress of the last twenty years. This progress has been essential for better standards of living, especially in the context of growing populations. Under these circumstances, climate change has not been their main focus. While there are still people living without food, electricity or fresh water supplies, climate change mitigation

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measures would appear to be a problem of the wealthy. However, it is poor countries that will be most affected by climate change.

It is necessary to achieve the goal of UNFCCC, its Kyoto Protocol and other climate change agreements, to reduce GHG emissions immediately. To stabilise even a 500 ppm level of carbon emissions by 2050, emissions will have to be cut by half,⁷⁹⁴ if the population does not grow, otherwise a two-thirds drop in per capita emissions would be essential.

Even if an early introduction of an international carbon tax is not possible, at least the reduction of emissions has to become, and has to remain, the common priority of all nations. At the Climate Conference in Durban, South Africa in December 2011, this achievement may become a real possibility. The outcome of the Climate Conference in Cancun, was an agreement that a reduction of carbon emissions would be achieved by holding the global average temperature beneath 2 °C. Furthermore, the development of systems to measure, monitor and report the reductions, as well as checking measures which have been taken by countries, compared to those measures committed, were agreed upon.

⁷⁹⁴ Intergovernmental Panel on Climate Change (IPCC) Summary for Policymakers Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change Solomon with Qin, Manning, Chen, Marquis, Averyt, Tignor and Miller (eds.) Cambridge University Press Cambridge and New York 2007 Figure 3.38 p. 228.

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Appendixes:

1 Appendix 1: Comparison cap and trade scheme and carbon tax

Criterion and rationale	Cap and trade scheme	A 'carbon tax'
Political acceptability. A global political consensus is imperative for an effective solution. Arguably this is the key criterion in practical terms.	The ETS has the momentum, with acceptance of the concept in Europe and appetite for similar schemes growing globally. There are political Challenges regarding agreement on the details for each phase of the scheme. The next phase begins in 2012.	A new tax is politically tough to implement, as discovered through the failure of the 'BTU' tax in the US and a pan-European carbon tax in the 1990s. The EU constitution is also a challenge. New taxes need unanimity but decisions on the ETS only need a (qualified) majority vote.
Effectiveness and tackling climate change. Cutting carbon (and other greenhouse gases) is, after all, what must be accomplished by the system.	Theoretically a cap and trade market has the potential to drive carbon savings at the lowest cost through permit trading. It also imposes an absolute quantity cap which can be managed in line with environmental requirements (unlike a tax, where there is no direct control over the quantity of emissions). Success of the ETS has been limited so far, with surplus free credits in the early years and again more recently because of falling energy demands. Many would argue that the rate at which auctioning is increased and the rate at which the quantity cap falls must accelerate to give this scheme genuine credibility as a successful tool to fight climate change.	The solutions to climate change, such as investment in renewable energy sources, need long-term investment, which will be greatly boosted by a clear price of carbon. A tax is better placed to provide this, as it can offer greater price consistency. There is a possibility that polluters will pay the tax rather than cut Carbon, but empirical evidence suggests taxes can be effective in influencing behaviour. The simplicity of a tax means it can be applied to more emitters than the ETS and therefore could have a greater influence on overall emission levels.
Price signal consistency. The solutions to climate change (such as renewable energy, carbon capture and storage) require long-term investment decisions with cannot be made without some degree of confidence concerning the price of carbon.	Volatility has been the Achilles heel of the ETS to date. Permit prices plummeted to nil in 2007, as the system did not allow excesses from Phase I to be carried over to 2008. The price recovered to over €30 before falling to €10 in recent months. With no constraints on the market price, it is a speculator's game to guess where we go next. This provides a fragile basis for investors looking to incorporate a long-term price for carbon into their decision making.	need to be flexible over time to react to changes - for example, scientific opinion on the requisite pace of emissions cuts – but volatility would be constrained by the state and some limits set for changes within, say, a five-year period. An international consensus for a precise figure may not be achievable but, like the EU VAT system, a range of acceptable values could be set.
Revenue-raising ability. A need to raise funds for climate change adaption and mitigation measures, exacerbated by growing national debts.	The ETS is slowly developing into a revenue-generating regime as the auctioning of permits begins. The EU presently permits up to 10% of permits to be auctioned (the UK is currently at 7%). In 2008 the first UK auction raised £54m. By 2014, 60% of permits are expected to be auctioned and the UK's Committee for Climate Change estimates annual revenues could reach £8bn by 2020. However, revenues are unstable, as they are dependent on market	A carbon tax provides cleaner access to revenues without the need to determine the quantum of 'free permits' or operate an auctioning system. The revenues would be more stable and controlled centrally, rather than by the whims of the market. An added benefit for heavily indebted governments might be that revenues would flow directly to central coffers for unfettered use, whereas ETS revenues are subject to siphoning off by the EU. A possible

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	forces and political influence (as evidenced by recent auctions of 3G phone licences).	hindrance might be an expectation that the carbon tax would mean reductions in other taxes.
Simplicity. Complex systems take time to negotiate as stakeholders push for tweaks to suit their needs. This leads to more complexity and time is quickly running out.	The crucial initial hurdle of acceptance (within the EU) has been cleared and the framework and systems are in place. However, costs and complexity implicit in the architecture are required to manage and maintain the market environment. Additionally, new concept participants have additional compliance costs, estimated at £100m in the UK for Phase II (2008 to 2012) of the ETS.	If a general framework for the tax could be agreed internationally (no mean feat), the implementation would be relatively simple. Accurate reporting of carbon would be a pre-requisite for both approaches and the existing corporation tax infrastructure, both at government and taxpayer levels, could be used to collect the taxes. Practically, simplicity can be difficult to hold on to, especially where international agreement is required - as evidenced by recent Scandinavian attempts at an energy tax. Without a coherent agreement between different countries, arbitrage would be possible, which could undermine the policy objective.
Criterion and rationale	Cap and trade scheme	A 'carbon tax'
Business attitudes. What are the implications for business and how will the system be perceived.	The ETS will keep popularity for now, as those affected enjoy another round of windfall profits from surplus free permits. The acid test will to come when the cap shrinks and more permits are put out to auction. A market system provides opportunities for speculative profits to be made from trading, which would be attractive to a limited few with the requisite expertise and resources to take advantage of this. However, such activities exacerbate price volatility, which is unattractive to the majority of businesses, including those looking to provide low-carbon or carbon-saving products and services and energy-intensive companies who will both resent the lack of clarity over the future carbon price.	There is an emerging trend that a tax would be preferable, principally because of the certainty and clarity it could offer. A 2007 PwC survey concluded that 23% of UK businesses saw a carbon tax as very effective, compared to just 9% for the ETS. More recently a PwC CEO survey suggested that a 'clear consistent policy framework' was most important in tackling climate change. 'An efficient global carbon market' was bottom of the list. Compliance and planning costs are lower, as these could be handled by the existing tax function, unlike carbon trading, which would probably require additional specialist resources.

Source: Schofield and Manistry 'Carbon Tax v Carbon Trading' *The Tax Journal* 23 March 2009 pp. 15-17(16-

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2 Appendix 2:

Excise tax rates and strategic stockpile fees in Finland (January 2008)

Fuel	Basic tax	Surtax (*carbon comp., EUR20/tonne CO ₂)	Strategic stockpile fee
Unleaded petrol, euro cents/litre - reformulated sulphur free - other grades	57.24 59.89	* 4.78 * 4.78	0.68 0.68
Diesel oil, euro cents/litre - sulphur free - other grades	30.67 33.32	* 5.38 * 5.38	0.35 0.35
Light fuel oil, euro cents/litre	2.94	* 5.41	0.35
Heavy fuel oil, euro cents/kg	-	* 6.42	0.28
Jet fuel (kerosene), euro cents/litre	33.32	* 5.38	0.35
Aviation gasoline, euro cents/litre	37.54	* 4.78	0.68
Coal, euros/tonne	-	* 49.32	1.18
Peat	-	-	-
Natural gas, euros/MWh	-	* 2.016 (reduced rate)	0.084
Electricity, euro cents/kWh - rate I (households, services, agric.) - rate II (mining, manufacturing)	- -	0.87 0.25	0.013 0.013
Pine oil (heating), euro cents/kg	6.70	-	-

(source: *Environmentally related energy taxation in Finland*<http://www.ymparisto.fi/print.asp?contentid=299288&lan=en&clan=en>)

Notes:

The table above is not all-inclusive; substitutes for liquid fuels may face the same rate. Leaded petrol is no longer sold in Finland. Fuels for electricity production (mainly), commercial aviation and commercial yachting are exempted; other exemptions also exist. Carbon component for natural gas: reduced rate. Strategic stockpile fee = precautionary stock fee. (For time series use: 1 euro = 5.94573 markka).

Total revenues from the excise on energy products amount to:

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€2,756m for 2002

€2,865m for 2003

€2,901m for 2004

€2,885m for 2005

€2,946m for 2006

€2,990m for 2007 (budgeted) and

€3,251m for 2008 (budgeted)

Annual revenues from strategic stockpile fee amount to circa €50 million. The share of liquid fuels in the annual excise duty revenue is circa €2 400 m. The share of the carbon tax revenue is circa €500 million annually.

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3 Appendix 3:

Relevant AHV Total Wage 2008		250 Mrd. Fr.
Reduction of AHV Total Wage by Duty-Refund		0,00036 %

Gramm CO₂ pro Mengeneinheit

Energy Carrier	Quantity-Unit	CO ₂ (g / Unit)
Fuel Oil EL	1 l	2653,000
Fuel Oil M/S	1 kg	3171,576
Petrol Coal	1 kg	3290,000
Hard Coal	1 kg	2641,400
Brown Coal	1 kg	2090,400
Natural Gas	1 kWh	198,000
Natural Gas	1 m3	2020,000
Electricity	1 kWh	0,000

Duty Income by Economy

Energy Carrier	CO ₂ Emissions of Economy 2008 in t	Duty Income Fuels Brut in Fr. (Total Consumption)	Duty Income Fuels Net in Fr. (except exemption, less Execution Charges and Partly Specific Purpose)
Electricity	0	0	
Fuels	10.300.000	123.600.000	
Total	10.300.000	123.600.000	84.320.000

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Duty Level 1 (from 1.1.2008):

Duty Rate Fuels	12,- Fr. / t CO ₂
-----------------	------------------------------

a) Duty on Fuels

Energy Carrier	Quantity-Unit	Consumption in Purchase Year	Duty Rate Fr./Quantity	Duty Amount (Fr.)
Fuel Oil EL	1 l	-	0,0318	-
Fuel Oil M/S	1 kg	-	0,0381	-
Gas	1 kWh	-	0,0024	-
Petrol Coal	1kg	-	0,0395	-
Hard Coal	1 kg	-	0,0317	-
Brown Coal	1 kg	-	0,0251	-
Electricity	1 kWh	-	0,0000	-
Total Duty				-

b) Refund Distribution

	Total Wages in Fr.	Refund Distribution	
		Part of Wages (%)	Total (Fr.)
except liability of Fuels	0	0,00036	-
with liability Fuels => no Refund	0	-	-

c) Net-Effect

	no Liability for Fuels	plus Liability for Fuels
Total Duty	-	-
Total AHV-Refund Distribution	-	-
Net Effect (+ = to be paid; - = Profit)	-	-

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4 Appendix 4:

Tables and Coefficients Duty-Level 3

AHV Total-Wages 2010		263 Mrd. Fr.
Reduction of Total Wage by Duty-Refund		0,00060 %

Gramme CO₂ per Quantity-Unit

Energy Carrier	Quantity-Unit	CO ₂ (g / Unit)
Fuel Oil EL	1 l	2653,0
Fuel Oil M/S	1 kg	3171,6
Petrol-Coal	1 kg	3290,0
Hard Coal	1 kg	2641,4
Brown Coal	1 kg	2090,4
Natural Gas	1 kWh	198,0
Natural Gas	1 m3	2020,0
Electricity	1 kWh	0,0

Duty Income by Economy

Energy Carrier	CO ₂ Emissions of Economy 2010 in t	Duty Income Fuels Brut in Fr. (Total Consumption)	Duty Income Fuels Net in Fr. (except exemption, less Execution Charges and Partly Specific Purpose)
Electricity	0	0	
Fuels	10.000.000	360.000.000	

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Total	10.000.000	360.000.000	146.200.000
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Duty Level 3 (earliest from 1.1.2010):

Duty Rate Fuels	36,- Fr. / t CO₂
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a) Duty on Fuels

Energy Carrier	Quantity Unit	Consumption in Purchase Year	Duty Rate Fr./Quantity	Duty Amount (Fr.)
Fuel Oil EL	1 l	-	0,1142	-
Fuel Oil M/S	1 kg	-	0,1184	-
Gas	1 kWh	-	0,0727	-
Petrol Coal	1kg	-	0,0951	-
Hard Coal	1 kg	-	0,0753	-
Brown Coal	1 kg	-	0,0071	-
Electricity	1 kWh	-	0,0000	-
Total Duty				-

b) Refund Distribution

	Total Wages	Refund Distribution	
	in Fr.	Part of Wages (%)	Total (Fr.)
except liability of Fuels	0	0,00000	-
with liability Fuels => no Refund	0	-	-

c) Net-Effect

	no Liability for Fuels	plus Liability for Fuels
Total Duty	-	-
Total AHV-Refund Distribution	-	-
Net Effect (+ = to be paid; - = Profit)	-	-

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5 Appendix 5:

CO₂-Duty-Calculator

Effects of CO₂-Duties on Companies

Calculator Form

Procedure:

Fill in all blue fields of this page. All other fields will be calculated.

Important Information

This duty-calculator delivers indicative values (Gross Estimation) on Net-Effects of CO₂-Duty on Companies. An exact estimation of Refund-Distribution-Amount is not possible, because important model-assumptions are full of insecurities. The Refund-Distribution-Amount and also the net-effect can turn out higher or lower in reality than described here.

The indication of cumulated net-load or -release of a company for several years is impossible, because the moment of activation of the different duty-levels on the decided level-model depends on the real development of emissions. To describe the three duty-levels within this calculation, the introduction at the earliest time is estimated in each case (Level 1 from 2008, Level 2 from 2009, Level 3 from 2010). On the basis of the CO₂-balance 2007, the CO₂-duty for 2009 remains on first level too; mid 2009 will be decided on the CO₂-balance 2008, if per 1.1.2010 the duty will be raised on level 3. As in the calculation not all possible variations of time staggering of duty-levels can be described, each company must carry out its own introduction of duty-levels. Accordingly, the entrepreneurial effects have to be reported by these variants.

Basic-Information of the Company / Input Values

Total Expenses for Fuels in Consumption-Year (in Fr.)	-
Total Wages in Consumption-Year (in Fr.)	-

Energy-Consumption	Quantity-Unit	Consumption in Period
Fuel Oil EL	1 l	-
Fuel Oil M/S	1 kg	-

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Gas	1 kWh	-
Petrol-Coal	1kg	-
Hard-Coal	1 kg	-
Brown-Coal	1 kg	-
Electricity	1 kWh	-

Total Energy Consumption**MWh****CO2-Emission in Tonnes****T****Net-Effects for the Company per Duty-Level**

(see Detail-Calculations in Tables of Duty-Level 1 and 2)

Result: Summary of Net-Effects in Fr. + = Charge by Duty - = Net-Profit by Refund-Distribution	<i>No Liability for Fuels (A)</i>	<i>Plus Liability for Fuels (B)</i>
Duty-Level 1 1 (from 1.1.2008): 12 Fr./tCO ₂ on Fuels	SFr. 0	SFr. 0
Duty-Level 2 (earliest from 1.1.2009): 24 Fr./tCO ₂ on Fuels	in 2009 no Raise of Duty.	
Duty-Level 3 (earliest from 1.1.2010): 36 Fr./tCO ₂ on Fuels	SFr. 0	SFr. 0

(A) Company without Liability for Fuels: Duty charged on Fuels, Refund-Distribution by Fuel-Duty-Income less Execution Charge(B) Company with Liability for Fuels: No Duty (Duty Refund), no Refund Distribution

6 Appendix 6:

Development CO₂-Emissions:

The future development of Total CO₂-Emissions of the economy will be estimated on the basis of CO₂-Statistics for 2007. The following Estimations are used: 2008: 10.3 Mio. t. CO₂, 2010: 10.0 Mio. t. CO₂.

Part of released companies on CO₂-emissions of the economy:

- Level 1: 30% (Estimation BFE/BAFU based on Monitoring data per Mid 2008 and already issued and actually worked out decrees).
- Level 3: 31% (Estimation INFRAS. Assumption, that because of additional liabilities the part of Liabes in Total is slightly increased as in 2008).

Part of released companies on AHV-payroll of economy:

- Level 1: 7% (according CEPE/BSR Study 2005 on Distribution-Effects of CO₂-Duty on Fuels, Table 3-2 and Table 3-4. The CO₂-Part of Liabes of Economy-Total obtained according to actual Monitoring data up to now (i.e. on Duty-Level 1 with 12 Fr./t CO₂) the level, which was expected in CEPE/BSR 2005 at a Duty-Rate of 35 Fr./t CO₂. Therefore the part of Liabes on AHV-Total-Wages of 7% shown in the study will be taken over).
- Level 3: 9% (according Study CEPE/BSR 2005 to Distribution-Effects of CO₂-Duty on Fuels, Table 3-2 and Table 3-4 Estimation INFRAS. Assumption, that cause of additional liabilities on the part of Liabes on the AHV-Total-Wages is 2% higher as in Duty-Level 1).

Partial Earmarking of CO₂-Duty from 2010:

On June 12 the Parliament decided, not to redistribute the entire CO₂-Duty to the population and the economy, but to finance it with one third from the income of climate-friendly Building-redevelopment for a maximum of 10 years (Partly Earmarking). With the increase of CO₂-Duty from 2010 up to 200 Million Franken per year are available for the sponsorship of Building-Redevelopment and of renewable Energies, Waste-Heat-Usage and Building-Technology. For the present Duty-Calculator, the Partial-Earmarking results in a reduction of the redistribution-amount.

Sources:

CEPE/BSR 2005: Distribution-Effects of CO₂-Duty on Fuels for the Economy of Switzerland. Eberhard Jochem CEPE, ETH Zürich, Volker Ott, BSR, Karlsruhe, by order of BUWAL, 2005

7 Appendix 7:

Zambia

Zambia ratified the Kyoto Protocol on 7 July 2006. As it is a developing country it does not have to fulfil any commitments under Kyoto. Nonetheless, Zambia has its so-called Surtax on Carbon Emissions. It is regulated in an amendment to the Customs and Excise (General) Regulations, 2000. This can be found in Part XIIB with the heading ‘Management of surtax on carbon emissions’.

It consists of only a few norms, whereas Regulation 113E contains the definitions of authority and motor vehicle. Regulation 113F states the tax object, which is ‘every motor vehicle which is imported, temporarily imported into, or in transit through Zambia’. When reading the objectives the difference of the tax in comparison to the above mentioned taxes is obvious. It is levied only on vehicles crossing the border of the country and affects mostly tourists and transport from other countries as well as cars imported for sale in the country.

Exemptions are made for motor vehicles which are ‘entered to be warehoused, removed in bond on a carrier or manufactured in Zambia’. According to regulation 113J refund or remission can be granted if the vehicle is ‘imported into Zambia, or is for the exclusive use of an international organisation, a diplomatic mission or any person who is connected with that mission and enjoys the privileges and immunities provided under the Diplomatic Immunities and Privileges Act’.

The time of taxation is the time of importation or when crossing through Zambia at the time of border crossing. If the car enters the border for purchase reasons then the time of taxation will be the time of purchase. The rates of the tax are determined in the fourth schedule to the Act and are as follows:

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Table 1:

Description of Goods	HS Tariff item under which classified	Statistical unit of quantity	Surtax Rate		Remarks
			Engine Capacity	Unit Tax	
Carbon emissions from vehicles of headings: (1) EX.87.01 Tractors (Mechanical horses & similar tractive units) (2) 8702, 8703 and 8704 excluding emissions from ambulances and prison vans.	EX.87.01	No.	Motor Cycles	50,000	Carbon emissions tax is payable on importation and thereafter per annum.
			0-1500cc	50,000	
			1501-2000cc	100,000	
	8702, 8703 and 8704	No.	2001-3000cc	150,000	
			3001cc+	200,000	

Source: FOURTH SECTION at: <http://www.zra.org.zm/CarbonTax.pdf>

The tax can be paid at any office of the authority or agent who might be authorised by the Commissioner-General.

To classify the car it is necessary to present the motor vehicle registration documents or its clearance or other relevant documents.⁷⁹⁵ The carbon emission tax certificate which then will be issued is to be fixed in a conspicuous place on the vehicle.⁷⁹⁶

As seen above the tax is called Surtax on Carbon Emissions but it is only levied on car emissions and neither includes any fossil fuels nor electricity. The regulations contain nothing about the revenue usage and accordingly it seems to be added to the general budget instead of protecting the environment. Therefore it does not fit into the group of previously discussed carbon/energy taxes and is as such not worthy of closer inspection; moreover it was only mentioned because of its name.

⁷⁹⁵ Regulation 113H.⁷⁹⁶ Regulation 113I.

8 Appendix 8:

Subsidies

This section will deal with subsidies, since they are steering measures which can be combined with energy taxation. They will be explained briefly, and to round off the picture a short legal estimation will be shown.

8.1 Background

Subsidising is normal in the energy field. Examples include:⁷⁹⁷

- direct subsidies
- tax concessions or tax exemptions
- low-cost long-term land concessions for energy exploration or production activity
- government absorption of different risks associated with exploration or production (such as liability waivers)
- energy infrastructure subsidies (such as low-cost power transmission lines, low-cost land concession rights and petroleum import or export facilities)
- the provision of loan guarantees
- grants or tax incentives to develop energy-related technologies
- grants or tax incentives to lower operating costs in various energy-intensive commercial production activities
- transfers to lower income household heating bills.

Subsidies can be helpful for environmental purposes (support of renewable energy or energy efficient assets) but can also be detrimental (support of coal, or other high emitters).

Developed countries annually subsidised around USD 70-80 billion of electricity generation during the final decade of the 20th century.⁷⁹⁸ For instance, in eastern and central Europe electricity subsidies were USD 34-39 billion a year, but have since decreased extensively.⁷⁹⁹ Developing countries displayed the same trend, with overall energy subsidies of estimated

⁷⁹⁷ 'Environmental Benefits of Removing Trade Restrictions and Distortions' note prepared by the WTO Secretariat 1998.

⁷⁹⁸ De Moor and Calamai *Subsidizing Unsustainable Development* Earth Council Toronto 1997 p. 49.

⁷⁹⁹ Larsen and Shah *World Fossil Fuel Subsidies and Global Carbon Emissions* World Bank Policy Research Working Paper No. 1002 Report Washington 1992 p. 5.

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USD 150 billion annually and an actual consumption account of USD 100 billion,⁸⁰⁰ whereas the electricity prices in developing countries were less than half of those in developed countries, and mostly did not include the long-term marginal cost of generation.⁸⁰¹

In September 2009, almost one decade later, there were still subsidies available for fossil fuels but the plan of the Group of Twenty (G20) leaders was to phase them out: 'We commit to rationalise and phase out over the medium-term inefficient fossil fuel subsidies that encourage wasteful consumption,' the leaders stated after a two-day G20 summit in Pittsburgh.⁸⁰²

8.2 Legal estimation of subsidies in general

During the Uruguay round, the ASCM of 1994 was adopted and has replaced the former subsidies codex. Article 1 of the ASCM describes three necessary elements which have to be fulfilled in order to estimate the measurement of subsidies:

- i. A financial contribution has to have been provided.
- ii. The contribution was made by a government or a public body within the territory of a WTO member.
- iii. The contribution confers a benefit.

The financial contribution is defined by a comprehensive list of measures, including direct measurement of funds (e.g. grants and loans), potential direct transfers or funds (for example guarantees), government revenue foregone (such as fiscal incentives through tax credits), the provision by the government of goods and services other than general infrastructure, and government purchase of goods as well as any form of income or price support by the government.⁸⁰³

⁸⁰⁰ *Op cit*, Fn. 600 p. 91.

⁸⁰¹ The World Bank *Expanding the Measure of Wealth: Indicators of Environmentally Sustainable Development* World Bank Washington 1997 p.51.

⁸⁰² Brisbane Times 'G20 leaders agree to phase out fossil fuel subsidies' *Brisbane Times* published 26 September 2009 [Online] <http://www.brisbanetimes.com.au/business/world-business/g20-leaders-agree-to-phase-out-fossil-fuel-subsidies-20090926-g6p1.html> accessed on 30 March 2010.

⁸⁰³ Article 1 (1) of the Agreement of the Subsidies and Countervailing Measures (ASCM).

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Under the ASCM only subsidies that are in line with specific enterprises and industries are covered.⁸⁰⁴ In addition the ASCM differs between three categories of subsidies:

- i. prohibited subsidies
- ii. actionable subsidies
- iii. non-actionable subsidies.⁸⁰⁵

Prohibited subsidies are export subsidies and competitive adulterant subsidies.⁸⁰⁶ If the subsidy is prohibited then it is deemed to be automatically specific to an enterprise.⁸⁰⁷ A subsidy is actionable if it causes ‘adverse effects’ to the interests of other member states. Actionable subsidies are not forbidden but are subject to challenge, either through multilateral dispute settlement or through countervailing action, in the event of causing adverse effects.⁸⁰⁸ There are three different types of adverse effects:⁸⁰⁹

- i. damages to a domestic industry caused by subsidised imports
- ii. serious prejudice, in general a result of adverse effects (for instance export displacements) in the market of the subsidising member state or a third country market
- iii. negation or impairment of GATT accumulated benefits, typically where subsidisation undercuts the improved market access presumed to flow from bound tariff reduction.⁸¹⁰

(In addition, a subsidy is non-actionable⁸¹¹ if it has been a general subsidy which has been open to public or non-specific subsidies, subsidies for industrial research, regional aids and some environmental subsidies.⁸¹²)

⁸⁰⁴ Article 1 (2) in conjunction with Article 2.

⁸⁰⁵ Note that since 1 January 2000, the category ‘non-actionable subsidies’ only contains non-specific subsidies.

⁸⁰⁶ Subsidies (such as allowances, benefits of interest, guarantees, among others) to an enterprise can adulterate competitiveness. An adulteration of competitiveness happens if the market conditions of the competitor have been changed artificially. A subsidy given to an individual enterprise, for example, allows it to lower its charges and thus improves its competitive position.

⁸⁰⁷ Article 2 (3).

⁸⁰⁸ WTO Agreement on Subsidies and Countervailing Measures [Online] http://www.wto.org/english/tratop_e/scm_e/subs_e.htm accessed on 22 February 2010.

⁸⁰⁹ *Ibid.*

⁸¹⁰ Bound tariff rates are the maximum rates which are allowed by WTO for any member state for imports from another member state.

⁸¹¹ The Agreement when it originally came into force, contained a third category — non-actionable subsidies. This category applied provisionally for five years, ending on 31 December 1999. Because of a lack of a consensus it was not extended. See: *Op cit*, Fn. 808.

⁸¹² Deardorf Deardorf's International Economic Glossary [Online] <http://www-personal.umich.edu/~alandear/glossary/n.html> accessed on 22 February 2010.

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Furthermore, to call a subsidy actionable it is required that the subsidy has to be specific to 'certain enterprises'. The term, 'certain enterprises', is not defined by ASCM other than as 'an enterprise or industry or group of enterprises or industries'.⁸¹³ However, Article 2 establishes principles that attempt to determine the specificity of a subsidy, as would be the case when authorities or legislation explicitly limits a subsidy to certain enterprises.⁸¹⁴ Specificity can be granted in jurisdictions where this is the case.⁸¹⁵ Specificity is not granted if 'objective criteria or conditions' regarding the eligibility and amount of subsidisation is established by the granting authorities or controlling legislation. This assumes automatic eligibility and strict adherence to the established policy, along with clear and official documentation. These criteria must be 'neutral' as far as they not favour certain enterprises and promote horizontal economic application, for instance in terms of enterprise size and number of employees.⁸¹⁶ Further to this, a subsidy can be found to be *de facto* specific, as would be the case when only a limited number of enterprises benefit from it, a disproportionately large percentage of the subsidy is granted to certain enterprises or the discretion used by the granting authority in relation to its documented policies in doubt.⁸¹⁷

8.3 Legal analysis of subsidies linked to energy or carbon taxes

When moving away from energy and carbon taxes to the subsidy problem there are some points to focus on: especially compensation measures and the question whether external costs do not have to be included in the cost burden of the enterprise because it could otherwise be called a subsidy.

External costs are a burden for the public and as such, when paid by the government, violate the 'polluter pays principle'. If the government does not implement regulations to internalise these costs, an indirect subsidy to the enterprise might be given, which utilises the resources (so-called environmental dumping). An example would be timber producers clearing woodlands without replanting, which could lead to flooding damage to private property. In this case the costs of re-establishing the plantation would be a public expense.⁸¹⁸ Had the

⁸¹³ Article 2 (1).

⁸¹⁴ *Green Trade rules and climate change subsidies* World Trade Review 2006 Vol. 5 No.3 pp. 377-414 (399).

⁸¹⁵ *Ibid.*

⁸¹⁶ *Ibid.*

⁸¹⁷ *Ibid.*

⁸¹⁸ Agarwal *Green Management* Aph Publishing Corporation New Delhi 2005 p. 27.

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timber producer been legally required to replant after harvesting, but the costs for doing so were indirectly recovered from government subsidies, this would effectively entail being financed by the same taxpayers who would otherwise have been the victim of floods.⁸¹⁹

The non-obligation of enterprises to pay compensation for damage constitutes a subsidy, since in general it is granted by the ‘polluter pays principle’ and the polluter pays. This subsidy does not comprise monetary payment to the polluter, but payment of compensation through tax revenue and thus contributes to the relief of the originator. Since no ‘financial contribution by a government or any public body’ is given, such indirect subsidy is not covered by ASCM or WTO regulations. It would be similar in the case of abandonment by government of debt benefits or allocation of goods. Such a subsidy would also not be specific and thus not actionable under WTO regulations.

Compensation would also be an indirect subsidy. This would be the case if the tax were paid back by reducing the social contribution. This pay-back system would support the service industries most as they would gain more by cutting social contributions than the amount they would lose by paying energy taxes. But already the classification under ASCM seems to be problematic. It does not concern a prohibited subsidy under ASCM Article 3f, as there is no benefit linked to the export. To fall under an actionable subsidy pursuant to Article 5ff, the interests of another member state have to be affected. This is the case if the industry of a member state were seriously damaged, prejudiced or jeopardised. A compensation measurement cannot be seen as a serious damage, jeopardy or prejudice. Furthermore, these measurements do not fulfil the criterion of specificity. To fulfil the criterion of specificity it is necessary that the subsidy has been specifically provided to the enterprise or industry or group of enterprises or industries.⁸²⁰ As this is not the case there would be no problem with a revenue neutral energy tax under the subsidy rules (which pays back the revenue by reducing the social contribution costs). Similarly there would be no problem for the abandonment of environmentally negative subventions or a per capita adjustment.

Another potential subsidy could be a governmental funding policy to increase the development and use of renewable energy sources and of goods with low carbon content and

⁸¹⁹ *Ibid.*

⁸²⁰ *Op cit*, Fn. 808.

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technologies; these incentives coming as direct grants for production, tax exemptions and guaranteed prices at above market rates.⁸²¹ Looking into these measures from an international trade perspective, such policies would lower the costs of manufacturing. In addition, countries which supported domestic energy-consuming industries with subsidies, to offset the cost of installing emission-reducing technologies, would consequently be helping them maintain international competitiveness. These subsidies need not necessarily be specifically provided to an enterprise or industry or group of enterprises or industries. As a consequence, financial incentives for renewable energy sources, such as wind power, solar energy or ethanol could be subsidised in order to mitigate the costs of renewable energy sources over those of fossil fuels.

Carbon ‘sinks’ which are used to take carbon out of the atmosphere are usually subsidised. For the ‘sinking’ they often use forests and agricultural lands. Such areas are subsidised by governments, especially in Canada, Belgium and the Czech Republic, as a supportive measure for the conservation of forests and farm land.⁸²² In the United States – Final Determination Softwood Lumber Case, the Appellate Body had to decide whether the United States had acted inconsistently with the Anti-Dumping Agreement by calculating margins of dumping on the basis of a methodology incorporating the practice of ‘zeroing’. In its decision it stated that the Canadian provincial government had provided a contribution to tree harvesters through their stumpage programme. According to the Appellate Body, standing timber is, contrary to the argument of Canada, ‘for the sole purpose of severing it from land and processing it’.⁸²³ Furthermore, it said that granting a right to harvest standing timber constitutes ‘providing’ the product. Accordingly, the use of land as sinks does not appear to constitute a financial contribution; whereas the exchange of land with harvestable trees, for a commitment concerning sinks could be seen as a financial contribution,⁸²⁴ but did not appear to have a beneficial aspect (only a worldwide public beneficial aspect which is not enough), which is necessary for it to come under the subsidy definition.

⁸²¹ Germany can be mentioned as an example, as it has a solar power production incentive, in which energy producers can receive a direct grant covering parts of the current premium for installing solar generation above other sources.

⁸²² UNFCCC *United Nations Framework Convention on Climate Change: The First Ten Years* Climate Change Secretariat Bonn 2004 p. 50 [Online] http://unfccc.int/resource/docs/publications/first_ten_years_en.pdf accessed on 10 April 2010.

⁸²³ Report of the Appellate Body *United States – Final Dumping Determination on Softwood Lumber from Canada* (WT/DS264/AB/R) 11 August 2004 para. 59.

⁸²⁴ *Op cit*, Fn. 814 p. 394.

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Investing tax revenue into research and development is a financial contribution whose benefits might be reaped solely by the party undertaking it.⁸²⁵ In the beginning of the introduction of energy taxes it was hoped that additional measures, such as funding as an incentive to increase scientific research could be avoided by implementing energy taxation and an ETS but that was a fallacy. The hope that industry would invest in developing low carbon productions did not occur as desired.

Accordingly, new funding is necessary for energy research. One example is the revitalised EU campaign to triple energy research funding (up to EUR eight billion annually) to compete with technology developments in Japan and the United States.⁸²⁶ In order for the European Union to attain its goal of reducing GHG's by 80% by 2050, more than EUR 50 billion in additional funding will be invested in researching energy technologies over the next decade.⁸²⁷ The campaign draft states that, 'we need to stimulate our best brains to push back the frontiers of science in materials, in chemistry and physics, in nanotechnology and biotechnology, to find new and better ways of producing and consuming energy'.⁸²⁸ This funding could contravene the ASCM, as an illegal subsidy. It is a financial contribution paid by the government and confers a benefit but it is not specifically provided to an enterprise or industry or group of enterprises or industries, as the research involves every sector where energy is used on the production and consumption side. But the classification under WTO law of every kind of subsidy which could be involved with climate change mitigation measures (for instance, grants and preferential loan rates for renewable energy and energy efficiency projects, preferential electricity tariffs for renewable energy, and tax relief including accelerated depreciation of capital and exemption from tax on electricity tariffs) would go beyond the scope of this thesis.

It is necessary to take a brief look at the research and development aspect of subsidisation, as it is one of the recommended designated revenue uses of an energy tax. It is certain that these subsidies for research and development concerning climate change and new technology are

⁸²⁵ *Ibid* p. 395.

⁸²⁶ EurActiv *Europe to triple funding for energy research* [Online] <http://www.euractiv.com/en/energy/europe-triple-funding-energy-research/article-186117> accessed on 22 February 2010.

⁸²⁷ *Ibid*.

⁸²⁸ *Ibid*.

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necessary, even if they are not as efficient at reducing emissions in the short-term as subsidising the decrease of fossil fuel energy sources and a reduction in energy use by consumers.⁸²⁹

Nonetheless, most of the subsidies in the global-warming mitigation area could be considered specific since they would be found disproportionately in particular areas, as it is with research and development in general (as they would not apply to the energy industry as a whole but to a sub-sector). On the other hand, if energy efficiency or emission reduction incentives were spread across all sectors, then the subsidies would be non-specific. But if a subsidy across all sectors was used mostly by a few industries then the subsidy could become *de facto* specific. (It is interesting that the subsidy would be specific for the few industries; if it was used by other industries as well, then it would be non-specific for the other industries). Research and development in the renewable energy field is not necessarily seen from the sub-energy-sector perspective as there are many different kinds of renewable energy, which means that the subsidy would be allocated between lots of sectors. However, this became unclear with the Softwood Lumber Panel decision which determined that the phrasing ‘certain enterprises’ referred to a ‘product type’ rather than any specific end product.⁸³⁰ Green mentions the idea that, ‘if governments can provide oil without it being considered specific because oil benefits many industries, the research and development subsidies to renewable energy could possibly be viewed as non-specific’.⁸³¹ But the definition, as well as the case law, as to ‘specificity’ is unclear. Nonetheless, research and development measures do not appear to be considered adversely effective as they would not be harmful to the domestic industry of another member state; impair the benefits of trade rules and climate change subsidies; constitute a tariff concession for another member state; or seriously prejudice the interests of another member state.

8.4 Conclusion

As seen above subsidies are already used in the energy sector and should be further used to motivate companies and individuals to invest in renewable energy as a relatively new sector. If there are doubts regarding conformity with WTO law, Article XX might help to clarify

⁸²⁹ Fischer and Newell *Environmental and Technology Policies for Climate Change and Renewable Energy* Discussion Paper 04-05 Resources for the Future Washington DC April 2004 p. 30f.

⁸³⁰ *Op cit*, Fn. 814 p. 401.

⁸³¹ *Ibid*.

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these. Otherwise, subsidies and energy taxation could work hand in hand to achieve the aim of global carbon emission reduction as well as a structural revision of the use of fossil fuels.

Furthermore, it would be desirable if environmental measures, especially in the global warming mitigation field, could be stated as non-actionable subsidies in the ASCM regulations, with a similar arrangement as in the former one, which expired on 1 January 2000.

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9 Appendix No.8:

World Bank list of economies (September 2010)

	<i>Economy</i>	<i>Code</i>	<i>Region</i>	<i>Income group</i>	<i>Lending category</i>
1	Afghanistan	AFG	South Asia	Low income	IDA
2	Albania	ALB	Europe & Central Asia	Upper middle income	IBRD
3	Algeria	DZA	Middle East & North Africa	Upper middle income	IBRD
4	American Samoa	ASM	East Asia & Pacific	Upper middle income	..
5	Andorra	ADO	..	High income: nonOECD	..
6	Angola	AGO	Sub-Saharan Africa	Lower middle income	IDA
7	Antigua and Barbuda	ATG	Latin America & Caribbean	Upper middle income	IBRD
8	Argentina	ARG	Latin America & Caribbean	Upper middle income	IBRD
9	Armenia	ARM	Europe & Central Asia	Lower middle income	Blend
10	Aruba	ABW	..	High income: nonOECD	..
11	Australia	AUS	..	High income: OECD	..
12	Austria	AUT	..	High income: OECD	..
13	Azerbaijan	AZE	Europe & Central Asia	Upper middle income	Blend
14	Bahamas, The	BHS	..	High income: nonOECD	..
15	Bahrain	BHR	..	High income: nonOECD	..
16	Bangladesh	BGD	South Asia	Low income	IDA
17	Barbados	BRB	..	High income: nonOECD	..
18	Belarus	BLR	Europe & Central Asia	Upper middle income	IBRD
19	Belgium	BEL	..	High income: OECD	..
20	Belize	BLZ	Latin America & Caribbean	Lower middle income	IBRD
21	Benin	BEN	Sub-Saharan Africa	Low income	IDA
22	Bermuda	BMU	..	High income: nonOECD	..
23	Bhutan	BTN	South Asia	Lower middle income	IDA
24	Bolivia	BOL	Latin America & Caribbean	Lower middle income	Blend
25	Bosnia and Herzegovina	BIH	Europe & Central Asia	Upper middle income	Blend
26	Botswana	BWA	Sub-Saharan Africa	Upper middle income	IBRD
27	Brazil	BRA	Latin America & Caribbean	Upper middle income	IBRD
28	Brunei Darussalam	BRN	..	High income: nonOECD	..
29	Bulgaria	BGR	Europe & Central Asia	Upper middle income	IBRD
30	Burkina Faso	BFA	Sub-Saharan Africa	Low income	IDA
31	Burundi	BDI	Sub-Saharan Africa	Low income	IDA
32	Cambodia	KHM	East Asia & Pacific	Low income	IDA
33	Cameroon	CMR	Sub-Saharan Africa	Lower middle income	IDA
34	Canada	CAN	..	High income: OECD	..
35	Cape Verde	CPV	Sub-Saharan Africa	Lower middle income	Blend
36	Cayman Islands	CYM	..	High income: nonOECD	..
37	Central African Republic	CAF	Sub-Saharan Africa	Low income	IDA
38	Chad	TCD	Sub-Saharan Africa	Low income	IDA
39	Channel Islands	CHI	..	High income: nonOECD	..
40	Chile	CHL	Latin America & Caribbean	Upper middle income	IBRD
41	China	CHN	East Asia & Pacific	Lower middle income	IBRD
42	Colombia	COL	Latin America & Caribbean	Upper middle income	IBRD
43	Comoros	COM	Sub-Saharan Africa	Low income	IDA
44	Congo, Dem. Rep.	ZAR	Sub-Saharan Africa	Low income	IDA
45	Congo, Rep.	COG	Sub-Saharan Africa	Lower middle income	IDA
46	Costa Rica	CRI	Latin America &	Upper middle income	IBRD

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47	Côte d'Ivoire	CIV	Caribbean	Lower middle income	IDA
48	Croatia	HRV	Sub-Saharan Africa	High income: nonOECD	IBRD
49	Cuba	CUB	..	Upper middle income	..
50	Cyprus	CYP	Latin America & Caribbean	High income: nonOECD	..
51	Czech Republic	CZE	..	High income: OECD	..
52	Denmark	DNK	..	High income: OECD	..
53	Djibouti	DJI	Middle East & North Africa	Lower middle income	IDA
54	Dominica	DMA	Latin America & Caribbean	Upper middle income	Blend
55	Dominican Republic	DOM	Latin America & Caribbean	Upper middle income	IBRD
56	Ecuador	ECU	Latin America & Caribbean	Lower middle income	IBRD
57	Egypt, Arab Rep.	EGY	Middle East & North Africa	Lower middle income	IBRD
58	El Salvador	SLV	Latin America & Caribbean	Lower middle income	IBRD
59	Equatorial Guinea	GNQ	..	High income: nonOECD	IBRD
60	Eritrea	ERI	Sub-Saharan Africa	Low income	IDA
61	Estonia	EST	..	High income: nonOECD	..
62	Ethiopia	ETH	Sub-Saharan Africa	Low income	IDA
63	Faeroe Islands	FRO	..	High income: nonOECD	..
64	Fiji	FJI	East Asia & Pacific	Upper middle income	IBRD
65	Finland	FIN	..	High income: OECD	..
66	France	FRA	..	High income: OECD	..
67	French Polynesia	PYF	..	High income: nonOECD	..
68	Gabon	GAB	Sub-Saharan Africa	Upper middle income	IBRD
69	Gambia, The	GMB	Sub-Saharan Africa	Low income	IDA
70	Georgia	GEO	Europe & Central Asia	Lower middle income	Blend
71	Germany	DEU	..	High income: OECD	..
72	Ghana	GHA	Sub-Saharan Africa	Low income	IDA
73	Gibraltar	GIB	..	High income: nonOECD	..
74	Greece	GRC	..	High income: OECD	..
75	Greenland	GRL	..	High income: nonOECD	..
76	Grenada	GRD	Latin America & Caribbean	Upper middle income	Blend
77	Guam	GUM	..	High income: nonOECD	..
78	Guatemala	GTM	Latin America & Caribbean	Lower middle income	IBRD
79	Guinea	GIN	Sub-Saharan Africa	Low income	IDA
80	Guinea-Bissau	GNB	Sub-Saharan Africa	Low income	IDA
81	Guyana	GUY	Latin America & Caribbean	Lower middle income	IDA
82	Haiti	HTI	Latin America & Caribbean	Low income	IDA
83	Honduras	HND	Latin America & Caribbean	Lower middle income	IDA
84	Hong Kong SAR, China	HKG	..	High income: nonOECD	..
85	Hungary	HUN	..	High income: OECD	..
86	Iceland	ISL	..	High income: OECD	..
87	India	IND	South Asia	Lower middle income	Blend
88	Indonesia	IDN	East Asia & Pacific	Lower middle income	IBRD
89	Iran, Islamic Rep.	IRN	Middle East & North Africa	Upper middle income	IBRD
90	Iraq	IRQ	Middle East & North Africa	Lower middle income	IBRD
91	Ireland	IRL	..	High income: OECD	..
92	Isle of Man	IMY	..	High income: nonOECD	..
93	Israel	ISR	..	High income: OECD	..
94	Italy	ITA	..	High income: OECD	..
95	Jamaica	JAM	Latin America & Caribbean	Upper middle income	IBRD
96	Japan	JPN	..	High income: OECD	..
97	Jordan	JOR	Middle East & North Africa	Lower middle income	IBRD

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98	Kazakhstan	KAZ	Europe & Central Asia	Upper middle income	IBRD
99	Kenya	KEN	Sub-Saharan Africa	Low income	IDA
100	Kiribati	KIR	East Asia & Pacific	Lower middle income	IDA
101	Korea, Dem. Rep.	PRK	East Asia & Pacific	Low income	..
102	Korea, Rep.	KOR	..	High income: OECD	IBRD
103	Kosovo	KSV	Europe & Central Asia	Lower middle income	IDA
104	Kuwait	KWT	..	High income: nonOECD	..
105	Kyrgyz Republic	KGZ	Europe & Central Asia	Low income	IDA
106	Lao PDR	LAO	East Asia & Pacific	Low income	IDA
107	Latvia	LVA	..	High income: nonOECD	..
108	Lebanon	LBN	Middle East & North Africa	Upper middle income	IBRD
109	Lesotho	LSO	Sub-Saharan Africa	Lower middle income	IDA
110	Liberia	LBR	Sub-Saharan Africa	Low income	IDA
111	Libya	LBY	Middle East & North Africa	Upper middle income	IBRD
112	Liechtenstein	LIE	..	High income: nonOECD	..
113	Lithuania	LTU	Europe & Central Asia	Upper middle income	..
114	Luxembourg	LUX	..	High income: OECD	..
115	Macao SAR, China	MAC	..	High income: nonOECD	..
116	Macedonia, FYR	MKD	Europe & Central Asia	Upper middle income	IBRD
117	Madagascar	MDG	Sub-Saharan Africa	Low income	IDA
118	Malawi	MWI	Sub-Saharan Africa	Low income	IDA
119	Malaysia	MYS	East Asia & Pacific	Upper middle income	IBRD
120	Maldives	MDV	South Asia	Lower middle income	IDA
121	Mali	MLI	Sub-Saharan Africa	Low income	IDA
122	Malta	MLT	..	High income: nonOECD	..
123	Marshall Islands	MHL	East Asia & Pacific	Lower middle income	IBRD
124	Mauritania	MRT	Sub-Saharan Africa	Low income	IDA
125	Mauritius	MUS	Sub-Saharan Africa	Upper middle income	IBRD
126	Mayotte	MYT	Sub-Saharan Africa	Upper middle income	..
127	Mexico	MEX	Latin America & Caribbean	Upper middle income	IBRD
128	Micronesia, Fed. Sts.	FSM	East Asia & Pacific	Lower middle income	IBRD
129	Moldova	MDA	Europe & Central Asia	Lower middle income	IDA
130	Monaco	MCO	..	High income: nonOECD	..
131	Mongolia	MNG	East Asia & Pacific	Lower middle income	IDA
132	Montenegro	MNE	Europe & Central Asia	Upper middle income	IBRD
133	Morocco	MAR	Middle East & North Africa	Lower middle income	IBRD
134	Mozambique	MOZ	Sub-Saharan Africa	Low income	IDA
135	Myanmar	MMR	East Asia & Pacific	Low income	IDA
136	Namibia	NAM	Sub-Saharan Africa	Upper middle income	IBRD
137	Nepal	NPL	South Asia	Low income	IDA
138	Netherlands	NLD	..	High income: OECD	..
139	Netherlands Antilles	ANT	..	High income: nonOECD	..
140	New Caledonia	NCL	..	High income: nonOECD	..
141	New Zealand	NZL	..	High income: OECD	..
142	Nicaragua	NIC	Latin America & Caribbean	Lower middle income	IDA
143	Niger	NER	Sub-Saharan Africa	Low income	IDA
144	Nigeria	NGA	Sub-Saharan Africa	Lower middle income	IDA
145	Northern Mariana Islands	MNP	..	High income: nonOECD	..
146	Norway	NOR	..	High income: OECD	..
147	Oman	OMN	..	High income: nonOECD	..
148	Pakistan	PAK	South Asia	Lower middle income	Blend
149	Palau	PLW	East Asia & Pacific	Upper middle income	IBRD
150	Panama	PAN	Latin America & Caribbean	Upper middle income	IBRD
151	Papua New Guinea	PNG	East Asia & Pacific	Lower middle income	Blend
152	Paraguay	PRY	Latin America & Caribbean	Lower middle income	IBRD
153	Peru	PER	Latin America & Caribbean	Upper middle income	IBRD

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154	Philippines	PHL	East Asia & Pacific	Lower middle income	IBRD
155	Poland	POL	..	High income: OECD	IBRD
156	Portugal	PRT	..	High income: OECD	..
157	Puerto Rico	PRI	..	High income: nonOECD	..
158	Qatar	QAT	..	High income: nonOECD	..
159	Romania	ROM	Europe & Central Asia	Upper middle income	IBRD
160	Russian Federation	RUS	Europe & Central Asia	Upper middle income	IBRD
161	Rwanda	RWA	Sub-Saharan Africa	Low income	IDA
162	Samoa	WSM	East Asia & Pacific	Lower middle income	IDA
163	San Marino	SMR	..	High income: nonOECD	..
164	São Tomé and Príncipe	STP	Sub-Saharan Africa	Lower middle income	IDA
165	Saudi Arabia	SAU	..	High income: nonOECD	..
166	Senegal	SEN	Sub-Saharan Africa	Lower middle income	IDA
167	Serbia	SRB	Europe & Central Asia	Upper middle income	IBRD
168	Seychelles	SYC	Sub-Saharan Africa	Upper middle income	IBRD
169	Sierra Leone	SLE	Sub-Saharan Africa	Low income	IDA
170	Singapore	SGP	..	High income: nonOECD	..
171	Slovak Republic	SVK	..	High income: OECD	..
172	Slovenia	SVN	..	High income: OECD	..
173	Solomon Islands	SLB	East Asia & Pacific	Low income	IDA
174	Somalia	SOM	Sub-Saharan Africa	Low income	IDA
175	South Africa	ZAF	Sub-Saharan Africa	Upper middle income	IBRD
176	Spain	ESP	..	High income: OECD	..
177	Sri Lanka	LKA	South Asia	Lower middle income	IDA
178	St. Kitts and Nevis	KNA	Latin America & Caribbean	Upper middle income	IBRD
179	St. Lucia	LCA	Latin America & Caribbean	Upper middle income	Blend
180	St. Vincent and the Grenadines	VCT	Latin America & Caribbean	Upper middle income	Blend
181	Sudan	SDN	Sub-Saharan Africa	Lower middle income	IDA
182	Suriname	SUR	Latin America & Caribbean	Upper middle income	IBRD
183	Swaziland	SWZ	Sub-Saharan Africa	Lower middle income	IBRD
184	Sweden	SWE	..	High income: OECD	..
185	Switzerland	CHE	..	High income: OECD	..
186	Syrian Arab Republic	SYR	Middle East & North Africa	Lower middle income	IBRD
187	Tajikistan	TJK	Europe & Central Asia	Low income	IDA
188	Tanzania	TZA	Sub-Saharan Africa	Low income	IDA
189	Thailand	THA	East Asia & Pacific	Lower middle income	IBRD
190	Timor-Leste	TMP	East Asia & Pacific	Lower middle income	IDA
191	Togo	TGO	Sub-Saharan Africa	Low income	IDA
192	Tonga	TON	East Asia & Pacific	Lower middle income	IDA
193	Trinidad and Tobago	TTO	..	High income: nonOECD	IBRD
194	Tunisia	TUN	Middle East & North Africa	Lower middle income	IBRD
195	Turkey	TUR	Europe & Central Asia	Upper middle income	IBRD
196	Turkmenistan	TKM	Europe & Central Asia	Lower middle income	IBRD
197	Turks and Caicos Islands	TCA	..	High income: nonOECD	..
198	Tuvalu	TUV	East Asia & Pacific	Lower middle income	..
199	Uganda	UGA	Sub-Saharan Africa	Low income	IDA
200	Ukraine	UKR	Europe & Central Asia	Lower middle income	IBRD
201	United Arab Emirates	ARE	..	High income: nonOECD	..
202	United Kingdom	GBR	..	High income: OECD	..
203	United States	USA	..	High income: OECD	..
204	Uruguay	URY	Latin America & Caribbean	Upper middle income	IBRD
205	Uzbekistan	UZB	Europe & Central Asia	Lower middle income	Blend
206	Vanuatu	VUT	East Asia & Pacific	Lower middle income	IDA
207	Venezuela, RB	VEN	Latin America & Caribbean	Upper middle income	IBRD
208	Vietnam	VNM	East Asia & Pacific	Lower middle income	Blend
209	Virgin Islands (U.S.)	VIR	..	High income: nonOECD	..

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210	West Bank and Gaza	WBG	Middle East & North Africa	Lower middle income	..
211	Yemen, Rep.	YEM	Middle East & North Africa	Lower middle income	IDA
212	Zambia	ZMB	Sub-Saharan Africa	Low income	IDA
213	Zimbabwe	ZWE	Sub-Saharan Africa	Low income	Blend
1	World	WLD			
2	Low income	LIC			
3	Middle income	MIC			
4	Lower middle income	LMC			
5	Upper middle income	UMC			
6	Low & middle income	LMY			
7	East Asia & Pacific	EAP			
8	Europe & Central Asia	ECA			
9	Latin America & Caribbean	LAC			
10	Middle East & North Africa	MNA			
11	South Asia	SAS			
12	Sub-Saharan Africa	SSA			
13	High income	HIC			
14	Euro area	EMU			
15	High income: OECD	OEC			
16	High income: nonOECD	NOC			
17	Arab League states	ARB			

Source for table and for the following comments can be found at the World Bank's homepage to download at: <http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20420458~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html> accessed on 10 October 2010

'This table classifies all World Bank member economies, and all other economies with populations of more than 30,000. For operational and analytical purposes, economies are divided among income groups according to 2009 gross national income (GNI) per capita, calculated using the World Bank Atlas method. The groups are: low income, USD995 or less; lower middle income, USD996–3,945; upper middle income, USD3,946–12,195; and high income, USD12,196 or more. Other analytical groups based on geographic regions are also used.

Geographic classifications and data reported for geographic regions are for low-income and middle-income economies only. Low-income and middle-income economies are sometimes referred to as developing economies. The use of the term is convenient; it is not intended to imply that all economies in the group are experiencing similar development or that other economies have reached a preferred or final stage of development. Classification by income does not necessarily reflect development status.

Lending category: IDA countries are those that had a per capita income in 2009 of less than USD1,165 and lack the financial ability to borrow from IBRD. IDA loans are deeply concessional—interest-free loans and grants for programs aimed at boosting economic growth and improving living conditions. IBRD loans are nonconcessional. Blend countries are eligible for IDA loans because of their low per capita incomes but are also eligible for IBRD loans because they are financially creditworthy.' (The World Bank's homepage can be downloaded

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at:

<http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20420458~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html>

accessed on 10 October 2010)

Note: Income classifications were in effect until 1 July 2011.

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VIII Bibliography

Legislation:

- Bundesgesetz vom 8. Oktober 1999 über die Reduktion der CO₂-Emissionen (CO₂-Gesetz)
- **Bundesministerium für Finanzen** *Gesetz zum Einstieg in die ökologische Steuerreform; Gesetz zur Fortführung der ökologischen Steuerreform*
- *Byrd-Hagel Resolution* [Online] <http://www.nationalcenter.org/KyotoSenate.html> accessed on 10 March 2010
- **Council of the European Economic Community** *First Council Directive on Harmonization of Member State Laws on Turnover Taxes—Introduction of the Value-Added Tax in Member State* No. 69/463/EEC (1969)
- **Council of the European Economic Community** *First Council Directive on Harmonisation of Member State Laws on Turnover Taxes* No. 67/227/EEC (1967)
- **Council of the European Economic Community** *First Council Directive on Harmonisation of Member State Laws on Turnover Taxes-Introduction of the Value-Added Tax in Member State* No. 69/463/EEC (1969)
- **GATT Consolidated Document on the Examination of Practices of Contracting Parties in Relation to Border Tax Adjustments** Restricted Document (L/3389) 6 May 1970
- **GATT Subsidies Code and Subsidies Code Annex** BISD 26S/56-83 Geneva GATT Secretariat 1980
- German Umsatzsteuergesetz of 21 February 2005
- **Inglis** Carbon Tax bill H.R. 2380 “Raise Wages, Cut Carbon” Act of 2009
- **Larson** Carbon Tax bill H.R. 1337 ‘America’s Energy Security Trust Fund Act of 2009’ (3/5/09)
- Law 9/2005 of December 29, Tax Measures on taxes and ceded taxes in 2006 (BORM Supplement No. 3 No. 301 of December 31, 2005). (The tax to develop this law was created by Article 45 of Law 1/1995 of March 8, Environmental Protection Agency of Murcia - 3/04/1995 BORM-changed by the additional provision fifth of Law 8/2004 of December 28, from administrative, tax rates and public service - BORM 30/12/2004)
- The Law for the Continuation of the Ecological Tax Reform
- Ley 1/1995, 8 de marzo: ‘canon por vertido de residuos’; ‘canon por emisión de gases contaminantes a la atmósfera’; ‘canon por vertidos al mar’ (modificado por la Ley 8/2004, de 24 de diciembre)
- Ley 11/2000, 26 de diciembre: ‘actividades cuyas instalaciones emiten a la atmósfera dióxido de azufre, dióxido de nitrógeno o cualquier otro compuesto oxigenado del azufre o del nitrógeno’; ‘producción termonuclear de energía eléctrica’; ‘almacenamiento de residuos radioactivos’
- Ley 12/1995, de 29 de diciembre: “emisión a la atmósfera de cualquiera de las siguientes sustancias: a) dióxido de azufre o cualquier otro compuesto oxigenado de azufre. B) dióxido de nitrógeno o cualquier otro compuesto oxigenado del nitrógeno”
- Ley 13/2005, de 30 de diciembre, de Medidas Fiscales y Administrativa en materia de Tributos Cedidos y Tributos Propios de la Comunidad Autónoma de Aragón(B.O.A. no 154, de 31 de diciembre de 2005)

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- Ley 18/2003, de Medidas Fiscales y Administrativas, en el Decreto 503/2004, de 13 de octubre, port el que se regulan determinados aspectos para la aplicación de los Impuestos sobre emission de gases a la atmósfera y sobre vertidos a las aguas litorales y en las Ordenes de desarrollo de 22 de octubre de 2004, por las que se aprueban los modelos de pago fraccionado a cuneta y de declaración-liquidación anual
 - Ley 18/2003: ‘la emisión a la atmósfera de dióxido de carbono, óxidos de nitrógeno u óxidos de azufre que se realice desde las instalaciones a las que se refiere el artículo 22...’
 - *Proposal for a Council Directive Restructuring the Community Framework for the Taxation of Energy Products* COM (97) 30 of 12.3.1997
 - **Stark** Carbon Tax bill H.R. 594 “Save Our climate Act of 2009” (1/15/09)
 - The Council Directive 2003/96/EC of 27 October 2003 *Restructuring the Community framework for the taxation of energy products and electricity*
 - *The Johannesburg Declaration on Sustainable Development* UN Document (A/CONF.1999/L.6/Rev.3) 4 September 2002
 - *The Proposal of a Council Directive Introducing a Tax on Carbon Dioxide Emissions and Energy* COM (92) 226 of 30.6.1992
 - **UNFCCC** *Kyoto Protocol* [Online] http://unfccc.int/kyoto_protocol/items/2830.php accessed on 22 February 2010
 - Verordnung über die CO₂-Abgabe (CO₂-Verordnung) vom 8. Juni 2007
 - *Vienna Convention on the Law of Treaties 1969* [Online] http://untreaty.un.org/ilc/texts/instruments/english/conventions/1_1_1969.pdf accessed on 10 March 2010
 - **WTO** *1994 Understanding on Rules and Procedures Governing the Settlement of Disputes* [Online] http://www.wto.org/english/tratop_e/dispu_e/dsu_e.htm#22 accessed on 10 March 2010

Reports and Working Papers:

- **Aldy, Joseph E. and Robert N. Stavins** *Designing the Post-Kyoto Climate Regime: Lessons from the Harvard Project on International Climate Agreements An Interim Progress Report for the 14th Conference of the Parties, Framework Convention on Climate Change* Poznan 2008
- **American Association of Insurance Services (AAIS)** *Viewpoint American Association of Insurance Services* 2005 p. 10 [Online] <http://www.aaisonline.com/viewpoint/AAISviewpointSp05.pdf> accessed on 25 March 2010
- **Australian Government** *Energy White Paper National Energy Policy - Framework 2030 Strategic Directions Paper* Department of Resources, Energy and Tourism Canberra March 2009
- **Australian Government Productivity Commission** *Productivity Commission Submission to the Prime Ministerial Task Group on Emissions Trading* Productivity Commission Melbourne 2007 [Online] http://www.pc.gov.au/_data/assets/pdf_file/0012/61104/emissionstrading.pdf accessed on 10 March 2010
- **Australian Government Productivity Commission** *Productivity Commission Submission to the Prime Ministerial Task Group on Emissions Trading* Productivity Commission Melbourne 2007 pp. 65–66 [Online]

by Nadia Kamm

University of Cape Town, South Africa

http://www.pc.gov.au/_data/assets/pdf_file/0012/61104/emissionstrading.pdf
accessed on 10 March 2010

- **Ayukawa, Yurika** *Japanese Policy on Climate Change: Adaptation and its complexity* April 2009 http://www.nautilus.org/projects/cc-workshops/seoul/workshop-papers/Japanese_Policy_on_Climate_Change.pdf/view accessed on 26 April 2010
- **Biermann, Frank with Frédéric Böhm, Rainer Brohm, Susanne Dröge, and Harald Trabold** *Verursacherprinzip - WTO-Recht und ausgewählte Instrumente* Umweltbundesamt Berlin December 1993
- **Bjørner, Thomas .B. and Henrik H. Jensen** *Industrial Energy Demand and the Effects of Taxes, Agreements and Subsidies* AKF forlag Copenhagen January 2000 [Online] http://www.akf.dk/udgivelser/2000/pdf/industrial_energy_demand.pdf accessed on 10 April 2010
- **Blanford, Geoffrey J. with Richard G. Richels and Thomas F. Rutherford** *Revised Emissions Growth Projections for China: Why Post-Kyoto Climate Policy Must Look East* Discussion Paper 08-06 Harvard Project on International Climate Agreements, Belfer Center for Science and International Affairs Harvard Kennedy School September 2008
- **Boyce, James with Matthew Riddle and Mark D. Brenner** *A Chinese Sky Trust? Distributional impacts of Carbon charges and Revenue Recycling in China* Working Papers Political Economy Research Institute University of Massachusetts at Amherst 2005
- **Cambridge Econometrics, University of Cambridge and Policy Studies Institute** *Modelling the Initial Effects of the Climate Levy* Cambridge 2005
- **Cao, Jing** *Reconciling Human Development and Climate Protection* Discussion Paper 08-25, Cambridge, Mass.: Harvard Project on International Climate Agreements November 2008
- **Chetty, Raj with Adam Looney and Kory Kroft** *Salience and Taxation: Theory and Evidence* August 2008
- **Chronic Poverty Research Centre** *The Chronic Poverty Report 2008-09* [Online] <http://www.chronicpoverty.org/publications/details/the-chronic-poverty-report-2008-09> accessed on 22 February 2010
- **CISDL** *The Principle of Common But Differentiated Responsibilities: Origins and Scope* a CISDL Legal Brief for the World Summit on Sustainable Development Johannesburg 2002 [Online] http://www.cisdl.org/pdf/brief_common.pdf accessed on 25 March 2010
- **Congress of the United States Congressional Budget Office** *A CBO study - Policy Options for Reducing CO₂ Emissions* The Congress of the United States 2008
- **Cooper, Richard N.** *The Case for Charges on Greenhouse Gas Emissions* Harvard Project on International Climate Agreements Discussion Paper 08-10 Cambridge Massachusetts October 2008
- **Corong, Erwin L.** *Economic and Poverty Impacts of a Voluntary Carbon Reduction for a Small Liberalized Developing Economy: The case of the Philippines* Fondazione Eni Enrico Mattei Working Paper#83 Milano 9 February 2007
- **Cosbey, Aaron** *Border Carbon Adjustment* a paper for Seminar on Trade and Climate Change June 2008 Copenhagen published August 2008
- **Cullen, Dr Michael and Pete Hodgson** *Implementing the carbon tax - A Governmental consultation paper* published by the Policy Advice Division of the Inland Revenue Department Wellington May 2005

by Nadia Kamm

University of Cape Town, South Africa

-
- Danish Government (edt) *A Presentation of the Danish Energy Package – Green Taxes* Copenhagen 1995
 - **Danish Ministry of Finance**(edt) *Energy Tax on Industry in Denmark* Copenhagen 1995
 - **De Moor, André and Peter Calamai** *Subsidizing Unsustainable Development* Earth Council Toronto 1997
 - **Demailly, Damien and Philippe Quirion** *Leakage from climate policies and border tax adjustment: lessons from a geographic model of the cement industry* HAL working papers No. halshs-00009337_v1 28 February 2006
 - **Department of Environmental Affairs and Tourism** *State of Air Report 2005 – A report on the state of the air in South Africa* Pretoria 2009 [Online] <http://soer.deat.gov.za/newsDetailPage.aspx?m=66&amid=6024> accessed on 10 April 2010
 - *Energy emissions: A modelling input into the Long Term Mitigation Scenarios process* Prepared by the Energy Research Centre for Department of Environment Affairs and Tourism Pretoria October 2007 [Online] <http://www.erc.uct.ac.za/Research/LTMS/LTMS-intro.htm> accessed on 10 March 2010
 - **European Environment Agency** *Market-based instruments for environmental policy in Europe* EEA Technical Report 8/2005 Copenhagen 2005
 - **European Environmental Agency** *Greenhouse gas emission trends and projections in Europe 2008* EEA Report No. 5/2008 [Online] http://www.eea.europa.eu/publications/eea_report_2008_5/Trends_and_projections_2008_executive_summary.pdf accessed on 10 April 2010
 - **European Environmental Agency** *Greenhouse trends and projections in Denmark* [Online] <http://www.eea.europa.eu/themes/climate/ghg-country-profiles/tp-report-country-profiles/denmark-greenhouse-gas-profile-summary-1990-2020.pdf> accessed on 10 April 2010
 - **Finansministeriet** ‘Evaluering af grønne afgifter og erhvervene’ Finansministeriet København februar 1999 [Online] <http://www.fm.dk/db/filarkiv/4620/hele.pdf> accessed on 4 March 2010
 - **Fischer, Carolyn and Richard Newell** *Environmental and Technology Policies for Climate Change and Renewable Energy* Discussion Paper 04-05 Resources for the Future Washington DC April 2004
 - **French, Hilary F.** *Clearing the Air: A Global Agenda* working paper#94 Worldwatch Institute Washington DC 1990
 - **GATT** *Border Tax Adjustments – Report of the Working Party adopted on 2 December 1970 (L/3464)* Working Party of GATT [Online] <http://www.worldtradelaw.net/reports/gattpanels/bordertax.pdf> accessed on 4 March 2010
 - **GATT** *Draft Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations (MTN.TNC/W/FA)* by the GATT Secretariat Geneva 20 December 1991. It was named by its chairman Arthur Dunkel
 - **GATT** *Draft Guidelines on Physical Incorporation* Document SCM/W/74 Rev.1 of 26 April 1985 [Online] http://www.wto.org/gatt_docs/English/SULPDF/91130156.pdf accessed on 10 April 2010
 - **GATT** *Minutes of the Meeting held on 3 June 1987* Document SCM/M/34/Corr.1 of 5 August 1987 [Online] http://www.wto.org/gatt_docs/English/SULPDF/91290140.pdf accessed on 10 April 2010

by Nadia Kamm

University of Cape Town, South Africa

-
- **GATT News and Views from the General Agreement on Tariffs and Trade - [Trade and Environment] - Work Starts on Environmental Charges, Taxes and Product Requirements - Consultations Planned on Exports of Domestically Prohibited Goods and Possible WTO Relation with other Organizations** Document TE 010 [Online] http://www.wto.org/gatt_docs/English/SULPDF/91810176.pdf accessed on 10 March 2010
 - **Global Utmaning Carbon taxation - a forgotten climate policy tool?** Global Utmaning Stockholm 2009
 - **Goulder, Lawrence H.** *China's Pollution Levy System Theoretical Capabilities and Practical Challenges* Stanford 2005
 - **Government of Denmark** *Denmark commits to overall energy reduction* fact sheet energy policy published by Ministry of Foreign Affairs of Denmark Copenhagen April 2008 [Online] <http://www.denmark.dk/NR/rdonlyres/3E7A0904-D320-4171-BE84-149EAF91334/0/FactSheetEnergyPolicy20082011.pdf> accessed on 10 April 2010
 - **Hargrave, Tim** *An Upstream/Downstream Hybrid Approach to Greenhouse Gas Emissions Trading* Center for Clean Air Policy USA 2000
 - **Hoerner, J. Andrew and Benoît Bosquet** *Environmental Tax Reform: The European Experience* Center for Sustainable Economy Washington February 2001 [Online] http://www.rprogress.org/publications/2001/eurosurvey_2001.pdf accessed on 30 June 2010
 - **Hoerner, J. Andrew and Frank Muller** *Carbon taxes for Climate Protection in a Competitive World* A paper prepared for the Swiss Federal Office for Foreign Economic Affairs by the Environmental Tax Program of the Center for Global Change University of Maryland College Park June 1996
 - **Hoerner, J. Andrew** *The Role of Border Tax Adjustments in Environmental Taxation: Theory and U.S. Experience* Working paper presented at the International Workshop on Market Based Instruments and International Trade of the Institute for Environmental Studies Amsterdam 19 March 1998
 - **Hughes, A. with M. Haw, H. Winkler, A. Marquard, and B. Merven** *Energy emissions: A modelling input into the Long Term Mitigation Scenarios process* Prepared by the Energy Research Centre for Department of Environment Affairs and Tourism Pretoria October 2007 [Online] <http://www.erc.uct.ac.za/Research/LTMS/LTMS-intro.htm> accessed on 10 March 2010
 - **Humphreys, John** *Exploring a Carbon Tax for Australia Perspectives on Tax Reform* CIS Policy Monograph Perspective on Tax Reform No.#14 St. Leonards October 2007
 - **Intergovernmental Panel on Climate Change (IPCC)** *Intergovernmental Panel on Climate Change (IPCC) Climate Change 2007: Synthesis Report Assessment of the Intergovernmental Panel on Climate Change* Abdelkader Allali, Roxana Bojariu, Sandra Diaz, Ismail Elgizouli, Dave Griggs, David Hawkins, Olav Hohmeyer, Bubu Pateh Jallow, Lucka Kajfez-Bogataj, Neil Leary, Hoesung Lee and David Wratt (eds.) Cambridge University Press Cambridge and New York 2007
 - **International Energy Agency** *Key World Energy Statistics 2009* Paris 2009
 - **International Energy Agency** *Key World Energy Statistics from the IEA 2001* Paris 2001
 - **Jacoby, Henry D. with Mustafa H. Babiker, Sergey Paltsev and John M. Reilly** *Sharing the Burden of GHG Reductions* Discussion Paper 08-09, Cambridge, Mass.: Harvard Project on International Climate Agreements October 2008

by Nadia Kamm

University of Cape Town, South Africa

-
- **Kaufmann, Daniel with Aart Kraay and Massimo Mastruzzi** *Governance Matters III: Governance Indicators for 1996-2002* World Bank Policy Research Working Paper 3106 Washington 30 June 2003
 - **Klemperer, Paul** *What is the top priority on Climate Change?* University of Oxford Discussion Paper No. 7141 January 2009
 - **Larsen, Bjorn and Anwar Shah** *World Fossil Fuel Subsidies and Global Carbon Emissions* World Bank Policy Research Working Paper No. 1002 Report Washington 1992
 - **Litman, Todd** *Carbon Taxes 'Tax What You Bum, Not What You Earn'* Victoria Transport Policy Institute 24 February 2010 [Online] <http://www.vtpi.org/carbontax.pdf> accessed 10 March 2010
 - **Manuel, Trevor A.** *Budget speech 2008* National Treasury Pretoria 20 February 2008 [Online] <http://www.treasury.gov.za/documents/national%20budget/2008/speech/speech.pdf> accessed on 10 March 2010
 - **Marshall, C.** *Economic Instruments and the Business Use of Energy* A Consultation Paper UK Treasury November 1998 [Online] <http://www.hm-treasury.gov.uk/d/EconomicInstruments.pdf> accessed on 10 April 2010
 - **Maribeth Gainard, Jane Messina Benoît and Martimort-Asso** *WTO's contribution to sustainable development governance: balancing opportunities and threats* IDDRI Conference, Paris, 20 & 21 October 2005
 - **Marshall, Lord** *Economic Instruments and the Business Use of Energy: A Consultation Paper* UK Treasury 1998 [Online] <http://archive.treasury.gov.uk/pub/html/prebudgetNOV98/marshall.pdf> accessed 10 April 2010
 - **Marsilla, Santiago Ibáñez** *Guide to Spanish Tax Law Research* [Online] <http://www.uv.es/ibanezs/SpanishTLRG.pdf> accessed on 10 March 2010
 - **McKibbin, Warwick and Peter Wilcoxon** 'A Credible Foundation for Long Term International Cooperation on Climate Change,' Working Papers *International Economics* issue 1 June 2006 [Online] <http://www.lowyinstitute.org/Publication.asp?pid=408> accessed on 4 March 2010
 - **Ministry for the Environment** *New Zealand's greenhouse-gas-inventory 1990-2008* Wellington New Zealand April 2010 [Online] <http://www.mfe.govt.nz/publications/climate/greenhouse-gas-inventory-2010/greenhouse-gas-inventory-2010.pdf> accessed on 22 April 2010
 - **Ministry of Environmental Protection** *Statement of Minister of Environmental Protection Gideon Ezra to the Knesset Plenum on July 22, 2008: Clean Air Law* [Online] http://www.environment.gov.il/Environment/Static/Binaries/News/Minister_on_clean_air_law_1.pdf accessed on 10 March 2010
 - **Mueller, Benito with Niklos Hoehne, and Christian Ellerman** *Differentiating (Historic) Responsibilities for Climate Change* Summary Report (2007) [Online] <http://www.oxfordclimatepolicy.org/publications/documents/DifferentiatingResponsibility.pdf> accessed on 10 April 2010
 - **Müller, Benito** *Equity in Climate Change: The great divide* Executive Summary Oxford Institute for Energy Studies and Shell Foundation 2002 [Online] http://www.oxfordclimatepolicy.org/publications/documents/The_Great_Divide-Executive_Summary.pdf accessed on 10 April 2010.

by Nadia Kamm

University of Cape Town, South Africa

-
- **National Museum of Australia** *Australia* [Online] http://www.nma.gov.au/exhibitions/past_exhibitions/extremes/australia/ accessed on 10 April 2010
 - **National Oceanic and Atmospheric Administration (NOAA)** *Astronomical Theory of Climate Change* [Online] <http://www.ncdc.noaa.gov/paleo/milankovitch.html> accessed on 22 February 2010
 - **National Research Council (NRC)** *Surface Temperature Reconstructions for the Last 2,000 Years* National Academy Press Washington DC 2006 [Online] http://nap.edu/openbook.php?record_id=11676&page=3 accessed on 7 October 2010
 - **National Treasury** *A framework for considering market-based instruments to support environmental fiscal reform in South Africa* draft policy paper National Treasury Tax Policy Chief Directorate Pretoria 2006 [Online] http://www.capeaction.org.za/uploads/Framework_for_enviro_fiscal_reform_Treasury_06.pdf accessed on 10 April 2010
 - **National Treasury** *A framework for considering market-based instruments to support environmental fiscal reform in South Africa* draft policy paper National Treasury Tax Policy Chief Directorate Pretoria 2006 [Online] http://www.capeaction.org.za/uploads/Framework_for_enviro_fiscal_reform_Treasury_06.pdf accessed on 10 April 2010
 - **Network of Heads of European Environment Protection Agencies** *The Contribution of Good Environmental Regulation to Competitiveness* Prague Nov. 2005
 - **NRC** *Abrupt Climate Change, Inevitable Surprises* report 2002 [Online] http://www.books.nap.edu/openbook.php?recort_id=10136&page=10 accessed on 25 March 2010
 - **OECD** *Climate Change, Economic Instruments and Income Distribution* OECD Paris 23 January 1996
 - **OECD** *Economic/Financial Instruments: Taxation (i.e. Carbon/Energy)* Annex I Expert Group on the United Nations Framework Convention on Climate Change Working Paper No. 4 OECD/GD(97)188 OECD Paris 1997
 - **OECD** *Environmental Taxes and Border Tax Adjustments* Environment Policy Committee and Committee on Fiscal Affairs Joint Sessions on Taxation and Environment 2nd session COM/ENV/EPOC/DAFFE/CFA(94)31 OECD Paris 1994
 - **OECD** *Report on Tax Adjustments Applied to Exports and Import on OECD Member Countries* Paris 1968
 - **OECD** *Taxation and the Environment: Complementary Policies* Paris 1993
 - **OECD** *The Political Economy of Environmentally related Taxes* OECD Paris 2006
 - **OECD** *The Political Economy of Environmentally Related Taxes* Policy Brief February 2007
 - **OECD** *Trade Principles and Concepts* OCDE/GD (95)141 Paris OECD 1995
 - **Pearson, M and S. Smith** *The European Carbon Tax: An Assessment of the European Commission's Proposals* The Institute for Fiscal Studies European Commission London 1991
 - **Peterson, Everett B. and Joachim Schleich** *Economic and environmental effects of border tax adjustments* Fraunhofer-Institute for Systems and Innovation Research in the series Working Paper Sustainable and Innovation No. S1/2007 Karlsruhe 2007
 - **Poterba, James M.** 'Is the Gasoline Tax regressive?' National Bureau of Economic Research (NBER) Working Papers No. 3578 *Tax Policy and the Economy* 1991 Vol. 5 pp. 145-164

by Nadia Kamm

University of Cape Town, South Africa

-
- **Ravallion, Martin and Shaohua Chen** *China is poorer than we thought, but no less successful in the fight against poverty* World Bank Policy Research Working Paper 4621 Washington DC Mai 2008
 - **Reinaud, Julia** Industrial competitiveness under the European Union Emissions Trading Scheme IEA information paper Paris February 2005
 - **Reinaud, Julia** *Issues behind Competitiveness and Carbon Leakages, Focus on Heavy Industry* IEA Information Paper OECD/IEA Paris October 2008
 - **Repetto, Robert C.** *Jobs, Competitiveness, and Environmental Regulations: What are the real issues?* World Resources Institute Washington DC 1995 with further references
 - **Rosenstock, Manfred** *Energy, Taxation Policy and Green Tax Reform Policy issues in the European Union: a viewpoint of the European Commission* UN-ECE/OECD workshop on enhancing the environment by reforming energy prices Průhonice near Prague 14 to 16 June 2000
 - **Ruddigkeit, Dana** *Border Tax Adjustment an der Schnittstelle von Welthandelsrecht und Klimaschutz vor dem Hintergrund des Europäischen Emissionszertifikatehandels* Institut für Wirtschaftsrecht Heft 89 Martin-Luther-Universität Halle-Wittenberg 2009
 - **Sander Johannsen, Katja and Anders Larsen** *Voluntary Agreements - Implementation and Efficiency* The Danish Country Study – Case Study in the Sector of Paper and Milk Condensing Copenhagen March 2000 [Online] http://www.akf.dk/vaie_en/papers/taskc_danish.pdf/ accessed on 22 February 2010
 - **Schwank, Othmar with Helen Lückge, Rolf Iten and Samuel Mauch** *Funding Scheme for Bali Action Plan – A Swiss Proposal for global solidarity in financing adaptation* Bali Paper updated for SB28 Bonn Federal Office for the Environment Berne 2008
 - **Schweizerische Eidgenossenschaft** *Faktenblatt 3 zur CO₂-Abgabe - Befreiung von der CO₂ Abgabe* Bundesamt für Umwelt (BAFU) 8 Juni 2007
 - **Seung-Joon, Park** *A Carbon Tax or an Environmental Tax Reform: Difficult Decision for Japan* The Eighth Global Conference on Environmental Taxation Munich 18-20 October 2007
 - **Shah, A and B. Larsen** *Carbon Taxes, the Greenhouse Effect, and Developing Countries* The World Bank Policy Research Working Paper Series 957 Washington 1992
 - **Singh, Gaurav** *India Says Per-Capita Emissions to Stay Below World Average* [Online] <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aOpKN3dUPWF8> accessed on 20 June 2010
 - **Slovenia** *Fourth National Communication under UNFCCC* 2006 <http://unfccc.int/resource/docs/natc/svnnc4.pdf> accessed on 10 March 2010
 - **Smith, S.** *“Green” Taxes and Charges: Policy and Practice in Britain and Germany* The Institute for Fiscal Studies London 1995
 - **Stern, Nicholas** *Stern Review executive summary* New Economics Foundation [Online] http://www.hm-treasury.gov.uk/media/4/3/Executive_Summary.pdf accessed on 25 March 2010
 - **Subak, Susan** *‘The case of Costa Rica’s carbon commodity’* Forest Trend Workshop Of the Natural Resources Defense Council Victoria BC 15 June 1999 [Online] http://www.forest-trends.org/~foresttr/documents/files/doc_688.pdf accessed on 22 February 2010

by Nadia Kamm

University of Cape Town, South Africa

-
- **Swedish Tax Agency** *Facts about Swedish Excise duties* 2008 [Online]
<http://www.skatteverket.se/download/18.233f91f71260075abe8800097301/10409.pdf?posid=1&sv.search.query.allwords=fact%20about%20swedish%20excise%20duties%202008> accessed on 10 March 2010
 - **Tamiotti, Ludivine with Robert Teh, Veslie Kulaçoğlu, Anne Olhoff, Benjamin Simmons and Hussein Abaza** *Trade and Climate Change WTO-UNEP Report* WTO-UNEP Report Geneva 2009
 - **Taviv, R with Wise, R, van der Merwe, M. and Winkler, H.** *The potential for, and costs of, reducing greenhouse gas emissions from non-energy sources in South Africa* University of Cape Town 2008
 - **Tiezzi, Silvia** *The welfare Effects of Carbon Taxation on Italian Households* Dipartimento di Economica Politica Università delgi Studi di Siena Working Paper No. 337 December 2001
 - **Tisdell, Clement A.** *Economics, Ecology and the Environment – Globalisation, WTO and Sustainable Development* Working Paper No. 46 The University of Queensland August 2000
 - **UNEP** *Climate Risk to global economy* Key findings of UNEP's Finance Initiatives study CEO briefing 2002 p.1 [Online]
http://www.unepfi.org/fileadmin/documents/CEO_briefing_climate_change_2002_en.pdf accessed on 25 March 2010
 - **UNEP** *Production and Consumption of Ozone Depleting Substances under the Montreal Protocol: 1986-2000* Ozone Secretariat UNEP Nairobi April 2002 [Online]
<http://www.unep.org/Ozone/pdfs/15-year-data-report.pdf> accessed 4 March 2010
 - **UNFCCC** *Copenhagen Accord* advance unedited version Decision-/CP.15 Copenhagen 18 December 2009 [Online]
http://unfccc.int/files/meetings/cop_15/application/pdf/cop15_cph_auv.pdf accessed on 10 March 2010
 - **UNFCCC** *United Nations Framework Convention on Climate Change: The First Ten Years* Climate Change Secretariat Bonn 2004 [Online]
http://unfccc.int/resource/docs/publications/first_ten_years_en.pdf accessed 10 April 2010
 - **United Nations Economic and Social Council** *Second Session on the Preparatory Committee of the United Nations Conference on Trade and Employment* (EPC/T/A/PV/9) 5 June 1947 pp. 18-19
 - **USCIB** *WTO Rules and Procedures and Their Implication for the Kyoto Protocol – A Background Paper* 11/2002 [Online]
<http://www.uscib.org/index.asp?DocumentID=2356> accessed on 20 March 2010
 - **USCIB** *WTO Rules and Procedures and Their Implication for the Kyoto Protocol – A Background Paper* 11/2002 [Online]
<http://www.uscib.org/index.asp?DocumentID=232> accessed on 20 March 2010
 - **Victor, David** 'Climate Accession Deals: New Strategies for Taming Growth of Greenhouse Gases in Developing Countries.' Discussion Paper 08-18, Cambridge, Mass.: Harvard Project on International Climate Agreements, November 2008
 - **Vojáček, Ondřej and Jaroslav Klusák** *Resource productivity, environmental tax reform and sustainable growth in Europe (pertE) Environmental tax reform: qualitative research in the Czech Republic* 2007
 - **Wang, Hua and David Wheeler** *Endogenous Enforcement and Effectiveness of China's Pollution Levy System* working paper Development Research Group World Bank 2005

by Nadia Kamm

University of Cape Town, South Africa

-
- **Winkler, Harald** (edt) *Long Term Mitigation Scenario - Technical Report* Department of Environmental Affairs and Tourism South Africa Pretoria October 2007
 - **Winkler, Harald and Andrew Marquard** *Analysis of the economic implications of a carbon tax* Energy Research Centre University of Cape Town February 2009
 - **Winkler, Harald and Andrew Marquard** *Energy development and climate change in South Africa: Decarbonising Growth in South Africa* for UNDP's Human Development Report 2007/2008 Occassional paper 2007/40
 - **Worldsteel Association** *Steel Statistical Yearbook 2009* worldsteel Committee on Economic Studies Brussels [Online]
<http://www.worldsteel.org/pictures/publicationfiles/Steel%20Statistical%20Yearbook%202009.pdf> accessed on 10 March 2010
 - **WTO-Committee on Trade and Environment** *Taxes and Charges for Environmental Purposes - Border Tax Adjustment* Note by the Secretariat 2 May 1997 WTO Document WT/CTE/W/47
 - **Yusuf, Arif Anshory and Budy P. Resosudarmo** *On the Distributional Effect of Carbon Tax in Developing Countries: The Case of Indonesia* Australian National University Economics and Environment Network Working Paper EEN0706 27 August 2007 [Online] http://een.anu.edu.au/download_files/een0706.pdf aessed on 4 March 2010

International Cases:

- **Report of the Appellate Body** *EC – Measures Concerning Meat and Meat Products (Hormones)* (WT/DS26/AB/R) 16 January 2008
- **Report of the Appellate Body** *European Communities – Measures Affecting Asbestos and Asbestos-Containing Products* (WT/DS135/AB/R) 12 March 2001 adpoted on 5 April 2001
- **Report of the Appellate Body** *Korea – Measures Affecting Imports of Fresh, Chilled and Frozen Beef.(Korea – Beef)*(WT/DS161/AB/R) and (WT/DS168/AB/R)11 December 2000
- **Report of the Appellate Body** *United States – Final Determination on Softwood Lumber from Canada* (WT/DS264/AB/R) 11 August 2004
- **Report of the Appellate Body** *United States – Import Prohibition of Certain Shrimp and Shrimp Products (Shrimp/Turtle)* (WT/DS58/AB/R) 12 October 1998 adopted on 6 November 1998
- **Report of the Appellate Body** *United States – Import Prohibition of Certain Shrimp and Shrimp Products – Recourse to Article 21.5 of the DSU by Malaysia* (WT/DS58/AB/RW) adopted 21 November 2001
- **Report of the Appellate Body** *United States - Standards for Reformulated and Conventional Gasoline (Gasoline)* (WT/DS2/AB/R) 29 April 1996
- **Report of the European Court of Justice** *Outokumpu Oy Reference for a preliminary ruling: Uudenmaan lääninoikeus – Finland Excise duty on electricity - Rates of duty varying according to the method of producing electricity of domestic origin - Flat rate for imported electricity* Case (C-213/96) I-01777 2 April 1998
- **Report of the Panel** *Argentina – Measures on the Export of Bovine Hides and the Import of Finished Leather (Argentina – Hides and Leather)* (WT/DS155/R) 19 December 2000 adopted 16 February 2001
- **Report of the Panel** *Brazil – Measures Affecting Imports of Retreaded Tyres* (WT/DS322/R)12 June 2007.

by Nadia Kamm

University of Cape Town, South Africa

-
- **Report of the Panel EEC – Regulations on Imports of Parts and Components** (Screwdriver Case) (L6657-37S/132) adopted on 16 May 1990
 - **Report of the Panel Japan – Customs Duties, Taxes and Labelling Practices on Imported Wines and Alcoholic Beverages** (L/6216 - 34S/83) 13 October 1987 adopted on 10 November 1987
 - **Report of the Panel Japan – Taxes on Alcoholic Beverages (Japan Alcohol Case)** (WT/DS8/R, WT/DS10/R, WT/DS11/R) 11 July 1996
 - **Report of the Panel Mexico – Taxes Measures on Soft Drinks and other Beverages** (WT/DS308/R) 7 October 2005 adopted on 24 March 2006.
 - **Report of the Panel United States – Import Prohibition of Certain Shrimp and Shrimp Products Recourse to Article 21.5 by Malaysia** (WT/DS58/RW) 15 June 2001
 - **Report of the Panel United States – Measures Affecting the Importation, Internal Sale and Use of Tobacco (Tobacco Case)** (DS44/R) 12 August 1994 adopted on 4 October 1994
 - **Report of the Panel United States - Restriction on Imports of Tuna (Tuna/Dolphin I)** (DS21/R – 39S/155) 3 September 1991
 - **Report of the Panel United States – Restriction on Imports of Tuna (Tuna/Dolphin II)** (DS29/R) 16 June 1994
 - **Report of the Panel United States - Standards for Reformulated and Conventional Gasoline** (WT/DS2/R) 29 January 1996
 - **Report of the Panel United States – Taxes on petroleum and certain imported substances (Superfund)** (L/6175 – 34S/136) 5 June 1987 adopted on 17 June 1987

Books:

- **Agarwal, S. K.** *Green Management* Aph Publishing Corporation New Delhi 2005
- **Bakker, Anuschka (edt)** *Tax on the Environment: A world of possibilities* IBFD Amsterdam April 2009
- **Barret, Scott** *Environmental and Statecraft* Oxford University Press February 2003
- **Birnie, Patricia and Alan Boyle** *International Law & the Environment* (2 ed) Oxford University Press 2002
- **Brack, Duncan with Michael Grubb and Craig Windram** *International Trade and Climate Change Policies* Earthscan London 2000
- **Brown, Lester Russell** *Eco-Economy: Building an Economy for the Earth* W.W. Norton & Company New York 2001
- **Common, Michael S. and Sigrid Stagl** *Ecological Economics: An introduction* Cambridge University Press 2005
- **Creedy, John and Catherine Sleeman** *The Distributional Effects of Indirect Taxes: Models and Applications from New Zealand* Edward Elgar Publishing Ltd. Cheltenham and Northampton 2006
- **Denmark** *Grønne agifter og erhvervene: midtvejsrapport, Embedsmandsudvalget om grønne afgifter og erhvervene* Finansministeriet April 1994
- **Fauchald, Ole Kristian** *Environmental Taxes and Trade Discrimination* Kluwer Law International London and Boston 1998
- **Garner, Bryan A.(edt)** *Black's Law Dictionary* 8th ed USA 2004
- **GATT Report of the Working Party on Border Tax Adjustments** GATT Basic Instruments and Selected Documents Volume 1- 42, Volume 18

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University of Cape Town, South Africa

-
- **House of Lords Select Committee on Economic Affairs** *The Economics of Climate Change Volume II: Evidence 2nd* Report of Session 2005-06 Authority of the House of Lords 2005
 - **Houser, Trevor with Rob Bradley, Britt Childs, Jacob Werksman and Robert Heilmayr** *Levelling the Carbon Playing Field: International Competition and US climate policy design* Peterson Institute for International Economics and World Resources Institute Washington DC 2008
 - **Jenzen, Holger** *Energiesteuern im nationalen und internationalen Recht: eine verfassungs-, europa- und welthandelsrechtliche Untersuchung* Peter Lang Verlagsgruppe Frankfurt am Main Berlin Bern New York Paris Wien 1998
 - **Köppl, Angela with Kurt Kratena, Claudia Pichl, Fritz Schebeck, Stefan Schleicher and Michael Wüger** *Makroökonomische und sektorale Auswirkungen einer umweltorientierten Energiebesteuerung in Österreich* Austrian Institute of Economic Research Wien 1995
 - **Kratena, Kurt** *Environmental Tax Reform and the Labour Market – The Double Dividend in Different Labour Market Regimes* Edwar Elger Ltd. Cheltenham 2002
 - **Leicester, Andrew** *The UK Tax System and the Environment* The Institute for Fiscal Studies London 2006
 - **Macrory, Patrick F.J. with Arthur E. Appleton and Michael G. Plummer** *The World Trade Organization: Legal; Economic and Political Analysis Volume 1* Springer New York 2005
 - **OECD** *Environmental Taxes in OECD countries* Washington and Paris 1995
 - **OECD** *Environmentally Related Taxes in OECD Countries, Issues and Strategies* OECD Paris 2001
 - **OECD** *Implementation Strategies for Environmental Taxes* Paris and Washington 1996
 - **OECD** *The Distributive Effects of Economic Instruments for Environmental Policy* Paris January 1994
 - **Pigou, Arthur Cecil** *Economics of Welfare* Cambridge 1920
 - **Roodman, David Malin** *Getting the Signal Right: Tax Reform to Protect the Environment and the Economy* Worldwatch Paper#134 Worldwatch Institute Washington 1997
 - **Roodman, David Malin** *The Natural Wealth of Nations: Harnessing The Market For The Environment* W.W. Norton & Company New York 1998
 - **Sands, Philippe** *Principles of International Environmental Law* (2 ed) Cambridge University Press 2003
 - **Stern, Nicholas** *The Economics of Climate Change – The Stern Review* Cambridge University Press 2007
 - **Williams, David W. with Geoffrey K. Morse, David Salter and Francis Ronald Davies** *Davies Principles of Tax Law* (3 ed) Thomson Sweet & Maxwell Andover 1996
 - **Winkler, Harald** *Cleaner energy, cooler climate: Developing sustainable energy solutions for South Africa* HSRC Press Cape Town 2009
 - **World Bank** *Expanding the Measure of Wealth: Indicators of Environmentally Sustainable Development* World Bank Washington 1997
 - **World Trade Organisation (WTO)** *Understanding the WTO* 4ed Lausanne 2008

by Nadia Kamm

University of Cape Town, South Africa

Chapters in Books:

- **Ashiabor, Hope with Patricia Blazey and Ben Connors** ‘The political economy of taxes and emissions trading in Australia’s climate change policies’ in Chalifour, Natalie with Janet E Milne, Hope Ashiabor, Kurt Deketelaere, and Larry Kreiser (edt) *Critical issues in environmental taxation international and comparative perspectives Volume V* Oxford University Press 2008 pp. 257-292
- **Bach, Stefan** ‘Ökologische Steuerreform in Deutschland’ Sven Rudolph and Sebastian Schmidt (edt) in *Der Markt im Klimaschutz* Metropolis Verlag Marburg 2009 pp. 19-47
- **Devine, Rachel and Ellison Rudd Watts** ‘New Zealand: Movement from Carbon Tax to Emissions Trading’ in *Environmental Taxes: A Global Perspective* London July 2008 pp. 70-71
- **Flavin, Christopher** ‘Wind Energy Growth Continues’ in Worldwatch Institute Vital Signs 2001 *The Trends that are Shaping Our Future* W.W. Norton & Company New York 2001 pp. 44-45
- **Godard, Oliver** ‘Taxes’ in Jean Charles Hourcade *International Economic Instruments and Climate Change* OECD Paris 1993 pp. 45-101
- **Haavisto** (Minister for the Environment) ,Energy Taxation in Finland‘ in: Bundestagsfraktion Bündnis90/Grünen (edt) *Eine Energiesteuerreform für Europa* Konferenzdokumentation vom 26.5.1997 Nr. 1370 Bonn pp. 32-34
- **Herrera, Pedro M.** ‘Legal Limits on the Competence of Governments in Spain’ in Milne, Janet with Kurt Deketelaere, Larry Kreiser and Hope Ashiabor *Critical Issues in Environmental Tax Vol. I International Comparative Persectives* Oxford University Press 2004 pp. 111-123
- **Hoerner, J. Andrew** ‘Taxing Pollution’ in Elizabeth Cook *Ozone Protection in the United States: Elements of Success* World Resources Institute Washington DC 1996 pp. 39-55
- **McKerchar, Margaret and Ann Hansford** ‘Climate Change Post-Kyoto: a tax policy perspective’ in Chalifour, Natalie with Janet E Milne, Hope Ashiabor, Kurt Deketelaere, and Larry Kreiser (edt) *Critical Issues in Environmnetal Taxation Vol. V* Oxford University Press 2008 pp. 855-871 (865)
- **Morotomi, Toru** ‘Environmental Taxation in Japan and a Proposal for a Mix of Policies’ Spain’ in Milne, Janet with Kurt Deketelaere, Larry Kreiser and Hope Ashiabor *Critical issues in environmental taxation Vol. I International Comparative Persectives* Oxford University Press 2004 pp. 289-307
- **Pearce, David** ‘The social cost of carbon’ in Helm (edt) *Climate-change Policy* Oxford University press 1995 pp. 99-133
- **Peng, Josephine and Leo Tsai** ‘Environmental and Energy Tax Reform in Taiwan: Seeking a Balance’ in B. Spicer *Environmental Taxes: A Global Perspective* London July 2008 pp. 77-78
- **Petersmann, Ernst-Ulrich** ‘International Trade Law and International Environmental Law: Environmental Taxes and Border Tax Adjustment in WTO Law and EU Law’ in Richard L. Revesz with Philippe Sands and Richard B. Stewart(edt) *Environmental Law, the Economy and Sustainable Development* Cambridge University Press 2000 pp. 127-156
- **Schlegelmilch, Kai and Maike Bunse** ‘Ecological Tax Reform and Emission Trading – Can they work together in Practice? An empirical Analysis for Germany’ in Chalifour, Natalie with Janet E Milne, Hope Ashiabor, Kurt Deketelaere, and Larry

by Nadia Kamm

University of Cape Town, South Africa

-
- Kreiser (edt) *Critical issues in environmental taxation international and comparative perspectives Volume V* Oxford University Press 2008 pp. 183-203
- **Soares, Claudia Dias** 'Energy and Taxation: Some critical implementation issues' in Kurt Deketeleare and Marjan Peeters (eds) *EU Climate Change Policy: The Challenge of New Regulatory Initiatives* Cheltenham Edward Elgar Ltd. 2006 pp. 256-275
 - **Toudou, Fumiaki** 'The Limits to Self-Restraint and Eco Efficiency: Proposed Application of Japanese Environmental Policy' in Chalifour, Natalie with Janet E Milne, Hope Ashiabor, Kurt Deketelaere, and Larry Kreiser (edt) *Critical issues in environmental taxation Vol. V* Oxford University Press 2008 pp. 783-802
 - **Wesner, Friederike** 'Die Energiepolitik Ostasiens, Bedarf, Ressourcen und Konflikte in globaler Perspektive' in Kristin Kupfer and Xuewu Gu (edt) *Die Energiepolitik Taiwans* Frankfurt New York Campus Verlag 2006 pp. 103-122

Articles in Journals:

- 'Report of the Working Group of Experts from the Member States on the Use of Economic and Fiscal Instruments in EC Environmental Policy' *Boston College International and Comparative Law Review* Vol. 14 issue 2 1991 pp. 447-480
- 'Scrubbing the skies' *The Economist Technology Quarterly* 7 March 2009
- **Andrew, J.** 'Green Taxes – Why, What, When, Where?' *The Tax Journal* 2000 Vol. 569 2000 pp. 5-6
- **Baranzini, Andrea with José Goldemberg and Stefan Speck** 'A future for Carbon Taxes' *Ecological Economics* March 2000 Vol. 32 issue 3 , pp. 395-412
- **Barker, T. and J. Köhler** 'Equity and Ecotax Reform in the EU: Achieving a 10 per cent Reduction in co2 Emissions Using Excise Duties' *Fiscal Studies* 1998 Vol. 19 issue 4 pp. 375-402
- **Beuermann, Christiane and Tilman Santarius** 'Ecological tax reform in Germany: handling two hot potatoes at the same time' *Energy Policy* 2006 Vol. 34 pp. 917-929
- **Biermann, Frank and Rainer Brohm** 'Implementing the Kyoto Protocol Without the United States: The Strategic Role of Energy Tax Adjustments at the Border' Global Governance Working Paper No. 5 January 2003 *Climate Policy* Vol. 4 2005 pp. 289-302
- **Bölsche, Jochen** 'Palmen im Alpenland' *Spiegel Special Nr. 1/2007* p. 50
- **Choi, Onelack and Ann Fisher** 'The Impacts of Socioeconomic Development and Climate Change on Severe Weather Catastrophe Losses: Mid-Atlantic Region (MAR) and the U.S.' *Climate Change* 2003 Vol. 58 No. 1-2 pp. 149-170
- **Cole, M.A. and R.J.R. Elliott** 'Do environmental regulations influence trade patterns? Testing old and new trade theories' *The World Economy* 2003 Vol. 26 issue 8 pp. 1163-1186
- **Collier, Ute** 'The European Union's climate change policy: Limiting emissions or limiting powers?' *Journal of European Public Policy* Vol. 3 issue 1 1996 pp. 122 – 138
- **Cornwell, A. and J. Creedy** *Carbon Taxation, prices and inequality* in Australia in *Fiscal Studies* 1996 Vol. 17 No. 3 pp. 21-38
- **Cottier, Thomas with Elisabeth Tuerk and Marion Panizzon** 'Handel und Umwelt im Recht der WTO: Auf dem Weg zur praktischen. Konkordanz' *Zeitschrift für Umweltrecht Sonderheft* 2003 pp. 155-166

by Nadia Kamm

University of Cape Town, South Africa

-
- **Demaret, P. and R. Stewardson** 'Border tax adjustments under GATT and EC law and general implications for environmental taxes' *Journal of World Trade* Vol. 28 issue 4 1994 pp. 5-65
 - **Dresner, Simone and Paul Ekins** 'Economic instruments to improve UK home energy efficiency without negative social impacts' *Fiscal Studies* 2006 vol. 27 pp. 47-74
 - **Ederington, J. and J. Minier** 'Is environmental policy a secondary trade barrier? An empirical analysis' *Canadian Journal of Economics* 2003 Vol. 36 issue 1 pp. 137-154
 - **Ekardt, Felix and Nina Neumann** 'Liberalisierter Welthandel und Umweltschutz' *Zeitschrift für Umweltpolitik und Umweltrecht* 2/2008 pp. 183-208
 - **Goh, Gavin** 'The World Trade Organization, Kyoto and Energy Tax Adjustments at the Border' *Journal of World Trade* 2004 Vol. 38 issue 3 pp. 395-423
 - **Green, Andrew** *Trade rules and climate change subsidies* *World Trade Review* 2006 Vol. 5 No.3 pp. 377-414
 - **Hamilton, K. and G. Cameron** 'Simulating the Distributional Effects of a Canadian Carbon Tax' *Canadian Public Policy* 1994 Vol. 20 pp. 385-399
 - **Harris, M. with L. Konya and L. Matyas** 'Modelling the Impact of Environmental Regulation on Bilateral Trade Flows: OECD 1990-1996' *The World Economy* 2002 Vol. 25 issue 3 pp. 387-405
 - **Honauer, Niklaus with Jürg Hutter and Saphira Di Costanzo** 'CO₂-Abgabe – Eine aktuelle Auslegeordnung Umverteilung über AHV und Krankenkassenprämien' *Der schweizer Treuhänder* 2008 pp. 164-168
 - **Ismer, Roland and Karsten Neuhoﬀ** 'Border Tax Adjustment: A feasible way to Support Stringent Emission Trading' *European Journal of Law and Economic* 2007 Vol. 24 issue 2 pp. 137-164
 - **Jaffe, Adam B. with Steven R. Peterson and Paul R. Portney** 'Environmental Regulation and the Competitiveness of U.S. Manufacturing: What Does the Evidence Tell Us?' *Journal of Economic Literature* Vol. 33 issue 1 March 1995 pp. 132-163
 - **Kohlhaas, Michael and Heinz Welsch** 'Modelle einer aufkommensneutralen Energiepreiserhöhung und ihre wirtschaftlichen Auswirkungen' *Zeitschrift für Energiewirtschaft* issue 1 1995 pp. 47-58
 - **Mankiw, N. Gregory** 'Gas Tax Now!' *Fortune* 24 May 1999 pp. 60-64
 - **Neumann, Nina and Felix Ekardt** 'Liberalisierter Welthandel und Umweltschutz Produktionsbezogene Handelsbeschränkungen und Border Tax Adjustments für umweltschädlich im Ausland hergestellte Produkte' *Zeitschrift für Umweltpolitik und Umweltrecht* Vol. 31 No. 2 June 2008 pp. 183-208
 - **Oates, W.E.** 'Green taxes: Can we protect the environment and improve the tax system at the same time?' *Southern Economic Journal* 1995 Vol. 61 pp. 914-922
 - **Ojha, Vijay P.** 'Carbon emissions reduction strategies and poverty alleviation in India' *Environment and Development Economics* 2009 Vol. 14 issue 3 pp. 323-348
 - **Ott, Hermann E.** 'Emissions Trading in the Kyoto Protocol – Finished and Unfinished Business' *Linkages Journal* Vol. 3 No. 4 Oct. 1998 [Online] <http://www.iisd.ca/journal/ott.html> accessed 4 March 2010
 - **Pearce, David** 'The role of carbon taxes in adjusting to global warming' *Economic Journal* 1991 Vol. 101 pp. 938-948
 - **Pegels, Anna** 'Renewable energy in South Africa: Potentials, barriers and options for support' *Energy Policy* 2010 vol. 38 issue 9 pp. 4945-4954
 - **Symons, Elizabeth J. with Stefan Speck and J.L.R. Proops** 'The Effects of Pollution and Energy Taxes across the European Income Distribution' *Keele*

by Nadia Kamm

University of Cape Town, South Africa

University Department of Economics Discussion Papers No. 2000/05 *European Environment* July/August 2002 Vol. 12 issue 4 pp. 203-212

- **Tole, Richard S. J. and Gary W. Yohe** 'A Review of the Stern Review' *World Economics* 2006 Vol. 7 issue 4 pp. 233-250
- **Traufetter, Gerald** 'Büßen mit Bäumen' *Spiegel Special Nr. 1/2007* p. 122-123
- **Tuyet, Bich Vu** 'Environmental Protection Through Taxation: Designing a Green Tax' *Tax Notes International* 22 January 2007 pp. 273-290
- **Van Heerden with Jan Horn with Reyer Gerlagh, James Nelson Blignaut, Mark Horridge, Sebastiaan Hess, Ramos Mabugu and Margaret Mabugu** 'Searching for triple dividends in South Africa: Fighting CO2 pollution and poverty while promoting growth' *The Energy Journal* 2006 Vol. 27 issue 2 pp. 113-141
- **Varma, Adarsh** 'UK's Climate Change Levy: Cost Effectiveness, Competitiveness and Environmental Impacts' *Energy Policy* January 2003 Vol. 31 issue 1 pp. 51-61
- **Weiler, J. H. H.** 'Comment: Brazil - Measures Affecting Imports of Retreaded Tyres (DS322)' Prepared for the ALI Project in the Case Law of the WTO *World Trade Review* 2009 Vol. 8 special issue 1 137-144
- **Wier, Mette with Katja Birr-Pedersen, Henrik Klinge Jacobsen and Jacob Klok** 'Are CO2 taxes regressive? Evidence from the Danish experience' *Ecological Economics* 2005 Vol. 52 issue 2 pp. 239-251
- **Xu, X.** 'International Trade and environmental regulation: time series evidence and cross section test' *Environmental and Resource Economics* 2000 Vol. 17 issue 3, pp. 233-257
- **Zhang, Zhongxiang and Andrea Baranzini** 'What Do We Know about Carbon Taxes? An Inquiry into their Impacts on Competitiveness and Distribution of Income' *Energy Policy* 2004 Vol. 32 No. 4 pp. 507-518

Article in newspapers:

- 'Clinton Hail Global Warming Pack' *CNN* published 11 December 1997 [Online] <http://www.cnn.com/ALLPOLITICS/1997/12/11/kyoto/> accessed on 10 March 2010
- **Aitkenhead, Decca** 'We're the first generation that has had the power to destroy the planet. Ignoring that risk can only be described as reckless' in *The Guardian* 30 March 2009
- **BBC News** 'At a glance: The Stern Review' *BBC News* published 30 October 2006 [Online] <http://news.bbc.co.uk/2/hi/business/6098362.stm> accessed on 4 March 2010
- **Brisbane Times** 'G20 leaders agree to phase out fossil fuel subsidies' *Brisbane Times* published 26 September 2009 [Online] <http://www.brisbanetimes.com.au/business/world-business/g20-leaders-agree-to-phase-out-fossil-fuel-subsidies-20090926-g6p1.html> accessed on 30 March 2010
- **Donnelly, Lynley** 'New carbon tax on its way' *Mail & Guardian online* published 29 October 2008 [Online] <http://www.mg.co.za/article/2008-10-30-new-carbon-tax-on-its-way> accessed on 2 February 2010
- **Fowle, Jonathan and Fiona Anderson** 'B.C. introduces carbon tax' *Vancouver Sun* published 19 February 2008 [Online] <http://www2.canada.com/vancouver/news/story.html?id=ecea1487-507c-43ef-ab88-5a972898e0b7&k=38130> accessed on 4 March 2010

by Nadia Kamm

University of Cape Town, South Africa

-
- **Friedman, Thomas L.** ‘(No) Drill, Baby, Drill’ *The New York Times* published 11 April 2009 [Online] <http://www.nytimes.com/2009/04/12/opinion/12friedman.html> accessed on 4 March 2010
 - **Government Information Office Republic of China (Taiwan)** ‘Energy taxes to take effect in 2011’ *Taiwan Review* published 18 June 2009 [Online] <http://taiwanreview.nat.gov.tw/fp.asp?xItem=53024&CtNode=205> accessed on 22 February 2010
 - **Kamaldien, Yazeed** ‘A carbon economy is not viable’ *Mail & Guardian* published 14 October 2009 [Online] <http://www.mg.co.za/article/2009-10-14-a-carbon-economy-is-not-viable> accessed on 4 March 2010
 - **Krugman, Paul** ‘Ersatz Climate Policy’ *New York Times* published 15 February 2002 [Online] <http://www.nytimes.com/2002/02/15/opinion/15KRUG.html?scp=1&sq=Ersatz%20Climate%20Policy&st=cse> accessed on 4 March 2010
 - **Mankiw, Gregory N.** ‘One Answer to Global Warming: A New Tax’ *The New York Times* published 16 September 2007 [Online] <http://www.nytimes.com/2007/09/16/business/16view.html> accessed on 4 March 2010
 - **Ming-chung, Lee and Y.F. Low** ‘Premier outlines principles for energy tax’ *Taiwan Online News* [Online] <http://www.highbeam.com/doc/1G1-219639040.html> accessed on 21 June 2010
 - **Science Daily** *Antarctic Ice Loss Speeds Up, Nearly Matches Greenland Loss* published 23 January 2008 [Online] <http://www.nasa.gov/topics/earth/features/antarctica-20080123.html> accessed on 25 March 2010
 - **Shimizu, Kaho** ‘War on Greenhouse gas emissions – Carbon Tax Proposal Short on Specifics – but not on skeptics’ 28 August 2003 *The Japan Times Online* [Online] <http://search.japantimes.co.jp/cgi-bin/nn20030828b3.html> accessed on 10 March 2010
 - **Simms, Andrew** ‘Unnatural disasters’ *The Guardian* published 15 October 2003 [Online] <http://www.guardian.co.uk/environment/2003/oct/15/guardiananalysispage.climatechange> accessed on 25 March 2010
 - **Taipei Times** ‘Yunlin County’s tax proposal raises eyebrows in Taipei’ *Taipei Times* published 24 February 2009 [Online] <http://www.taipeitimes.com/News/taiwan/archives/2009/02/24/2003436890> accessed on 4 March 2010
 - **Vidal, John** ‘In the land where life is on hold’ in *The Guardian* 30 June 2005 [Online] <http://www.guardian.co.uk/environment/2005/jun/30/climatechange.climatechangeenvironment> accessed on 25 March 2010

Internet:

- [Online] <http://wordnetweb.princeton.edu/perl/webwn?s=excise%20tax> accessed on 4 March 2010
- [Online] http://www.gsone.org/1/productssolutions/ecom/xml/implementation/tmg_2_4/XML-Guidelines/Order/h31.htm?/1/productssolutions/ecom/xml/implementation/tmg_2_4/XML-Guidelines/Order/h34q.htm accessed on 10 March 2010

by Nadia Kamm

University of Cape Town, South Africa

-
- **A Program of the Institute for local self-reliance** *Climate Action Plan Tax – Boulder CO* <http://www.newrules.org/environment/rules/climate-change/climate-action-plan-tax-boulder-co> accessed 28 June 2010
 - **Adam Teva v'din** *Israel has a Clean Air* [Online] <http://www.adamteva.org.il/?CategoryID=392&ArticleID=358> accessed on 10 March 2010
 - **Adam Teva v'din** *IUED report on global warming* [Online] <http://www.adamteva.org.il/?CategoryID=436&ArticleID=976> accessed on 22 February 2010
 - **Agence France Presse (AFP)** *Climate change Sarkozy backs carbon tax, EU levy on non-Kyoto imports* [Online] <http://afp.google.com/article/ALeqM5gx9Wyu07XJiydxsqseJmVdX3-MoQ> accessed on 4 March 2010
 - **Alibaba.com** *China ministries propose carbon tax from 2012-report* [Online] <http://news.alibaba.com/article/detail/energy/100297064-1-china-ministries-propose-carbon-tax.html> accessed on 24 June 2010
 - **Australian Government** *Multi-Party Climate Change Committee – Clean Energy Agreement* <http://www.climatechange.gov.au/en/government/initiatives/multi-party-committee/clean-energy-agreement.aspx> accessed on 26 July 2011
 - **Bnet Business Dictionary** *Business Definition for: Border Tax Adjustment* [Online] <http://dictionary.bnet.com/definition/border+tax+adjustment.html> accessed on 22 February 2010
 - **British Columbia** *Balanced Budget 2008 Backgrounder B.C. 's Revenue-neutral Carbon Tax* [Online] http://www.bcbudget.gov.bc.ca/2008/backgrounders/backgrounder_carbon_tax.htm accessed on 22 February 2010
 - **Broschure** *Most polls show that if people believe John Anderson can win, he will win. Your support will make Anderson President* [Online] <http://www.4president.org/brochures/andersonlucy1980brochure.htm> accessed on 22 February 2010
 - **Business Report** *South Africa offers to slash emissions for aid* 7 December 2009 [Online] http://www.busrep.co.za/index.php?from=rss_Business%20Report&fArticleId=5276938 accessed on 10 March 2010
 - **BusinessGreen.com** *China to impose carbon tax from 2012* [Online] <http://www.businessgreen.com/business-green/news/2262857/reports-china-impose-carbon-tax> accessed 24 June 2010
 - **Carbon Tax Center** *Bills* [Online] <http://www.carbontax.org/progress/carbon-tax-bills/> accessed on 4 March 2010
 - **Carbon Tax Center** *Where Carbon is Taxed* [Online] <http://www.carbontax.org/progress/where-carbon-is-taxed/> accessed on 22 February 2010
 - **China.org.cn** *Levying carbon tax, promoting low-carbon education proposed* [Online] http://www.china.org.cn/china/NPC_CPPCC_2010/2010-03/10/content_19572382.htm accessed on 24 June 2010
 - **Chinese in Vancouver** *China to impose carbon tax* [Online] <http://www.chineseinvancouver.ca/2009/04/china-to-impose-carbon-tax/> accessed on 22 February 2010

by Nadia Kamm

University of Cape Town, South Africa

-
- **Danish Energy Agency** *The Danish National Allocation Plan* [Online] http://www.ens.dk/en-US/ClimateAndCO2/national_allocation_plan/Sider/Forside.aspx accessed on 10 April 2010
 - **Deardorf** *Deardorf's International Economic Glossary* [Online] <http://www-personal.umich.edu/~alandear/glossary/n.html> accessed on 22 February 2010
 - **Department of Energy and Climate Change** *Climate Change Agreements: umbrella agreements, reduced rate certificates* [Online] http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/cas/umbrella_ccas/umbrella_ccas.aspx accessed on 22 February 2010
 - **Environmental Administration** *Environmentally related energy taxation in Finland* [Online] <http://www.ymparisto.fi/default.asp?contentid=299288&lan=EN> accessed on 4 March 2010
 - **EPA** *Coastal Zone and Sea Level Rise* [Online] <http://www.epa.gov/climatechange/effects/coastal/index.html> accessed on 22 February 2010
 - **EPA** *Forests* [Online] <http://www.epa.gov/climatechange/effects/forests.html> accessed on 22 February 2010
 - **EPA** *Future climate change* [Online] <http://www.epa.gov/climatechange/science/futurecc.html> accessed on 22 February 2010
 - **EPA** *Health* [Online] <http://www.epa.gov/climatechange/effects/health.html> accessed on 25 March 2010
 - **EPA** *Past Climate Change* [Online] <http://www.epa.gov/climatechange/science/pastcc.html> accessed on 25 February 2010
 - **EPA** *Polar Regions* [Online] <http://www.epa.gov/climatechange/effects/polarregions.html> accessed on 22 February 2010
 - **Eskom** *Average Price Increases* [Online] http://www.eskom.co.za/live/content.php?Item_ID=937&Revision=en/18 accessed on 30 June 2010
 - **Eskom** *Electrification* [Online] http://www.eskom.co.za/live/content.php?Item_ID=2786 accessed on 1 July 2010
 - **EurActiv** *Europe to triple funding for energy research* [Online] <http://www.euractiv.com/en/energy/europe-triple-funding-energy-research/article-186117> accessed on 22 February 2010
 - **EUROPA** *A Community Strategy to Limit Carbon Dioxide Emissions and Improve Energy Efficiency* [Online] <http://europa.eu/rapid/pressReleasesAction.do?reference=P/92/29&format=HTML&aged=1&language=EN&guiLanguage=en> accessed on 10 April 2010
 - **Europa Energy Taxation:** *Commission welcomes Council adoption of new EU rules, IP/03/1456* Brussels 27 October 2003 [Online] <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/03/1456&format=HTML&aged=1&language=EN&guiLanguage=fr> accessed 4 March 2010
 - **EUROPA** *The Commission approves aid under the new Danish "Green Taxes" Package* [Online] <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/95/777&format=HTML&aged=1&language=EN&guiLanguage=en> accessed on 30 June 2010

by Nadia Kamm

University of Cape Town, South Africa

-
- **European Commission** *EU Tax Policy Strategy* [Online]
http://ec.europa.eu/taxation_customs/taxation/gen_info/tax_policy/index_en.htm
accessed on 29 June 2010
 - **European Commission** *Legislation New Directive on Energy Taxation* [Online]
http://ec.europa.eu/taxation_customs/taxation/excise_duties/energy_products/legislation/index_en.htm accessed on 10 March 2010
 - **European Economic and Social Committee** *Opinion of the Economic and Social Committee on the Amended Proposal for a Council Directive introducing a tax on carbon dioxide emissions on energy (COM(95)172 final)* 28 March 1996 [Online]
http://eescopinions.eesc.europa.eu/EESCopinionDocument.aspx?identifier=archives.ces\anciennes_sections\eco\eco211\421-1996.wpd&language=EN accessed on 30 June 2010
 - **Fischlowitz-Roberts, Bernie** *Restructuring Taxes to Protect the Environment* [Online]
http://www.earth-policy.org/Updates/Update14_printable.htm accessed on 4 March 2010
 - **GLOBAL WARMING** *Early Warning Signs The impact of global warming in Africa* [Online] <http://www.climatehotmap.org/africa.html> accessed on 22 February 2010].
 - **Glossary** [Online] <http://www.cbo.gov/budget/glossary.shtml> accessed on 22 February 2010
 - **Hattem, Jennifer** *Obama Challenged on Climate During Turkey Trip* Treehugger 8 April 2009 [Online] <http://www.treehugger.com/files/2009/04/obama-challenged-on-climate-during-turkey-trip.php> accessed on 22 February 2010
 - **IEA** *Green Tax Package 1995* [Online]
<http://www.iea.org/Textbase/pm/?mode=pm&action=detail&id=1573> accessed on 10 March 2010
 - **Institute for Local-Selfreliance** *ILSR's Minnesota Carbon Tax Shift Achieves* [Online]
<http://www.newrules.org/energy/ilsrs-minnesota-carbon-tax-shift-archives> accessed 22 February 2010
 - **International Monetary Fund (IMF)** *Overview* [Online]
<http://www.imf.org/external/about/overview.htm> accessed on 22 February 2010
 - **IRIN** *Climate change – only one cause among many for Darfur conflict* UNEP report of 28 June 2007 [Online] <http://www.irinnews.org/Report.aspx?ReportId=72985> accessed on 25 March 2010
 - **ISO** *Discover ISO* [Online] http://www.iso.org/iso/about/discover-iso_who-standards-benefits.html accessed on 22 February 2010
 - **Israel Ministry of Environmental** *Green Taxes in Effect in Israel* [Online]
http://www.sviva.gov.il/Enviroment/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=Object&enDispWho=News^l4767&enZone=e_news accessed on 10 April 2010
 - **Larsen, Kari** 'Denmark continues its renewable tradition' in *Renewable energy focus* 19 July 2008 [Online] <http://www.renewableenergyfocus.com/view/843/denmark-continues-its-renewable-tradition/> accessed on 4 March 2010
 - **Lee, Marc** *Happy Birthday, Carbon Tax!* The Progressive Economics Forum 18 February 2009 [Online] <http://www.progressive-economics.ca/2009/02/18/happy-birthday-carbon-tax/> accessed on 10 March 2010
 - **Meador, Scott** *Building on a Breeze* 1 May 2006 [Online]
http://ewweb.com/mag/electric_building_breeze/ accessed on 10 March 2010

by Nadia Kamm

University of Cape Town, South Africa

-
- **Ministry for the Environment** *The Kyoto Protocol*
<http://www.mfe.govt.nz/issues/climate/international/kyoto-protocol.html> accessed on 22 February 2010
 - **Ministry of Finance** *The history of green taxes in Norway*
<http://www.regjeringen.no/en/dep/fin/Selected-topics/taxes-and-duties/The-history-of-green-taxes-in-Norway.html?id=418097&epslanguage=en-GB> accessed on 10 March 2010
 - **Ministry of the Environment** *Environmentally related energy taxation in Finland*
<http://www.environment.fi/default.asp?contentid=147208&lan=en> accessed on 10 March 2010
 - **Ministry of the Environment Government of Japan** *Utilization of Economic Instruments in Environmental Policies – Taxes and Charges I. Basic Concept Regarding Economic Instruments* [Online]
<http://www.env.go.jp/en/policy/tax/econo/et1b.html> accessed on 4 March 2010
 - **NASA** *Global Warming* [Online]
http://earthobservatory.nasa.gov/Library/GlobalWarmingUpdate/global_warming_update2.html accessed on 25 February 2010
 - **NASA** *How is Today's Warming Different from the Past?*
<http://earthobservatory.nasa.gov/Features/GlobalWarming/page3.php> accessed 10 October 2010
 - **NASA** *The carbon cycle* [Online]
<http://earthobservatory.nasa.gov/CarbonCycle/printall.php> accessed on 25 February 2010
 - **NASA** *The sun's chilly impact on earth* [Online]
<http://www.gsfc.nasa.gov/topstory/20011207iceage.html> accessed 22 February 2010
 - **NASA** *Volcanoes and Climate Change* [Online]
<http://earthobservatory.nasa.gov/Study/Volcano/> accessed on 25 February 2010
 - **NASA** *What is Global Warming?* [Online]
<http://earthobservatory.nasa.gov/Features/GlobalWarming/page2.php> accessed on 7 October 2010
 - **NASDAQ** *Taiwan Panel OKs Energy, CO2 Taxes; Taxes May Start In 2011* [Online]
<http://www.nasdaq.com/aspx/stock-market-news-story.aspx?storyid=200910190351dowjonesdjournal000088&title=taiwan-panel-oks-energy-co2-taxes-taxes-may-start-in-2011> accessed on 22 February 2010
 - **News24** *SA emissions to drop from 2035* 5 November 2009 [Online]
http://www.news24.com/Content/SciTech/News/1132/319b19ac5ecd4155b2f6d7e7375164a4/05-11-2009-10-24/SA_emissions_to_drop_from_2035 accessed on 22 February 2010
 - **NZZ Online** *Nachrichten Schweiz: Dreimal höhere CO₂-Abgabe ab 2010* 19 Juni 2009 [Online] http://www.nzz.ch/nachrichten/schweiz/dreimal_hoehere_co2-abgabe_ab_2010_1.2771709.html accessed on 22 February 2010
 - **OECD** *Glossary of Statistical Terms* [Online]
<http://stats.oecd.org/glossary/detail.asp?ID=6437> accessed on 25 July 2011.
 - **OECD** *Taxes, fees or charges – Main characteristics for selected countries* [Online]
<http://www2.oecd.org/econinst/queries/index.htm> accessed on 10 March 2010
 - **Parker, Alexander** *South Africa: Fuel Emissions* 4 August 2010 [Online]
<http://allafrica.com/stories/201008040502.html> accessed on 10 August 2010
 - **Pax Natura** *Payment for Environmental Services (PES) Program Highlights* [Online]
<http://www.paxnatura.org/CostaRicanPESProgram.htm> accessed on 22 February 2010

by Nadia Kamm

University of Cape Town, South Africa

-
- **Pearson, Natalie** *India to Raise \$535 Million From Carbon Tax on Coal* [Online] <http://www.businessweek.com/news/2010-07-01/india-to-raise-535-million-from-carbon-tax-on-coal.html> accessed on 10 August 2010
 - **People's Daily Online** *China likely to levy carbon tax around 2012* [Online] <http://english.peopledaily.com.cn/90001/90778/90862/6980805.html> accessed on 24 June 2010
 - **Power-Gen WorldWide** *Chinese government 'to impose carbon tax'* [Online] <http://www.powergenworldwide.com/index/display/articledisplay/359955/articles/power-engineering/industry-news-2/2009/04/chinese-government-to-impose-carbon-tax.html> accessed on 20 October 2010
 - **Roberts, Kari** *Carbon tax: A one-size-fits-all solution?* Canada West Foundation [Online] http://www.cwf.ca/V2/cnt/commentaries_200804301515.php accessed on 10 March 2010
 - **Salgado, Ingi** *In a warming world, where can you go for the snow?* Business Report 5 June 2008 [Online] <http://www.busrep.co.za/index.php?fSectionId=561&fArticleId=4438540> accessed 10 March 2010
 - **Schmil, Daniel** *"Green" car tax reform hits the road* Haaretz 27 November 2009 [Online] <http://www.haaretz.com/hasen/spages/1130796.html> accessed on 22 February 2010
 - **Schweizerische Eidgenossenschaft** *Calculation tool for CO₂ fee* [Online] <http://www.bfe.admin.ch/energie/00572/00573/00626/index.html?lang=en> accessed on 10 March 2010
 - **Swissworld** *climate policy* [Online] http://www.swissworld.org/en/environment/climate_change/climate_policy/ accessed on 10 March 2010
 - *Tax definitions* [Online] <http://www.tax-definition.org/> accessed on 25 July 2011
 - **Tax history museum** *1777-1815 The Revolutionary War to the War of 1812* [Online] <http://www.taxanalysts.com/Museum/1777-1815.htm> accessed on 10 March 2010
 - **TED Case Studies** *US BTU Tax* [Online] <http://www1.american.edu/TED/usbtutax.htm> accessed on 22 February 2010
 - *The Energy Technology List* [Online] <http://www.hoval.co.uk/docs/GB/PDFs/EnergyTechList.pdf> accessed on 25 July 2011.
 - **The Garnaut Climate Change Review** *Australia's emissions in a global context* [Online] <http://www.garnautreview.org.au/chp7.htm> accessed on 10 April 2010
 - *The habitable planet* <http://www.learner.org/courses/envsci/unit/pdfs/unit2.pdf> accessed on 20 October 2010
 - **The World Bank** *Country Classifications* [Online] <http://data.worldbank.org/about/country-classifications> accessed on 30 June 2010
 - **The World Bank** *Country Classifications* [Online] <http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20420458~menuPK:64133156~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html> accessed on 22 February 2010
 - **The World Bank** *Data – Change in Terminology* [Online] <http://web.worldbank.org/external/default/main?contentMDK=20451503&menuPK=64133156&pagePK=64133150&piPK=64133175&theSitePK=239419> accessed 30 June 2010
 - **U.S. Energy Information Administration** *India Background* [Online] <http://www.eia.doe.gov/cabs/India/Background.html> accessed on 10 March 2010

by Nadia Kamm

University of Cape Town, South Africa

-
- **UNFCCC Kyoto Protocol Status of Ratification** Last modified on 3 December 2009 [Online]
http://unfccc.int/files/kyoto_protocol/status_of_ratification/application/pdf/kp_ratification_20091203.pdf accessed on 22 February 2010
 - **UNFCCC Status of Ratification of the Kyoto Protocol** [Online]
<http://unfccc.int/playground/items/5524.php> accessed on 21 June 2010
 - **USGS Volcanoes and the Weather** [Online]
http://vulcan.wr.usgs.gov/Glossary/VolcWeather/description_volcanoes_and_weather.html accessed on 10 April 2010.
 - **Wilcoxon, Peter J. and Warwick J. McKibbin** *Climate Change after Kyoto: A Blueprint for a Realistic Approach* Brookings Spring 2002 [Online]
<http://www.brookings.edu/press/REVIEW/spring2002/mckibbin.htm> accessed on 4 March 2010
 - **World Resource Institute** *Climate Analysis Indicators Tool Version 7.0* [Online]
<http://cait.wri.org/cait.php?page=yearly> accessed on 4 March 2010
 - **WTO Agreement on Subsidies and Countervailing Measures** [Online]
http://www.wto.org/english/tratop_e/scm_e/subs_e.htm accessed on 22 February 2010
 - **WTO Principles of the Trading System** [Online]
http://www.wto.org/english/theWTO_e/whatis_e/tif_e/fact2_e.htm accessed on 22 February 2010
 - **WTO The multilateral trading system and climate change** [Online]
http://www.wto.org/english/tratop_e/envir_e/climate_change_e.pdf accessed on 4 March 2010