An Historical Political Economy Analysis of High-Emissions Low-Employment Development in South Africa

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Abstract

South Africa is grappling with persistently high levels of poverty, inequality and unemployment, while at the same time being one of the top twenty greenhouse gas emitters in the world. While calls have been made for South Africa to embark on a just transition to a low-carbon society, a better understanding is needed of the factors that have led to the country's current unsustainability. Drawing on the concept of the minerals-energy complex, this thesis presents an historical political economy analysis of South Africa's industrialisation process in order to (1) identify the key factors that have contributed to the country's high emissions and low employment; and (2) to determine the role of industrial policy in shaping this unsustainable development pathway. The analysis shows that the capital- and energy-intensive characteristics of South Africa's industrial structure have contributed to the country's high unemployment and high emissions. While industrial policy has been instrumental in shaping this industrial structure, its role in the post-apartheid era has been complicated by the existence of a 'hidden' industrial policy in conflict with official objectives as well as implementation challenges which together have constrained the effectiveness of policies aimed at inclusive decarbonisation. From these results, it is argued that the adoption of an integrated green industrial policy has an important role to play in enabling South Africa to embark on a just transition to an inclusive low-carbon society.

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List of abbreviations

AAC	Anglo American Corporation
AECI	African Explosives and Chemical Industries
ANC	African National Congress
AsgiSA	Accelerated and Shared Growth Initiative for South Africa
BEE	Black Economic Empowerment
BUSA	Business Unity South Africa
CEO	Chief Executive Officer
CO_2	Carbon dioxide
CTL	Coal-to-liquids
DEPP	Developmental Electricity Pricing Programme
DMRE	Department of Mineral Resources and Energy
DTI	Department of Trade and Industry
ECSA	Energy Council of South Africa
EIUG	Energy Intensive Users Group
EU	European Union
Escom	Electricity Supply Commission
Eskom	Escom's name after 1987 (not an acronym)
GDP	Gross Domestic Product
GEAR	Growth Employment and Redistribution
GHG	Greenhouse Gas

IDC	Industrial Development Corporation
IPAP	Industrial Policy Action Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan
Iscor	Iron and Steel Industrial Corporation
ISI	Import-substitution industrialisation
JSE	Johannesburg Stock Exchange
LSE	London Stock Exchange
LTMS	Long-Term Mitigation Scenarios
MEC	Minerals-energy complex
MERG	Macroeconomic Research Group
NCCRWP	National Climate Change Response White Paper
NDP	National Development Plan
NEM	Normative Economic Model
NIPF	National Industrial Policy Framework
NP	National Party
OFS	Orange Free State
PCC	Presidential Climate Commission
PPA	Power Purchase Agreement
PV	Photovoltaic
R&D	Research and Development
RE	Renewable Energy
REIPPPP	Renewable Energy Independent Power Producers Procurement Programme
RDP	Reconstruction and Development Programme
Sasol	South African Oil and Gas Corporation
SIP	Strategic Industrial Projects
SOE	State-owned enterprise
VFTPC	Victoria Falls and Transvaal Power Company

1. Introduction

South Africa is the most industrialised country in Africa (UNIDO, 2021:65), having developed significant manufacturing capabilities throughout the 20th century. While industrialisation (i.e. the growth of manufacturing relative to other forms of production) is typically associated with improved quality of life and human development indicators (UNIDO, 2020:19), South Africa continues to grapple with persistently high levels of poverty, inequality and unemployment, which together constitute the country's 'triple challenge'. In addition to these socioeconomic challenges, South Africa is the largest annual emitter of greenhouse gasses (GHGs) in Africa and one of the top twenty emitters in the world (Climate Watch, 2022). While emissions tend to increase exponentially as countries achieve higher levels of development, Figure 1 shows that South Africa is one of the few clear outliers in this regard with comparatively high emissions relative to its Human Development Index.

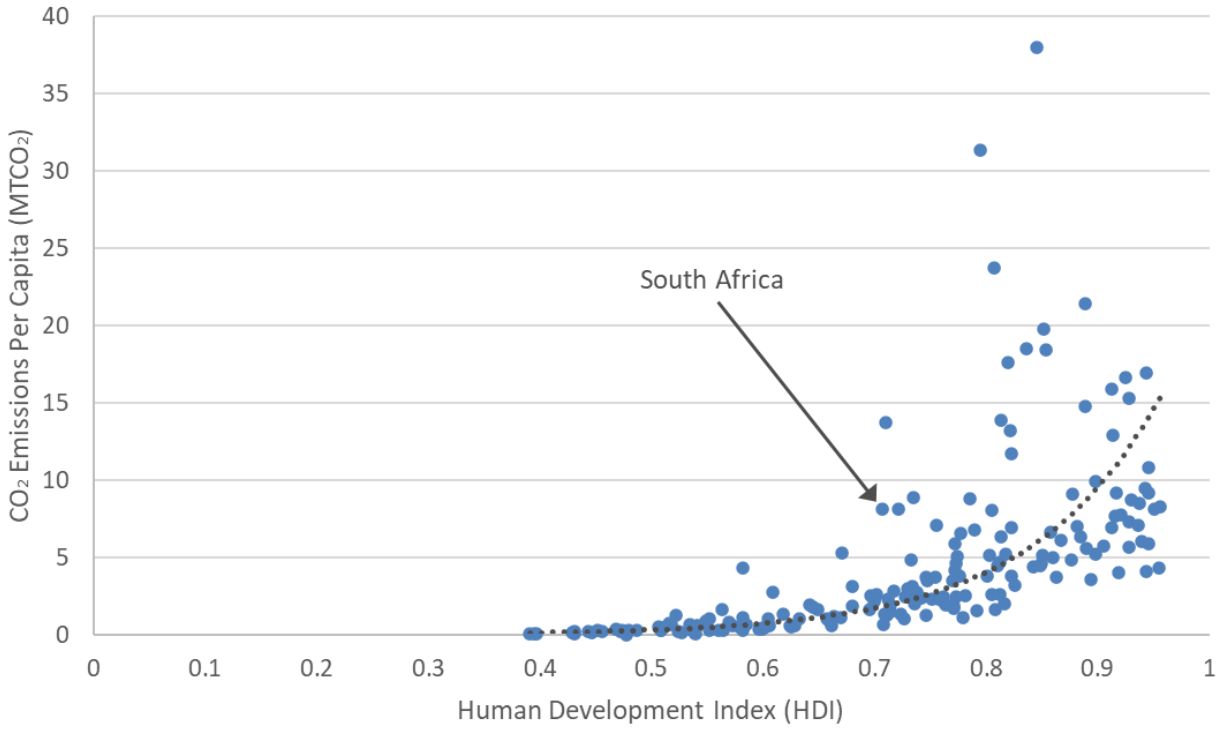

FIGURE 1 Comparison of per capita CO_2 emissions and Human Development Index scores for 189 countries. Source: Author based on Figure 2 from Winkler & Marquard (2009:50) using updated 2018 data from the CDIAC Archive and the UNDP, freely available from www.gapminder.org (CC-BY).

South Africa faces these development challenges in the context of a global climate emergency in which deep and immediate emissions reductions are needed across all economic sectors (IPCC, 2022:21) in order to meet the goal of limiting global warming to below 1.5°C in line with the Paris agreement. Rather than incremental change, it is increasingly acknowledged that

countries need to focus on shifting their entire development pathways in order to open up a broader range of mitigation options while simultaneously addressing existing development challenges (IPCC, 2022:49). Consequently, calls have been made for 'just transitions' that shift economies away from fossil fuels while simultaneously addressing social justice issues relating to poverty, inequality and unemployment (Swilling & Annecke, 2012). However, in order to shift to more inclusive and low-carbon societies a better understanding is needed of the causes that have led to what Barry (2012:14) terms 'actually existing unsustainability'. It is therefore necessary to develop a better understanding of why South Africa's high-emissions development pathway has not resulted in comparable socio-economic benefits.

This thesis seeks to contribute to such an understanding in two ways: (1) by identifying the core features that have led South Africa onto its current high-emissions low-employment development pathway; and (2) by assessing the role that industrial policy has played in shaping this development trajectory. While the first research aim seeks to identify the specific characteristics of South Africa's political economy that have contributed to the country's current unsustainability, the second research aim deepens the analysis by assessing the historic role of the state in shaping South Africa's economic structure and the potential for industrial policy to support a just transition to a future inclusive and low-carbon society.

In pursuit of these research aims, this thesis makes use of information acquired through content analysis of policy documents, reports and secondary literature to provide an historical political economy analysis of South Africa's industrialisation process. The analysis draws on Fine & Rustomjee's (1996) concept of the minerals-energy complex (MEC) as a framework through which to understand the unique structure of South Africa's economy and the historical processes that have informed industrial policy thinking and practice.

The structure of the thesis is as follows. Chapter 2 introduces the MEC as the conceptual framework that forms the foundation of the analysis. It is shown how interlinkages between resource-based industries across the mining, energy and manufacturing sectors have given rise to a highly concentrated, capital- and energy-intensive industrial structure which has had a disproportionate impact on the functioning of the economy. This is followed by an overview of the concept of industrial policy including its definition, its historical evolution, the recent emergence of green industrial policy in the context of climate change, and finally the relationship between industrial policy and the MEC.

The next two chapters comprise the core substantive analysis of the thesis, drawing on the MEC as a conceptual device to trace a periodisation of the country's process of industrialisation. Chapter 3 traces South Africa's industrial development between 1867 and 1994, showing how state support contributed to the development of the MEC which in turn resulted in a capital- and energy-intensive industrial configuration that became the structural inheritance of the post-apartheid regime. Chapter 4 continues this periodisation in the post-apartheid era, showing how the embrace of neoliberalism and the associated neglect of industrial policy in the first decade of democracy combined with more recent implementation challenges relating to industrial and climate policy have resulted in an economic structure that exhibits strong continuity with the past.

Chapter 5 provides a synthesis of the key findings including the core features that have contributed to South Africa's high rates of unemployment and high emissions, as well as the role of industrial policy in shaping the country's unsustainable development pathway. Drawing on these findings, a case is made for the adoption of an integrated green industrial policy with the potential to enable South Africa to embark on a just transition to an inclusive low-carbon society. Chapter 6 concludes.

2. Conceptual foundations

This chapter introduces the concept of the MEC which is employed as a tool for analysing South Africa's process of industrialisation. This is followed by an overview of the concept of industrial policy, how its use has evolved over time, and finally its relationship with the MEC in the South African context. Since both the MEC and industrial policy relate to economic structure, these concepts are particularly relevant to gaining an understanding of the structural characteristics and processes that have led South Africa onto an unsustainable development trajectory.

2.1 The minerals-energy complex (MEC)

The MEC is a concept used to describe the unique structure and functioning of the South African economy that was introduced in the literature by Ben Fine and Zavareh Rustomjee in their seminal 1996 book *The Political Economy of South Africa*. Writing during a period of extraordinary change, with the African National Congress (ANC) coming to power after defeating the repressive apartheid government in the country's first fully democratic elections in 1994, Fine & Rustomjee (1996:4) noted that this political transition had not been

accompanied by a commensurate transformation of the country's economic structure. In seeking to explain this outcome, Fine & Rustomjee (1996:71) introduce the MEC as a conceptual device for understanding the unique form of industrialisation that has occurred in South Africa. The MEC can be understood in two interrelated senses: (1) as a set of sectoral relationships between a core set of industries related to mining, energy and associated manufacturing processes; and (2) in a much broader sense as a system of accumulation whereby the strong linkages between these industries has had a determining effect on the rest of the economy as a whole.

From a sectoral perspective, Fine & Rustomjee (1996:79) include the following industries as making up the MEC core: mining; electricity; non-metallic mineral products; iron, steel and non-ferrous metals basic industries; plastics; chemicals; and liquid fuels. While standard classifications separate these industries into distinct mining, energy and manufacturing sectors, Fine & Rustomjee (1996:79) argue that this obscures the highly interdependent nature of these industries which exhibit strong economic linkages between one another. One implication of these linkages is that, contrary to indications that the economy has industrialised away from primary production activities, manufacturing has remained closely tied to South Africa's resource base through processes such as smelting and refining while being dependent on the provision of cheap coal-based electricity (Fine & Rustomjee, 1996:76). From this perspective, the growth of manufacturing in South Africa has not represented a significant structural diversification away from the country's historical resource base, but rather a gradual evolution in which the engine of growth remains dominated by the MEC. By focusing on productive linkages between industries, the MEC provides a more accurate picture of the structure of the economy than aggregated sectoral representations which fail to account for the integrated nature of many mining, energy and manufacturing processes.

As a system of accumulation, Fine & Rustomjee (1996:91) argue that the dominance of MEC core industries has had a determining effect on the development of seemingly unrelated sectors of the economy. In particular, they argue that the economy-wide impacts of the MEC have been amplified by the high degree of corporate ownership and the extension of this ownership across the financial sector. Fine & Rustomjee (1996:96) note how the South African economy has historically been dominated by six main conglomerates whose ownership spans the mining, manufacturing and financial sectors. This extensive control of finance has reinforced the linkages between mining, energy and manufacturing industries and shaped the pattern of

industrialisation along a particular growth path centred around the MEC (Fine & Rustomjee, 1996:103). Therefore, as a broader system of accumulation, the MEC is seen as having a disproportionate influence on the country's development path that far exceeds the contribution of MEC core industries to GDP.

The MEC, both as a set of core industries and as a system of accumulation, provides a useful concept for understanding South Africa's high-emissions low-employment development pathway for two main reasons. First, the resource-based heavy industries within the MEC core are highly energy-intensive requiring large amounts of electricity, the vast majority of which is generated from domestically sourced coal (Fine & Rustomjee, 1996:80). This is of particular importance for South Africa's mitigation efforts given that the electricity sector is the largest source of GHG emissions in the country, with the manufacturing sector accounting for the greatest share of total electricity demand (DEFF, 2020:128). Second, the MEC sheds light on South Africa's chronic unemployment problem with the downturn in gold mining from 1986 leading to the shedding of mining jobs combined with static employment in the manufacturing sector due to the high capital intensity of heavy industries within the MEC (Fine & Rustomjee, 1996:90). These features make the MEC a useful concept through which to understand South Africa's peculiar form of industrialisation and the consequences this has had on the country's development pathway. However, understanding the role of the state in shaping this pathway requires an examination of industrial policy and how it relates to the MEC.

2.2 Industrial policy

Industrial policy has proven to be a highly controversial term that has been at the centre of major debates within economics and development studies, particularly since the end of the Second World War. These debates have tended be ideologically charged and often framed within broader discussions around the appropriate role of the state versus the market in driving economic development. This review outlines the core concepts and defining features of industrial policy, how thinking on the theory and practice of industrial policy has evolved over time, and the recent emergence of green industrial policy in the context of climate change.

2.2.1 Defining industrial policy

Despite the prominence of industrial policy in economic development debates, there is no universally agreed upon definition for what constitutes 'industrial policy', with an extremely

wide range of definitions found across the literature.[1] Narrow definitions single out the manufacturing sector as the focal point of industrial policy. Pack (2000:48) for example defines industrial policy as comprising "a variety of actions designed to target specific sectors to increase their productivity and their relative importance within the manufacturing sector." This focus on the manufacturing sector is due to the fact that productive potential is not uniform across all sectors, with manufacturing having a particularly strong influence on growth and productivity. The importance of the manufacturing sector has been highlighted by Nicholas Kaldor in his pioneering work on growth laws which state that: (1) there is a strong positive correlation between the growth of manufacturing and the growth of GDP; (2) there is a strong relationship between manufacturing output and productivity growth; and (3) as manufacturing output increases, labour moves from non-manufacturing to the manufacturing sector such that overall productivity growth increases as employment in manufacturing rises (Thirlwall, 1983:345). Together, these three 'laws' provide the theoretical foundation for the claim that manufacturing represents the 'engine of growth' within industrialised countries and therefore deserves special attention in the form of industrial policy.

An additional reason for the focus on manufacturing is that industries in this sector tend to have a much broader effect on the establishment of other industries and businesses within the economy. This characteristic was first articulated by Hirschman (1958:100) who introduced the concept of *linkage effects* to describe the ways in which the establishment of certain industries can have knock-on effects that stimulate the development of complimentary activities that drive economic growth within a country. Hirschman (1958:100) elaborates two forms of linkage effects: (1) forward-linkages, which occur when the output of one form of production gives rise to new forms of production in downstream industries; and (2) backward-linkages, which occur when a non-primary economic activity induces the establishment of upstream industries to supply the inputs needed in that activity. Hirschman (1958:117) observes that the greatest economic benefits tend to be derived from investments that exhibit strong forward- and backward-linkages since these often result in positive feedbacks that impart on the economy a certain dynamism that drives further economic development. Importantly, the manufacturing sector is identified as having far superior linkage effects relative to other sectors (Hirschman, 1958:110), thus providing a strong justification for developing countries to change

[1] See Table 2 in Aiginger & Rodrik (2020:204) for a chronological overview of a range of selected definitions of industrial policy.

their economic structures away from primary production towards manufacturing through industrial policy.

However, while high productivity industries and the presence of strong linkage effects are typically found within manufacturing, other sectors can have similar effects depending on a country's stage of economic development. Aiginger (2007:302) for example, notes how the focus of industrial policy varies across stages of development with the share of manufacturing in per capita GDP rising during initial industrialisation and decreasing once higher income levels are attained. Indeed, Aiginger & Rodrik (2020:191) argue that as economies turn towards services, deindustrialisation is essentially inevitable in middle- and high-income economies and therefore industrial policy (while still acknowledging the importance of manufacturing) should be aimed at developing economic activities more broadly. From this perspective the term 'industrial policy' may even be seen as slightly misleading since it obscures this broader objective, with 'productive development policies' or 'structural transformation policies' being potentially more appropriate terms (Aiginger & Rodrik, 2020:191).

Accordingly, rather than confining industrial policy to actions aimed exclusively at increasing the performance of the manufacturing sector, broader definitions of the concept include any policies that are implemented with the intention of altering the structure of economy. Naudé (2010:4) for instance defines industrial policy as "the process whereby governments aim to deliberately affect the structural characteristics of their economies." This definition points to a more economy-wide objective for industrial policy aimed at bringing about 'structural transformation', which involves shifting from low- to high-productivity activities, diversification into new activities and the targeted upgrading of certain industrial sectors (Oqubay, 2020:20). The impetus behind the need for structural transformation is the recognition that growth alone is insufficient for sustaining economic development and that altering the composition of production activities in line with a broader national development strategy is necessary to ensure sustained productivity growth (Oqubay, 2020:20).

Assuming a broader role for industrial policy nonetheless presents significant challenges such the need for government coordination across multiple policy domains. Andreoni & Chang (2019:17) emphasise that the effectiveness of industrial policy measures is dependent on the extent to which institutions and policy instruments are aligned to reinforce complementarities and avoid contradictions. This need to ensure policy alignment is echoed by Aiginger & Rodrik (2020:200) who emphasise that industrial policy should not be considered an isolated

departmental policy in conflict with other policy domains, but rather a systemic economy-wide policy that maximises policy synergies. In order to ensure coherence, they argue that industrial policy should not be formulated and implemented by single departments or ministers alone, but should be the responsibility of the government as a whole, with the president or prime minister at the helm (Aiginger & Rodrik, 2020:200).

Broader conceptions of industrial policy that emphasise the role of the state in steering the direction of development also raise questions about the appropriate sectors and industries to support. Indeed, one of the key debates among scholars of industrial policy is the extent to which industrial policy should conform to or defy a country's current comparative advantage. Lin & Monga (2013:34) advocate a comparative advantage-following approach to industrial policy which they consider the 'silver bullet' for ensuring successful development outcomes. They argue that industrial policy often fails because it is implemented without due regard for firm viability, which is determined by a country's existing endowment structure – i.e. the relative abundance of capital, labour and natural resources (Lin & Monga, 2013:31). By contrast, Chang (2013:40), while acknowledging that the further a country deviates from its comparative advantage the riskier its industrial policy becomes, argues that countries need to defy their existing comparative advantage in order to accumulate the technological capabilities necessary for economic development. The extent to which a country seeks to conform to or defy its existing comparative advantage therefore reflects a key industrial policy choice that decision makers need to grapple with.

Overall, there is no agreed upon definition for industrial policy. While the manufacturing sector tends to be the focal point, the ultimate objective of industrial policy is to change the structural characteristics of the economy. Given that this thesis is concerned with understanding the origins and evolution of South Africa's development pathway as a whole, a broader definition of industrial policy is considered more appropriate. Accordingly, for the purposes of this thesis, industrial policy will be defined as *government interventions that seek to alter the structural characteristics of the economy in a desired direction.* Such a broad definition may be criticised as lacking conceptual clarity since it encompasses a potentially unlimited range of policy domains. However, as noted by Fine (1997:133) the underlying factors to be examined and the range of policies affecting industrial performance change depending on the issues under consideration as well as the specific context in which industrial policy is being implemented. Therefore, the benefit of such a broad definition is that it allows for a more comprehensive

account of the shifting range of policies that affect industrial and economic performance that may otherwise be ignored if a narrower definition were employed.

2.2.2 The evolution of industrial policy

Definitional issues aside, the popularity and support for industrial policy in practice has ebbed and flowed over the past century, gaining widespread popularity in the immediate post-war era until the 1970s when interventionist policies were largely dismissed in favour of a *laissez-faire* market-based approach to development under the Washington Consensus. More recently however, industrial policy has made a resurgence, particularly in the wake of the 2008 financial crisis which led to some questioning of the appropriateness of market mechanisms in shaping economic development. Consequently, industrial policy is back at the centre stage of policy debates in developed and developing countries alike.

Early use: 1940s – 1960s

Industrial policy emerged as a leading focus of development theory and practice during the reconstruction of Japan and Europe in the wake of World War II and following the independence of many states in Africa and Asia (Naudé, 2010:10). In developed countries, the Keynesian Revolution heralded a period of sustained growth based on mixed economies characterised by state intervention, public investment and strong welfare provisions. In developing countries, a key motivation behind the use of industrial policy was a recognition that a reliance on market mechanisms alone had not resulted in the structural transformation necessary to ensure sustained economic development (Stiglitz et al., 2013:3). During this period, an extensive range of selective interventions were adopted such as import tariffs, quotas and the formation of state-owned enterprises (SOEs) often in service of broader infant industry protection and import-substitution industrialisation (ISI) policies.

ISI became a widespread development strategy during this period and was based on the replacement of previously imported products with goods that are produced domestically. The origins of ISI stem from critiques of the international division of labour put forward by scholars such as Raúl Prebisch (1950:1) who argued that confining developing countries to the production of food and raw materials for the industrial centres of the world had undermined their development prospects. In this context, industrialisation was seen as a prerequisite for economic development and therefore the promotion of a domestic manufacturing sector was considered imperative. The thrust of ISI was to diversify the production structure with the aim of changing the prevailing pattern of specialisation towards technology intensive activities,

mainly in the manufacturing sector (Peres & Primi, 2009:31). While the logic behind these early industrial policies was sound, the performance record of countries that adopted these policies was mixed. Although some developing countries recorded high growth rates in this early stage many stagnated recording a deterioration of their incomes relative to developed countries (Lin & Monga, 2013:28).

Out of favour: 1970s – 1990s

From the late-1970s, the use of industrial policy fell out of favour with leading Western governments, mainstream economists, international financial institutions and development agencies as the Keynesian promotion of mixed economies was replaced by a monetarist fixation with free markets. Wade (2012:227) notes how under this free-market paradigm (known as the Washington Consensus) free trade, very low average tariffs, a lack of quantitative restrictions and the removal of export subsidies were considered optimal policies that would benefit all countries irrespective of their structure of production or income level. With free markets presumed to be universally beneficial, the economic challenges facing many developing countries, such as low growth rates and financial instability, were deemed to be the result of excessive and inefficient government intervention.

Two primary critiques were levelled against the use of industrial policy. First, it was argued that governments lacked the capabilities and information necessary to correctly identify and promote sectors most deserving of support (Naudé, 2010:18). While markets are not always effective in stimulating dynamic growth, critics of industrial policy argued that interventionist policies allowed governments to 'pick winners', thus undermining competitiveness and market efficiency. The second critique was that industrial policy opened the door for rent-seeking and corruption since governments were susceptible to manipulation by economic agents that stood to benefit or lose-out from certain policy interventions (Naudé, 2010:20). As a result, industrial policy was not seen as a viable approach to economic development and the significance of market failures was superseded by an emphasis on government failures.

Weiss (2020:130) argues that what replaced industrial policy during this period was a focus on 'business environment reform' which involved the removal of barriers to private sector expansion through investments in infrastructure and training, lowering taxes, instituting banking reforms, and streamlining regulation. Unlike selective (vertical) industrial policy which targeted specific sectors/industries, these measures were intended to benefit all producers equally through (horizontal) interventions that supposedly did not discriminate

between different industries. Ultimately, Weiss (2020:131) argues that the state was no longer conceptualised as an active participant in shaping the direction of long-term development but rather a mere facilitator for the activities of the private sector.

Resurgence: 2000s – present

More recently, industrial policy has seen a resurgence as the market-fundamentalist approach of the late-20th century has attracted strong criticism. Stiglitz et al. (2013:5) argue that the 2008 global financial crisis marked a distinct turning point by demonstrating that markets are not necessarily efficient and that without strong government intervention in the form of bailouts, the market economies of the Western world may well have collapsed. In addition, Stiglitz et al. (2013:4) note how deindustrialisation and declines in per capita income became common features of developing countries such as those in Sub-Saharan Africa who had liberalised their economies in accordance with the prevailing neoliberal orthodoxy. Conversely, historically unprecedented growth rates were recorded in several East Asian countries (such as South Korea) that did not subscribe to the Washington Consensus approach. Instead these late industrialisers adopted active industrial policies that defied conventional free market wisdom by intervening in the economy and intentionally 'getting prices wrong' to make up for their relatively late entry into competitive global markets (Amsden, 1989:139).

Moreover, contrary to the perception that the Global North abandoned the use of industrial policy, Peres & Primi (2009:28) show that the United States' steel industry continued to benefit from protection since the late 1960s and that *de facto* industrial policy was implemented at the height of free-market capitalism under the Reagan administration. At the same time, governments in Europe also made efforts to protect domestic steel, textiles and automobile industries, despite formal rhetoric against the use of industrial policy (Peres & Primi, 2009:28). Even the more horizontal 'business environment reforms' that were intended to have neutral impact ended up favouring certain industries over others. For example, while infrastructure development is often considered favourable due to its perceived neutrality, the type of infrastructure as well as where and when it is built are far from neutral considerations (Stiglitz et al., 2013:6).

While the poor performance record of Washington Consensus policies and the recognition that state intervention has been key to the economic success of industrialised countries have put industrial policy firmly back on the policy agenda, the climate crisis has provided yet another rationale for their adoption. The latest modelling from the Intergovernmental Panel on Climate

Change shows that in order to limit warming below 1.5°C, rapid and deep emissions reductions will be required across all sectors of the economy (IPCC, 2022:28). This need has given rise to 'green' industrial policy that seeks to bring about structural changes that decarbonise the economy.

2.2.3 Green industrial policy

The imperative of combating climate change has led to development being conceived of as a dual challenge requiring economic development to address socioeconomic challenges while at the same time decarbonising the global economy and staying within planetary boundaries (Altenburg et al., 2017:8). The need to meet this dual challenge has given rise to green industrial policy which refers to "any policy measure aimed at aligning the structure of a country's economy with the needs of sustainable development within established planetary boundaries" (Lütkenhorst et al., 2014:6).

According to Rodrik (2014:472), the theoretical case for green industrial policy is based on the presence of two main market failures associated with climate change. First, the development of new green technologies tends to generate positive spillovers, such as industry-wide learning, skills development and new knowledge, which are not fully captured by the initial investors. This means that companies withholding investment in green technologies accrue many of the benefits of investors without having to pay the upfront capital costs. Government support for the development of green technologies through industrial policy will therefore result in fewer market distortions than if these investments were left to the market alone (Rodrik, 2014:470). A second market failure is that the price of carbon does not internalise the costs of climate change, meaning that the private user cost of carbon falls far below what is appropriate from a broader societal perspective. Consequently, the private return on investment in green technologies is substantially lower than the social return derived from these investments and therefore government nurturing and support for green technologies through industrial policy can be expected to yield more positive societal and environmental benefits (Rodrik, 2014:470).

However, beyond merely correcting market-failures, green industrial policy has an important role to play in steering development in a more sustainable direction. Indeed, Lütkenhorst et al. (2014:22) argue that the ambition behind green industrial policy should be the transformation of the economy in its entirety by disrupting old development pathways and creating new ones that are more sustainable. Similarly, Mazzucato et al. (2020:426) advocate a 'mission-oriented' approach to industrial policy that sets the direction of growth and tilts the playing field towards

the achievement of societal objectives, such as the sustainable development goals. Rather than framing industrial policy in a narrow sense as simply stepping in to fix market failures, Mazzucato et al. (2020:423) argue that 'market shaping' should be the over-arching objective of industrial policy to ensure that markets support the public purpose. This formulation sees green industrial policy as a key tool in shaping the direction of growth towards the achievement of a low-carbon society.

While this survey of the literature on industrial policy provides a general outline of the subject, assessing the impact of industrial policy in practice requires an understanding of the particular context in which it is used. This is emphasised by Warwick (2013:42) who argues that there is no single technology or policy that can be applied universally to drive green innovation. In all countries, the most appropriate industrial policy is determined by the nature and state of the underlying system and therefore no one-size-fits-all approach is applicable (Warwick, 2013:42). Accordingly, assessing the role of industrial policy in shaping South Africa's high-emissions low-employment development path requires an understanding of the nature of the underlying structure of the economy and the broader political economy context in which industrial policy has been implemented. Understanding how the MEC influenced industrial policy; and conversely, how industrial policy influenced the development of the MEC, are therefore important questions that anchor this analysis in the South African context.

2.3 The relationship between industrial policy and the MEC

Fine & Rustomjee (1996) argue that the presence of the MEC has had a profound influence on industrial policy and South Africa's industrialisation process. Their central argument is that industrial diversification out of mining was circumscribed by a disjuncture between Afrikaner political power and English economic power (concentrated in the mining houses) (Fine & Rustomjee, 1996:147). Industrial policy was part of a broader state strategy aimed at remedying this disjuncture by facilitating the interpenetration of Afrikaner capital with English mining capital. This happened over three stages: (1) the creation and support of Afrikaner finance capital in the 1950s; (2) the expansion of Afrikaner finance capital into MEC core industries during the 1960s; and (3) the erosion of the political-economic disjuncture, allowing for coordinated policies for the expansion of public and private investment into mineral, heavy chemical and energy production by the 1970s (Fine & Rustomjee, 1996:147). By the 1980s however, apartheid was in crisis and while the integration of capital had opened up the possibility for a coherent industrial policy aimed at diversifying out of the MEC, a confluence

of factors impeded this process. In particular, increasing acquisitions of financial assets over productive fixed investments combined with deregulation and the desire of large-scale capital to offshore their investments had undermined efforts to alter the trajectory of industrialisation that remained centred around the MEC (Fine & Rustomjee, 1996:174).

This interpretation of South Africa's industrialisation path, and the role of industrial policy in shaping it, has nonetheless been challenged. In a critique of the MEC thesis, Bell & Farrell (1997:594) argue that Fine & Rustomjee fail to convincingly refute the conventional view that the structural weakness of South Africa's economy is rooted in a failed ISI industrial policy. The authors support this failed-ISI interpretation by showing how import penetration ratios declined from 1926 with the share of capital goods increasing relative to consumer goods in subsequent decades (Bell & Farrell, 1997:596). In response, Fine & Rustomjee (1998:694) argue that import ratios and changing shares of manufacturing composition are insufficient indicators for showing whether ISI has occurred, with the pattern and sequencing of sectoral linkages being far more important indicators of ISI. Where ISI is typically thought to proceed through a sequential process starting with the substitution of imports from 'easy' consumer goods and progressing through backward linkages to more 'difficult' capital goods, Fine & Rustomjee (1996:223) argue that South Africa defied this pattern since capital-intensive heavy industries were developed relatively early on. Rather than failed ISI, Fine & Rustomjee (1998:695) blame South Africa's truncated industrialisation on the failure of the manufacturing sector to develop forward linkages from the capital-intensive MEC core to diversified downstream industries.

More recent critiques have centred on the appropriateness of the MEC in describing the political economy dynamics in the post-apartheid era. Seekings & Nattrass (2015:99) argue that while the MEC remains an important generator of export revenues, its share of gross value added and exports has declined relative to other clusters since the end of apartheid. Consequently, Seekings & Nattrass (2015:100) argue that increasing capital intensity in post-apartheid South Africa was not a result of the increasing dominance of the MEC but rather a consequence of broader processes (such as rising wages) that affected all sectors in the economy, not just the MEC. However, the declining share of the MEC in GDP does not in, and of, itself indicate the irrelevance of the MEC in the post-apartheid period since this ignores the sectoral linkages and path dependent effects that continue to shape South Africa's development trajectory.

Overall, the MEC is a useful conceptual device for analysing South Africa's unsustainable development path by drawing attention to the particular form of industrialisation that has taken place in the country. By emphasising the capital- and energy-intensive nature of resource-based heavy industries, the MEC makes it possible to draw a link between high emissions and low employment in the country. Additionally, by focusing on productive linkages between sectors as well as the political and class constraints that have inhibited a more concerted industrial diversification strategy, the MEC provides a useful lens through which to interpret the formation and implementation of South African industrial policy. The following chapters draw on the MEC to trace South Africa's industrialisation process, to identify the key factors that are at the heart of the country's unsustainability, and to determine the role of industrial policy in shaping the country's development pathway.

3. 20th century industrialisation and the development of the MEC

South Africa's high-emissions and low-employment development pathway has its origins in the 20th century. While the prior discovery of diamonds and gold in the late-19th century laid the foundation for an economy heavily dependent on minerals, the subsequent development of the MEC was far from an automatic process. Industrial policy played a critical role in shaping the direction of development and was instrumental in the formation of a capital- and energy-intensive industrial structure rooted in the MEC. This structure lies at the heart of South Africa's economy and is the foundation on which the country's high-emissions low-employment development pathway is based.

In this chapter, the historical evolution of this development pathway is broken down into four broad phases beginning with the discovery of diamonds in 1867 and ending with the country's first fully democratic elections in 1994. In the first phase (1867 – 1914), the discovery of diamonds and gold resulted in a mineral revolution that saw the formation of powerful mining houses whose operations were dependent on the availability of cheap coal, repressed black labour, and access to foreign capital markets. The outbreak of World War I marked the beginning of the second phase (1914 – 1948) which saw a concerted effort on the part of policymakers to develop South Africa's industrial base, most notably through the establishment of several SOEs. The third phase (1948 – 1973) saw the introduction of apartheid, the nationalisation of the electricity industry, the inception of the country's synfuels programme, and the growth of resource-based heavy industries within the MEC. Finally, the fourth phase (1973 – 1990) was marked by the expansion and consolidation of the MEC with the rapid

growth of the country's synfuels industry and a massive electricity build programme resulting in significant overcapacity and a strategy to attract energy-intensive industries. However, by the 1980s, the country's system of accumulation had run up against its own internal constraints leading to a deep crisis in the apartheid economy. Ultimately, the consequence of this development process was a capital- and energy-intensive industrial configuration that became the structural inheritance of the post-apartheid regime.

3.1 Pre-industrial mining economy (1867 – 1914)

The discovery of diamonds in Kimberley in 1867 along with the even more consequential discovery of gold in the Witwatersrand Basin in 1885 brought about a 'mineral revolution' in South Africa that by the start of the 20th century had established the country as the major producer of these commodities within the global economy (Freund, 2018:23). Unlike other commodities which are generally prone to highly volatile market prices, gold occupied a unique position in the global economy as the foundation on which the international money supply was based (first under the gold standard and later under the Bretton Woods system) ensuring that the gold price remained relatively stable until the 1970s (Feinstein, 2005:93). As a result, gold proved to be an extremely valuable commodity that would form the basis of the country's economy and exports for next century.

Since the price of gold was fixed under the gold standard, the profitability of the industry was entirely dependent on the availability of three key inputs: capital, cheap coal and cheap black labour. The high capital requirements of the mining industry resulted in a high concentration of ownership among a few large (mostly foreign-owned) mining houses that had access to international capital markets. Starting with droves of independent miners seeking their own private fortune, the diamond mines in Kimberley quickly came under concentrated corporate control with more than 3 000 individual claims being amalgamated and consolidated under Cecil Rhodes' De Beers diamond monopoly by the late 1880s (Feinstein, 2005:99). Concentrated ownership also characterised the gold mines on the Rand, where minute gold particles were embedded in hard seams of rock extending several kilometres diagonally downwards. These conditions were not conducive to small-scale mining as the high capital costs required to establish a viable mining operation precluded smaller players. Consequently, the gold mines had to be very large to ensure a sufficient return on the capital committed in any particular area, and even then, it became necessary for large independent mines to cluster themselves into groups of corporate entities under the broader control of specific mining houses

(Wilson, 1972:22-23). The greatest advantage of this group system was that it was much easier for companies to raise capital since the risk of investment in any one mine was spread over a number of separate operations (Wilson, 1972:23). This led to the rapid growth of the gold mining industry which generated important tax revenue for the state.

In addition to capital, significant coal reserves on the Highveld provided the mining companies with low-cost energy – the second key input. As a result, the development of the country's coal resources occurred in tandem with the growth of the gold mining industry (Marquard, 2006:72). During the early-20th century, the significant electricity demands of the mines were met by coal-fired power stations controlled by the Victoria Falls and Transvaal Power Company (VFTPC), a private company formed in 1906 that quickly bought out existing competitors, signed new supply contracts with the gold mines and increased the size of its plant to such an extent that by 1914 it represented the largest power works in the world (Christie, 1984:32, 45). The exploitation of South Africa's abundant coal reserves, driven by increasing demand from the mining industry, lead to coal becoming the basis of South Africa's energy system from the late 1800s.

The availability of cheap black labour constituted the third key input. This was foundational to the profitability of the mines and as a result the availability of cheap black labour was actively supported through coercive state legislation. While ensuring an adequate supply of cheap black labour had long been an important political objective in South Africa, the mineral revolution amplified this need and prompted the formation of recruitment bodies such as the Rand Native Labour Association which was created in 1896 by the Chamber of Mines (Wilson, 1972:3). Additionally, taxation laws such those included in the 1894 Glen Gray Act were promulgated in order to push black men into the service of the mines along with legislation pertaining to land rights such as the infamous 1913 Land Act which forced black Africans into overcrowded 'native reserves' from which the mines drew much of their labour (Wilson, 1972:2-3).

In addition to these recruitment organisations and labour laws, the cost of mine labour was also kept at artificially low levels. The high concentration of ownership that characterised the mining industry allowed the goldmines to maintain extremely low wages through monopsonistic labour recruitment practices coordinated through the Chamber of Mines that limited competition (Wilson, 1972:33). Similarly, wages were suppressed in the coal mining industry through cartels such as the Transvaal Coal Owner's Association which was formed in 1908 to control the coal market by preventing competition for labour (Marquard, 2006:80).

Finally, the ability of mineworkers to organise and demand higher wages was curtailed through legislation such as the 1911 Native Labour Regulation Act which made it a criminal offence for contracted black workers to strike (Wilson, 1972:10). Together, repressive labour laws, collusive wage control and dedicated recruitment organisations were operationalised to ensure a continuous supply of cheap black labour to the mines.

By the turn of the 20th century, mining had become the principal driver of economic growth in the country predicated on access to foreign capital, the supply of low-cost coal-based energy, and the availability of cheap black labour. Large capital requirements led to a concentration of economic ownership in hands of a few large foreign-owned mining houses that generated important tax revenue for the state. Additionally, the concomitant development of the South Africa's coal resources laid the foundation for the country's coal-based energy system and hence high emissions. Finally, ensuring control over black labour became a political priority that would remain important for subsequent administrations such that by the imposition of apartheid in 1948 the institutional foundations of black repression had already been well established.

3.2 Drive towards industrialisation (1914 – 1948)

World War I provided the catalyst for South Africa's drive towards industrialisation. The war had several important effects which contributed to the development of secondary industry in South Africa, the growth of which effectively doubled between 1915 and 1920 (Christie, 1984:52). These included: disruptions to global shipping which limited imports; increased state coordination, planning and research directed at addressing problems of production; fuller employment (which in turn stimulated demand); and increased mechanisation as labour-saving devices were installed to compensate for the drafting of soldiers (Christie, 1984:52). The growth of South African industry was championed by Jan Smuts, who became Prime Minister in 1919 and embraced a form of 'state capitalism' which saw a far stronger role for state intervention in the economy than previous administrations.

Although mining had been the primary driver of growth throughout the early-20th century, by 1919 the costs of mining had increased considerably and in response, the mines had sought to lower costs by reducing wages and replacing expensive white labour with much cheaper black labour (Clark, 1994:43). This provoked strong resistance from white mineworkers culminating in a general strike in 1922 that soon escalated into a full-blown rebellion which was ruthlessly contained by Smuts' government, resulting in 230 to 250 deaths (Wilson, 1972:10). With the

prospect of mine closures threatening government revenue and further exacerbating white unemployment, both the state and the mining companies came to see the development of secondary industry as a viable solution to their challenges (Clark, 1994:44). The subsequent industrialisation drive was based on a vision that saw the development of upstream resource-based industries to provide cheap industrial inputs that would stimulate growth in the mining and manufacturing sectors (Marquard, 2006:150). Several industrial policy measures were introduced to give effect to this industrialisation drive including tariff protection, the establishment of SOEs, and the provision of development finance.

3.2.1. Tariff protection

In 1925, the Customs Tariff Act was passed and tariff protection was used to raise the prices of consumer imports in order to support the development of infant industries in line with ISI logic (Feinstein, 2005:119). The introduction of tariffs was preceded by the establishment of the Board of Trade and Industries in 1922, which was tasked with advising government on the country's tariff regime. Tariffs for industrialisation were nonetheless strongly opposed by the mining industry who saw the resultant increase in prices damaging their bottom line and therefore the introduction of tariffs generated heated debate. In addition to promoting ISI, the Tariff Act included stipulations that made the maintenance of tariffs for certain industries dependent on special conditions such as job creation and preferential labour practices that privileged white employees (Feinstein, 2005:119). However, while tariffs are generally considered one of the primary industrial policy mechanisms for countries pursuing ISI strategies, in South Africa their effect on industrialisation remained limited. Fine & Rustomjee (1996:190) note how the impact of tariff protection was constrained by poor management, the reactive nature of implementation (i.e., responsive to the interests of private capital rather than proactive in targeting specific industries) and its poor integration with additional industrial policy measures. A far more consequential industrial policy was the decision to establish several SOEs in sectors considered essential to broad-based industrial development, namely electricity and iron and steel.

3.2.2. The Electricity Supply Commission (Escom)

As the coal industry developed off the back of rapid growth in the mining industry, coal needed to be transported from the collieries in Natal to the mines in the Transvaal and to the coast for export. While the transport of coal via South African Railways had been achieved using steam powered locomotives, the electrification of the railways was considered an important objective

since electric locomotives required less labour, were more efficient, and were better able to navigate undulant terrain due to their increased power (Christie, 1984:75). The provision of electricity for the electrification of the railways was deemed best served by a state-owned electricity supplier that could provide the electricity at cost. Beyond the railways, Smuts and his advisors recognised that if state electricity could be generated cheaply (through large coal-fired power stations) and provided at cost throughout the country, this would undoubtedly help stimulate the development of local industry (Christie, 1984:76).

As a result, the Smuts administration passed the 1922 Electricity Act establishing the Electricity Supply Commission (Escom) which was tasked with the provision of a "cheap and abundant supply of electricity" that would form the basis of the country's industrial development (Marquard, 2006:126). This role was embraced by Escom's founding chairman and the key protagonist behind the country's industrialisation drive, Hendrik van der Bijl, who saw Escom's primary function being the development of secondary industry through the promotion of private enterprise based on the availability of cheap electricity.

Escom's ambitions were initially constrained by the existing control of the electricity market firstly by the VFTPC; and secondly, by local power producers who relied on their own electricity supply for municipal revenues. However, through a series of negotiations and special price agreements with the VFTPC and municipalities, Escom was nonetheless able to gradually increase its control over national electricity production while allowing existing suppliers to retain control of electricity distribution and marketing (Clark, 1994:80). While this arrangement allowed the VFTPC to generate enormous profits from its contracts with the goldmines, it crucially enabled Escom to expand its market to collieries and industrial consumers which created the economies of scale necessary to generate low-cost coal-based electricity that would form the basis of the country's industrial expansion.

3.2.3. The Iron and Steel Industrial Corporation (Iscor)

In addition to establishing a state-owned electricity company, Smuts also sought to promote the development of a modern large-scale steel industry. When private investors proved reluctant to front the investment, the Pact government (who defeated Smuts' South African Party in the 1924 elections) passed the 1928 Iron and Steel Act which created the state-owned South African Iron and Steel Industrial Corporation (Iscor). Iscor's first plant came online in 1934 and it quickly became the leading supplier of steel for South Africa's rail network. The main inputs into steel manufacture constitute iron ore, coal and electricity, for which Iscor built

its own coal-fired power station. By 1935 the company was supplying 17% of the country's aggregate steel requirements (Zalk, 2017:99) and by 1940 this figure had risen to 33% (Feinstein, 2005:121). The mining industry was the largest consumer of steel followed by the railways, however, World War II led to rapid growth in steel production as the demand for armaments increased and Iscor expanded rapidly resulting in a second steelworks being constructed in 1947 (completed in 1952) (Roberts & Rustomjee, 2010:55).

3.2.4. The Industrial Development Corporation (IDC)

While inroads had been made into state-owned electricity and iron and steel industries by the start of the war, one of the key factors inhibiting industrialisation was the lack of long-term investment capital available for the establishment of secondary industries. The prevailing weight of the mining companies in the economy meant that the majority of capital investment remained tied to gold and minerals extraction, with little incentive on the part of the mining companies to diversify (Mondi & Bardien, 2013:3). In response, the Industrial Development Corporation (IDC) was formed through the passing of the 1940 Industrial Development Act as a development bank to make finance available for industrialisation (Mondi & Bardien, 2013:4). While the Act initially protected the IDC against any political interference, with funding considered strictly on economic merits alone, this soon changed as the financial pressures of war mounted. An amendment to the Industrial Development Act was made that gave the IDC much broader scope to finance any industrial venture, and made it possible for the government to use the IDC to fund large-scale development projects of national importance (Mondi & Bardien, 2013:5). Although initially rather ineffectual, the IDC proceeded to play a central role in funding capital- and energy-intensive investments in heavy industry, constituting one of the key mechanisms through which industrial policy was exercised in support of the formation and development of the MEC.

3.3 Apartheid and the growth of the MEC (1948 – 1973)

By 1948, the institutional architecture for South Africa's industrialisation had been set. Despite the ousting of Smuts' United Party government and the election of the National Party (NP), which codified the various segregationist policies of the previous decades into a concerted project of social engineering under apartheid, economic and industrial policy remained characterised by general continuity. Nonetheless, apartheid had important implications for industrial policy, which was driven not only by economic considerations but also by political and ideological objectives. In particular, the practice of ensuring white employment through

job reservation continued and a decentralisation policy was pursued that involved the establishment of border industries on the edges of the Bantustans, rather than near the white suburbs.

In addition to these measures, a broader objective of the apartheid state was to raise the economic standing of Afrikaners relative to their largely English counterparts who continued to hold a dominant position in the economy through their ownership of the mines. For Fine & Rustomjee (1996:181), the objective of Afrikaner empowerment had a profound impact on policymaking during the apartheid era and led to an industrial policy which bolstered the core sectors within the MEC while impeding the development of a more diversified industrial base. As the existing system of accumulation, the MEC provided the means by which Afrikaner capital could grow and consequently a two-pronged industrial strategy was pursued based on the nationalisation of the electricity industry and the creation of an indigenous synfuels programme (Fine & Rustomjee, 1996:157).

3.3.1. Nationalisation of the electricity industry

Although Escom had already established itself as a central player in the supply of electricity by the 1940s, its dominant position was cemented in 1948 when it assumed monopoly control of the electricity sector through its purchase of the VFTPC. The takeover was not only in Escom's interest, but also in the interests of the mining companies for whom the cost of electricity per ton of ore milled had grown 10% during the war, largely due to the excessive profits reaped by the VFTPC (Clark, 1994:154).[2] Consequently, Anglo American Corporation (AAC), one of Escom's largest coal suppliers and electricity consumers, supported Escom's bid to purchase the VFTPC, providing £8 000 000 of the £14 500 000 paid by Escom to acquire the VFTPC's operations (Clark, 1994:156).[3]

This purchase occurred in the context of an extraordinary expansion in mining following AAC's successful prospecting in the Orange Free State (OFS). By 1960, twenty-two new mines were operating on the OFS goldfields, producing 60% of the country's total gold output and 79% of the industry's working profits (Feinstein, 2005:166). This mining windfall propelled the rise of AAC into the most powerful finance and mining house in the country, with the share of the country's total gold output produced by AAC rising from 14% in 1936 to 41% by 1969

[2] Christie (1984:104-115) notes that according to company officials, the profits of the VFTPC were larger than they 'knew what to do with', and the company resorted to creative accounting methods to hide its excessive profits.
[3] At the time, this represented the largest transaction in the country's history.

(Feinstein, 2005:167). The development of the OFS goldfields combined with expansion in industrial activity after the war substantially increased electricity demand, which by 1949 had begun to exceed supply leading to load-shedding throughout the 1950s. In response, Eskom increased generation capacity sixfold from 2 378 MW in 1948 to 14 134 MW in 1975, almost entirely through the construction of coal-fired power stations (Christie, 1984:151).

Besides increasing GHG emissions, this coal-based expansion contributed to the interpenetration of Afrikaner capital into the MEC since many of the coal supply contracts for these new power stations were awarded to Afrikaner-owned collieries. For example, Fine & Rustomjee (1996:160) note that four of the five coal supply contracts awarded in the 1960s went to Federale Mynbou (a subsidiary of Afrikaner-owned Sanlam), which by 1962 had risen to become the second largest coal producer in the country after AAC. Federale Mynbou was also invited by AAC to take over a controlling share of a portion of its gold mining enterprise (Zalk, 2017:105).[4] This agreement was particularly symbolic as it represented the accession of Afrikaner finance capital into mining and the accommodation of Afrikaner mining interests by established English mining capital (Fine & Rustomjee, 1996:161).

3.3.2. Creation of an indigenous synfuels programme

In addition to Escom's acquisition of the VFTPC, one of the most significant state investments during this period was the creation of the South African Oil and Gas Corporation (Sasol) in 1950. While South Africa had abundant supplies of coal, it had no significant indigenous source of oil, and was therefore dependent on imports to satisfy domestic oil demand. Sasol, with a small coal-to-liquids (CTL) plant in Sasolburg, was therefore celebrated as a strategically important enterprise controlled by the South African state (Sparks, 2016:715). The creation of Sasol also contributed to the growth of the chemicals sector since the CTL process produced several valuable petrochemicals used as feedstocks in the downstream chemicals industry. This provided an additional avenue through which Afrikaner capital could grow, with Sasol facilitating the development of Sentrachem (a subsidiary of Sanlam), which together with Sasol directly challenged the dominance of AAC's African Explosives and Chemical Industries (AECI) in the chemicals industry (Sparks, 2016:720).

Despite the presence of cheap coal and electricity, which constitute the key inputs into the CTL process, Sasol remained heavily dependent on state support for its operations. Funding for

[4] This later led to the formation of Gencor, which became one of the country's largest conglomerates by the end of apartheid.

Sasol came directly from the state through the IDC in exchange for shares in the company, thereby establishing Sasol as yet another SOE (Mondi & Bardien, 2013:8). This constituted by far the IDC's largest investment and by 1956, 77% of the IDC's total industrial investments were absorbed by the creation of Sasol (Fine & Rustomjee, 1996:159). Moreover, from its inception, Sasol benefited from tariff protection and was subsidised through a fuel levy based on an import-parity pricing scheme that ensured that the petrol produced at Sasol was sold at the same price as petrol provided by the oil multinationals (Sparks, 2016:717). Under this pricing system, hypothetical freight, insurance, port and transport costs were added to the price of Sasol's petrol, even though these costs were never incurred (Marquard, 2006:263). In effect, this pricing system constituted a form of subsidy to Sasol (paid for by consumers) that was essential for the SOE's economic viability.

3.3.3. Increase of manufacturing linked to the MEC

In 1956, AAC, flush with cash following the development of the OFS goldfields, began diversifying into activities outside of mining, including the manufacturing sector. This represented a broader sectoral trend as mining capital invested increasingly into rapidly-expanding manufacturing industries such that most major industrial firms came to be linked to either the state or the mining houses (Christie, 1984:160). The acquisition of manufacturing interests by the mining houses accelerated following rising international opprobrium in the wake of the 1960 Sharpeville massacre, which saw domestic mining interests buy-up existing operations owned by foreign firms eager to disinvest from South Africa (Fine & Rustomjee, 1996:161).

While a narrow sectoral reading of the growth of manufacturing from the 1960s may indicate a shift away from the country's historical dependence on mining and natural resources, a disaggregated analysis of manufacturing growth reveals that most of this increase took place in heavy industries within the MEC core. Indeed, a large proportion of fixed investment in the manufacturing sector went to steel, chemicals and minerals processing industries, with fixed investment in MEC sectors rising from 35.5% in 1961 to 49.8% in 1972 (Fine & Rustomjee, 1996:164). Owing to the capital-intensive nature of these industries and the increasing desire of companies to substitute capital for labour, the fixed capital per worker in manufacturing more than doubled between 1948 and 1974 (Feinstein, 2005:185).

In addition to increased private investment from the mining houses, the state played a critical role in the growth of heavy industry with SOE contributions to total fixed investment rising

from 6.2% in 1946 to 11.5% by 1973 (Freund, 2018:83). Initially, the IDC favoured labour-intensive industries outside the MEC, establishing two textile factories during the war, Good Hope Textiles and Fine Wool Products. However, since the capital requirements for these industries were marginal (especially compared to electricity generation and steel production) the barrier for entry into the textile market was low and the IDC's textile companies were faced with fierce competition both locally and abroad (particularly from Japan) (Clark, 1994:138). In its attempts to remain competitive while promoting economic decentralisation, the IDC sought to exploit the low costs of rural black labour by establishing its industries in or near to the Bantustans.[5] However, the extremely low wages that were seen as necessary for a viable textile industry provoked strong resistance from black workers leading to a number of strikes and unacceptably high turnover rates (Clark, 1994:139-146).[6] The inability of these firms to effectively control labour in a highly competitive industry contributed to the IDC's turn towards supporting industries with high capital requirements, thus keeping competition low (Clark, 1994:145).

In addition to Sasol, the IDC proceeded to fund several capital- and energy-intensive projects through joint ventures with private firms. One of the most significant investments occurred in the minerals processing industry where the IDC, in cooperation with Rand Mines (an AAC subsidiary) and Alusuisse, mobilised large investment funds to establish the Alusaf aluminium smelter in Richards Bay. The smelting plant came online in 1971 at a cost of R59.5 million, accounting for 16% of total manufacturing fixed investment in 1970 (Fine & Rustomjee, 1996:164). This shift in IDC funding – from labour-absorbing light manufacturing industries in textiles to capital-intensive heavy industry – mirrored broader sectoral trends with the contribution of heavy industry in manufacturing rising from 48% to 61% between 1948 and 1975 and a concomitant decline in light industry from 52% to 39% over the same time period (Feinstein, 2005:187).

Iscor was also instrumental in the growth of heavy industry during this period with the iron and steel sector accounting for over a quarter of manufacturing fixed investment in the 1960s (Fine & Rustomjee, 1996:164). After 1948, Iscor (under new Afrikaner leadership) received substantial government support allowing it to expand its operations such that by 1955, Iscor was producing 70% of the country's steel requirements (Clark, 1994:150). Similarly to the

[5] Although a 'border areas industrialisation policy' was only formally adopted in 1960, decentralisation had already been an objective of the IDC resulting in the establishment of several border industries in the mid-1940s.
[6] The turnover rates at Good Hope Textiles for example were over 100% - particularly damaging for an industry where training could last up to six months for semi-skilled workers tasked with operating machinery.

IDC, Iscor (through its investment arm, Metkor) entered into a number of joint ventures mainly with AAC, whose Highveld Steel and Vanadium project threatened Iscor's control of the steel market (Zalk, 2017:104). One of these joint ventures included the establishment of International Pipes and Steel Investment South Africa which subsequently bought out many of the country's major steel-consuming engineering companies, cementing Iscor and AAC's oligopolistic control of the domestic steel industry and their dominance over steel-consuming engineering companies (Zalk, 2017:106).

The increase of energy-intensive manufacturing industries linked to the MEC meant that by 1965, South Africa had the second highest energy intensity (i.e. energy usage per unit output) in the world (Christie, 1984:176). Since the vast majority of energy was generated from coal, this energy-intensive industrial structure resulted in a highly emissions-intensive form of development. Although South Africa's manufacturing sector grew substantially over this period, exports continued to be dominated by minerals (increasingly coal and minerals other than gold) with the manufacturing sector running a net foreign exchange deficit leaving the country's balance of payments heavily dependent on natural resource earnings (Feinstein, 2005:190). Far from marking a shift away from the country's historic dependence on resource extraction, manufacturing remained inextricably linked to the country's mineral wealth and was dependent on the availability of cheap coal-based electricity provided by Escom.

3.4 Consolidation of the MEC (1973 – 1994)

Although the growth of heavy industry was already well underway, the 1970s saw the consolidation of the MEC as the threat of an oil embargo provided the strategic impetus for a significant expansion to Sasol's CTL operations, and an oversupply of electricity capacity prompted attempts to attract investments in energy-intensive industries. While these developments provided a substantial boost to the MEC, the failure to develop broader economic linkages resulted in a constrained development path that by the 1980s contributed to a mounting crisis of the apartheid regime.

3.4.1. Sasol's expansion

While the prospect of an oil embargo against South Africa had emerged in the 1960s, it was not until two oil shocks in the 1970s that the threat of being cut off from the world's oil supplies became a pressing reality for the NP. The first shock took place in 1973 when a number of Arab oil producers imposed an embargo that forced South Africa to switch to an almost total dependence on Iran – which went from providing 54% of South Africa's oil in 1972 to 90% by

1974 (Marquard, 2006:285). The oil embargo, combined with a global increase in oil prices and a weakened rand, resulted in a doubling of imported oil's contribution to South Africa's balance of payments, however, Sasol's CTL project provided a valuable import-substitution function, reducing the negative effect on total imports by 5% to 15% (Marquard, 2006:292).

The key response from government in the wake of the embargo was the decision to dramatically increase synfuel production by constructing Sasol 2 – a massive CTL plant built on the coalfields in the Eastern Transvaal (Sparks, 2016:721). The construction of Sasol 2 (completed in 1980) represented the single largest engineering project undertaken in the country and gave rise to the small town of Secunda for the plant's workforce. A second more significant oil shock occurred in 1979 following the fall of the Shah during the Iranian Revolution. The decision by the new Iranian government to join the oil embargo posed a particular challenge for the NP since by that stage 96% of South Africa's oil came from Iran (Marquard, 2006:299).[7] In response, Sasol doubled the capacity of its Secunda plant by constructing Sasol 3 (an exact replica of Sasol 2).

The state played a critical role in enabling Sasol's expansion over this period. State funding was secured primarily through a levy on liquid fuels, as well as parliamentary grants and export credits (Marquard, 2006:298; 303). This process was initially managed by the IDC, with the chemical sector as a whole accounting for an estimated 40% of direct IDC investment up until the early 1980s (Freund, 2018:125). Extensive state financing for the construction of Sasol 2 and 3 was accompanied by regulatory measures to ensure a market for Sasol's output while guaranteeing the buy-in of the major multinational oil companies operating in the country. After the combined Secunda plant came into operation in 1982, an agreement was reached with the oil companies to mothball 30% of their refining capacity in order to accommodate Sasol's increased output (Sparks, 2016:721). Over and above the financing and favourable regulatory system provided by the state, Sasol turned to private markets for additional financing by listing on the Johannesburg Stock Exchange (JSE), making Sasol the first major parastatal to be privatised in 1979.

Importantly, this rapid increase of Sasol's CTL operations further reinforced the dominance of coal as the country's primary energy source, with synfuels accounting for 27.4% of local coal

[7] Despite the anti-apartheid position of Ayatollah Khomeini's government, Iranian oil nonetheless continued to flow to South Africa after 1979, often in exchange for arms. For a detailed account of the actors, networks and mechanisms used by the apartheid state to circumvent the oil embargo (and arms sanctions in particular), see van Vuuren (2017) *Apartheid, Guns and Money*.

consumption by 1989 (Gerson, 1992:12). Additionally, since the CTL process required considerably more energy than standard crude refineries, Sasol's expansion significantly increased the energy intensity of the economy (Marquard, 2006:254). Consequently, as seen in Table 1, the construction of Sasol 2 and 3 had a substantial impact on GHG emissions, with the Secunda plant accounting for 15.8% of CO_2 emissions from coal by 1989.

Sector	CO_2 (kt)	CO_2 (%)
Electricity generation	147 902	65.3
Synfuels*	35 905	15.8
Industry	20 680	9.1
Metallurgical	17 490	7.7
Domestic	3 608	1.6
Mining	638	0.3
Transport	352	0.2
Total	226 575	100

* Sasol 2 and 3 only

TABLE 1 Sectoral breakdown of CO_2 emissions from coal in 1989. Source: Adapted from Gerson (1992:14).

In addition to GHG emissions, Sasol's expansion had a considerable impact on the capital intensity of the economy. From the 1980s, Sasol capitalised on its production of petrochemicals by diversifying more heavily into chemicals, displacing AECI as the dominant basic chemicals firm in the sector (Roberts & Rustomjee, 2010:62). This resulted in a significant increase in the capital intensity of manufacturing, with the chemicals sector accounting for nearly 40% of this increase between 1971 and 1988 (Levy, 1992:6). This mirrored broader trends in the economy as capital-intensive industries displaced more labour-absorbing industries throughout the second half of the 20th century. Indeed, Levy (1992:4) notes how the share of capital stock in six of the most labour-intensive subsectors (clothing, leather, footwear, wood, furniture and metal products) declined from 20.1% in 1951 to a mere 5.3% in 1988; whereas the most capital-intensive subsectors (chemicals, basic metals, and paper) saw an increase from 24% in 1951 to 56.2% in 1988.

3.4.2. Escom's coal-based expansion and strategy to attract energy-intensive industry

The increasing capital- and energy-intensity of the manufacturing sector was boosted further by parallel developments in the electricity sector. During the 1970s, electricity demand increased dramatically in part due to fuel switching from oil-based generators to electricity

after the 1973 oil shock but also due to increasing investments in energy intensive beneficiation and minerals processing projects such as the Alusaf Bayside Aluminium smelter commissioned in 1971. Consequently, between 1971 and 1975, Escom was unable to match the rate of demand growth and as a result, Escom began a massive build programme to bring additional plant online. The vast majority of new generation came from coal and included the construction of the Matla and Duvha coal-fired power stations (each of which ran six 600 MW units) followed by the construction of the Lethabo and Tutuka plants (respective copies of the former two plants) in response to further demand growth increases in the wake of the second oil shock in 1979 (Steyn, 2006:14-15). Determined not to constrain economic growth, Escom's CEO, Jan Smith, commissioned the construction of three additional 4 000 MW coal-fired power stations (Matimba, Kendal and Majuba) in the early 1980s (Steyn, 2006:19).

As a result of this expansive build programme, between 1973 and 1994, Escom's installed capacity more than tripled (see Figure 2). By the end of 1989, Eskom (renamed in 1987) had 18 coal-fired power stations in operation (totalling 29 881 MW), which together accounted for nearly two thirds of all emissions from coal that year (Gerson, 1992:12). However, by the mid-1980s, it was clear that Escom's demand projections had been significantly exaggerated and what had begun as a crisis of under-capacity quickly morphed into a long-term problem of over-capacity, with the reserve margin rising from a mere 11% in 1975 to approximately 40% by the early 1990s (Steyn, 2006:14, 38).[8]

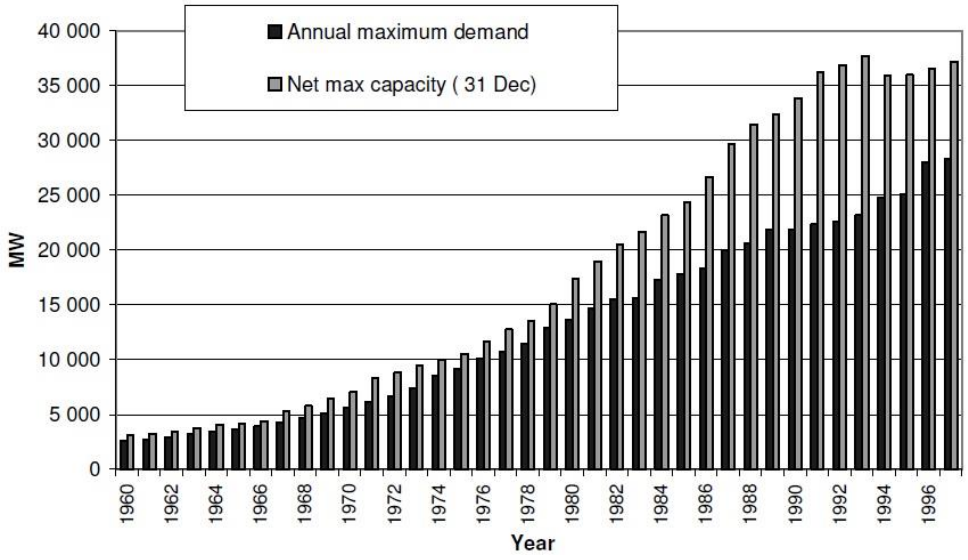

FIGURE 2 Eskom net maximum capacity and maximum demand. Source: Steyn (2006:13).

[8] A 17% reserve margin was considered sufficient by Escom engineers. These figures therefore highlight the severe under-capacity of the 1970s and the dramatic over-capacity that characterised the electricity system by the early 1990s.

In response, Eskom sought to make use of its surplus capacity by encouraging investments in energy-intensive activities. Providing low-cost electricity was a key element of this strategy as evident in Eskom's 1991 'price compact' which sought to reduce the real price of electricity by 20% over a period of five years (Black & Hasson, 2016:296). Consequently, major investments into metals processing took place in the 1990s with the state playing a key role not only by supplying cheap electricity but also by providing infrastructure and offering significant tax breaks to energy-intensive companies. For example, Columbus Stainless Steel (a joint venture with the IDC) and Saldanha Steel (a joint venture between Iscor and the IDC) benefitted from extremely low electricity prices and received significant 37E tax breaks directed towards energy-intensive projects beneficiating locally-sourced materials (Roberts & Rustomjee, 2010:55).[9] Another notable beneficiary of this strategy was Alusaf's Hillside aluminium smelter near Richard's Bay (Burton, 2011:42). In this case, Eskom agreed to supply Alusaf's electricity requirements (approximately 23% of production costs) at a considerable discount by pegging the price of electricity directly to the price of aluminium on the London Metal Exchange (Baker, 1996:12).[10] The Alusaf project also benefited from significant tax breaks after 1992 when Section 37E of the Income Tax Act was extended to cover projects beneficiating imported materials (Fine & Rustomjee, 1996:202). As a result of these measures, by the end of 1993, Eskom's industrial electricity tariffs were among the lowest in the world (van Horen, 1997:34) and the state was actively promoting the establishment of energy-intensive industries to make use of Eskom's excess capacity.

3.4.3. Constrained development and apartheid in crisis

Despite improvements in productivity associated with mechanisation, by the mid-1980s the gold mining industry was unable to contain the rising costs of production as ore grades declined and extraction costs escalated amidst sluggish international demand (Feinstein, 2005:209). Consequently, gold output fell sharply, old mines were closed, and rationalisation programmes were introduced cutting the number of workers employed in the gold mines from a peak of over 530 000 in 1986 to fewer than 200 000 by the end of the century (Feinstein, 2005:210).

[9] It is worth noting that while the 37E tax incentive attempted to promote downstream manufacturing by requiring firms to price domestic products at levels that did not exceed their exports, Saldanha Steel circumvented this requirement by simply refusing to sell directly to local companies.

[10] The price of electricity is particularly important for the viability and competitiveness of aluminium smelting in South Africa due to the lack of domestic reserves of bauxite (the raw material used to make aluminium) which has to be imported.

The poor performance of gold mining occurred in the context of a mounting domestic economic crisis as South Africa's system of accumulation ran up against its own internal constraints.

In particular, the economy was hamstrung by an industrial structure rooted in the MEC that failed to develop productive economic linkages forward from upstream heavy industries and backward from (largely protected) consumer goods (MERG, 1993:213). The consequent absence of sufficient capabilities in capital and intermediate goods meant that economic growth was dependent on imports for the bulk of technology, machinery and equipment, which in turn put pressure on the country's balance of payments (Marais, 2011:28). With exchange reserves overwhelmingly dependent on mineral exports (particularly gold) and foreign capital inflows, South Africa's industrial structure left the economy highly vulnerable to external economic shocks (Marais, 2011:28). As a result, declining capital inflows and rising outflows (especially after the 1976 Soweto Uprising) combined with the poor performance of the gold mining sector proved to be consequential factors contributing to a deep crisis in the apartheid economy.

The crisis came to a head in 1985 when Chase Manhattan Bank refused to rollover important loans to South Africa and the government instituted a debt standstill on foreign loan repayments. In an effort to prevent a rapid exodus of capital, the state imposed strict capital controls which led to a spate of domestic mergers and acquisitions which further eroded the disjuncture between Afrikaner and English capital and led to a significant increase in corporate concentration in the economy (Fine & Rustomjee, 1996:193). Concentration of corporate ownership increased to such an extent that by 1992, 85.7% of all shares on the JSE were controlled by six main conglomerate groups: AAC (with 33.7%), Sanlam (15.6%), the Rembrandt Group (14.6%), SA Mutual (14.2%), the Liberty Group (4.7%), and Anglovaal (2.9%) (Joffe, 1995:149). Together these conglomerates dominated MEC core industries with their control extending across a large proportion of the country's core mining, manufacturing and financial assets (Fine & Rustomjee, 1996:96). This high economic concentration meant that as the country entered a period of democratic transition, big business (intent on preserving the existing accumulation strategy rooted in the MEC) had considerable influence over the policies adopted in the immediate post-apartheid era.

3.5 Summary: Structural inheritance of the new South Africa

This chapter has located the historical antecedents of South Africa's high-emissions low-employment development path in the country's capital- and energy-intensive industrial structure rooted in the MEC. The existence of this development pathway was not an automatic

process but was actively forged by a combination of industrial and energy policies throughout the 20th century. In particular, Eskom, Iscor, Sasol and the IDC were the primary entities through which industrial policy was exercised and proved instrumental in the development of the MEC.

This MEC-dominated industrial structure meant that by the time the ANC came to power in 1994, it inherited one of the most energy-intensive economies in the world, with 92% of the electricity generated in the country coming from coal (van Horen, 1997:32). Being one of the most polluting fossil fuels, the country's coal-based power sector combined with an industrial structure dominated by energy-intensive heavy industries within the MEC led to an economy with an incredibly high emissions-intensity. By 1988, South Africa was one of the largest emitters of GHGs on a per capita basis, the largest emitter in Africa, and the eighteenth largest by total emissions (accounting for 1.2% of global GHG emissions) (van Horen, 1997:53). The high per capita emissions of South Africa at the end of apartheid are even more remarkable when considering that the vast majority of the black population were excluded from access to electricity for most of the 20th century. In a rough approximation of disaggregated emissions, Durning (1990:25) found that the carbon emissions of white South Africans in 1990 were likely nine times the global average, making them the world's highest GHG emitters on a per capita basis.

In addition to high emissions, the capital-intensive nature of the MEC contributed to low rates of employment. Indeed, the failure to develop sufficient capabilities in capital and intermediate goods constrained the growth of more diversified manufacturing industries leaving the sector dependent on an extremely narrow base dominated by resource-based heavy industries within the MEC. The high capital-intensity of these industries undermined the sector's ability to generate jobs, with almost no increase in manufacturing employment taking place from 1976 to 1988 (Levy, 1992:2). This inability to absorb labour occurred despite periods of considerable manufacturing investment and sectoral growth. Between 1976 and 1981 for example, manufacturing value added increased by an average of 6.1% annually, whereas employment grew at an average of only 1.4% per year (Levy, 1992:2). Consequently, by the time the commodity-driven boom of the 1970s had run its course, the manufacturing sector was unable to compensate for the loss of jobs in the mining sector, resulting in chronic unemployment. As a result, by 1994, the reduced demand for unskilled labour combined with an expanding labour market resulted in the unemployment rate rising to approximately 20% (30% if discouraged job seekers are included) (Seekings & Nattrass, 2015:83).

Industrial policy played an important role in shaping this capital- and energy-intensive development path, particularly through the operations of the SOEs. Eskom provided cheap electricity that was used to attract capital- and energy-intensive heavy industries, many of which would otherwise not have been economically viable. Similarly, Iscor in partnership with private enterprise was instrumental in the development of the country's iron and steel industry. Sasol's CTL programme extended South Africa's dependence on coal from the power sector into liquid fuels while providing the petrochemical feedstocks on which the capital-intensive chemicals sector developed. Finally, while the IDC had initially sought to establish labour-intensive textiles industries, its investments soon shifted to capital-intensive projects largely due to the difficulties it experienced in controlling labour. The operations of these SOEs were supported by further industrial policy measures such as the provision of infrastructure, tax incentives and electricity pricing schemes, all of which contributed towards the development of a capital- and energy-intensive industrial structure that became the economic inheritance of the post-apartheid regime.

Importantly, this economic inheritance was accompanied by a corresponding inheritance of an institutional configuration and mode of operation that formed the basis on which apartheid industrial policy had been administered (Fine, 1997:134). As noted by Marquard (2006:71), the administration of apartheid industrial policy extended across multiple sectors with overlapping policy networks that were co-ordinated by an informal 'industrial policy elite' spanning multiple state agencies (such as the IDC), with close connections to the political and economic elite. As a result, by the time of the historic 1994 elections, the incoming ANC government inherited an industrial, institutional and corporate structure centred around the MEC that set the country on a high-emissions low-employment development trajectory.

4. Post-apartheid industrial and climate policy

This chapter considers how the incoming ANC government sought to engage with the MEC and reorient the country's high-emissions low-employment development pathway in a more sustainable direction. In particular, the chapter looks at the role and effectiveness of post-apartheid industrial and climate policy in altering South Africa's industrial structure with the aim of achieving a low-carbon and employment-generating economy.

The sequence of post-apartheid industrial development is traced over three periods from the ANC's historic 1994 electoral victory to the present. In the first phase (1994-2007), the ANC's embrace of neoliberalism resulted in increased liberalisation, corporate restructuring and the

absence of an overarching industrial policy framework. However, despite appeals to the virtues of the free market, several fragmented industrial incentives continued to support the growth of the MEC in the first decade of democracy. The second phase (2007-2018) saw the introduction of official industrial and climate policies in the context of a broader economic policy framework that sought to shift the economy onto an inclusive low-carbon development path. However, challenges associated with policy implementation constrained their effectiveness with the economy exhibiting signs of premature deindustrialisation and the persistent dominance of MEC industries in the manufacturing sector. Finally, the election of President Cyril Ramaphosa marked the beginning of the third phase (2018-present) in which the country's changing political, technological and economic landscape has begun to undermine the cumulative causal dynamics of the MEC and opened the opportunity for a just transition to an inclusive low-carbon society.

4.1. Liberalisation and fragmented industrial incentives (1994 – 2007)

The end of apartheid in 1990 and the subsequent ANC election victory in 1994 marked one of the most profound turning points in South Africa's political history. However, the ANC's political victory was not accompanied by a commensurate shift in the country's economic structure. In order to understand this structural continuity, it is first necessary to look back at the process of ANC economic policy formation that took place during the transition to democracy in the early 1990s.

4.1.1. Economic policy stance of the NP and big business at the start of negotiations

Although the conglomerates had expanded in large part due to capital controls imposed by the apartheid government, at the start of democratic negotiations in 1990, one of their core interests was to ensure a liberalised trade environment that allowed them to offshore their investments and establish overseas listings. This trade liberalisation objective was shared by the ruling NP which from the start of the economic crisis in the late-1970s had begun to shift away from its previous interventionist stance towards a more market-oriented dispensation that abandoned any state-led industrial strategy (Marais, 2011:32).

Consequently, by the time official negotiations with the ANC began in 1990, the economic policy stance of the NP and big business in South Africa was decidedly market-oriented and in line with the prevailing Washington Consensus which characterised economic orthodoxy at the time (Padayachee & van Niekerk, 2019:76). This was most clearly outlined in the NP's official economic policy document the Normative Economic Model (NEM) published in 1993 which

outlined a ‘redistribution through growth strategy’ emphasising the need for fiscal restraint, lower inflation, trade liberalisation and minimal state intervention (Terreblanche, 2002:83).

4.1.2. Economic policy stance of the ANC at the start of negotiations

While the interests of the NP and big business had coalesced around an economic policy centred on neoliberalism, the ANC had not prioritised the formulation of a coherent economic policy by the start of negotiations. Having been preoccupied with the goal of first assuming political power through a revolutionary overthrow of the apartheid government, the ANC was not prepared for the incremental negotiated settlement that transpired (Terreblanche, 2002:85). Nonetheless, as expressed in the 1956 Freedom Charter, the ANC’s broader ideology had for decades been rooted in social democracy espousing a mixed economy that saw an important role for the state in ensuring the achievement of a just and equitable society (Padayachee & van Niekerk, 2019:20).

This ideological stance was evident in a Discussion Document on Economic Policy published by the ANC in 1990. The document was highly critical of the monetarist policies adopted by the NP while stressing the need for a fundamental restructuring of the economy by charting a new development path based on ‘growth through redistribution’ (DEP, 1990:4). In contrast to the NP’s later published NEM, public investment in basic services was seen not only as providing for pressing human needs but also as an important catalyst for stimulating demand with multiplier effects that spillover to other sectors of the economy (DEP, 1990:14). In line with this neo-Keynesian approach, the restructuring of industry through a targeted industrial policy was seen as an essential component in ensuring that new productive capacity was developed to meet the demand for basic needs created through redistribution (DEP, 1990:8). While markets and the private sector were considered essential, the role of the state was seen as paramount in setting the direction of development and coordinating all sectors and interest groups towards the country’s development objectives (DEP, 1990:12).

In addition to the discussion document, the ANC established the Macroeconomic Research Group (MERG) in 1991 to undertake economic policy research and training to inform the ANC’s economic policy stance. MERG’s 1993 report Making Democracy Work was heavily critical of the NEM and its trickle-down logic, arguing instead that direct interventions were necessary to set the country on a new growth path (MERG, 1993:4). As a precursor to Fine & Rustomjee’s (1996) MEC thesis, the MERG report diagnosed the primary cause of manufacturing decline as lying in the lack of further economic integration of the sector –

through forward linkages from mining/energy, and backward linkages from consumer goods – which had resulted in a narrow mining and minerals processing base on which manufacturing was dependent (MERG, 1993:213). The report criticised the notion that uninhibited markets and unregulated private capital would drive economic restructuring, and instead saw a significant role for the state in reshaping the direction of development (MERG, 1993:220). Consequently, industrial policy was considered essential including measures such as determining output and pricing decisions, promoting indigenous technology, R&D, and making tax breaks conditional on labour-intensive employment guarantees and the development of downstream processing industries (MERG, 1993:221).

4.1.3. ANC-business engagement and the shaping of ANC economic policy

Although the ANC had initially espoused a mixed economy with an active role for industrial policy, throughout the 1990s, business sought to engage the ANC on economic matters with the intention of guaranteeing an economic dispensation favourable to their interests. In particular, the conglomerates pushed for exchange control liberalisation and overseas listings, arguing that this would allow them to raise capital more cheaply in international markets while simultaneously encouraging inward foreign direct investment to grow the economy (Chabane et al., 2006:558).

Although business had been engaging the ANC in exile from the mid-1980s, the pace and scale of ANC-business engagement increased dramatically following the unbanning of the ANC in 1990 (Hirsch, 2020:5). This engagement included several scenario planning exercises (such as those held at Mont Fleur in Stellenbosch) which made the case for a highly conservative economic policy that prioritised macroeconomic stability (Bond, 2000:59). A core feature of these scenario exercises was their emphasis on the dangers of so-called 'macroeconomic populism', a term used to discredit policies aimed at redistribution through increased social spending. Ultimately, business was successful in convincing the ANC of the need to create an economic environment that promoted business confidence while warning of the impracticality of significant government interventions for economic restructuring and redistribution.[11]

The ANC's ideological shift culminated in the embrace of an orthodox market-based approach as expressed in the publication of the Growth Employment and Redistribution (GEAR) policy

[11] Although business played a central role in shaping ANC economic policy, a confluence of additional factors contributed to the shift in ANC economic policy such as the end of the Cold War and a lack of technical policymaking capacity within the ANC. See Padayachee & van Niekerk (2019) for a more comprehensive account.

in 1996. While GEAR professed a commitment to the redistributive rhetoric of the Reconstruction and Development Programme (RDP) (on which the ANC had successfully campaigned in the 1994 elections), its emphasis on fiscal restraint, deregulation and minimal state intervention were in direct contradiction to the developmental thrust of the RDP (Habib & Padayachee, 2000:252). The major economic policies were liberalisation of trade and capital flows, moves towards privatisation, a macroeconomic policy predicated on the need to ensure 'stability', fiscal policy aimed at cutting the public deficit and monetary policy preoccupied with controlling inflation (DF, 1996:2). As outlined below, this neoliberal approach to South Africa's development had a considerable impact on both corporate and economic restructuring in the first decade of democracy.

4.1.4. Trade liberalisation and uneven industrial performance

With the adoption of GEAR, trade liberalisation continued apace throughout the first decade of democracy. The average industrial tariff was reduced from 23% in 1994 to a mere 8.2% by 2006 – an even more rapid phase down than that required by the World Trade Organisation which South Africa joined in 1993 (Zalk, 2014:332).[12] The need to ensure macroeconomic 'stability' was anchored in the formal adoption of inflation targeting, which sought to limit inflation to between 3-6% (Zalk, 2014:331). The resultant high interest rates combined with capital account liberalisation, currency speculation and high natural resource earnings during the 2000s commodities boom led to pervasive currency overvaluation and volatility (Bell et al., 2018:iii). Despite the poor and declining performance of mining, Zalk (2014:336) argues that these developments led to a form of 'Dutch Disease' in which the overvaluation of the Rand during the mid-2000s had a dire impact on the competitiveness of manufacturing exports.

The impacts of liberalisation were nonetheless unevenly distributed within the manufacturing sector. In particular, while international trade increased rapidly, heavy industries within the MEC were best positioned to take advantage of the opening up of the economy due to their existing comparative advantage (in large part due to historical state support) (Roberts, 2008:17). As a result, resource-based heavy industries grew rapidly with the capital-intensive minerals, basic metals, basic chemicals, and pulp and paper sectors accounting for approximately 60% of merchandise exports between 1994 and 2007 (Black & Roberts,

[12] While overall tariffs were reduced dramatically over this period, certain sensitive sectors such as automotives and clothing and textiles received additional protection in an attempt to minimise the economic shock of import penetration.

2009:221).[13] Conversely, several labour-intensive manufacturing industries performed poorly with the textiles and footwear sectors experiencing negative average annual growth rates of -1.5% and -2.8% respectively between 1994 and 2007 (Black & Roberts, 2009:219). The strong performance of capital-intensive resource-based industries and the concomitant destruction of industrial capabilities of more diversified labour-intensive industries indicates how rather than shifting the country towards a more productive development path, liberalisation and hawkish monetary policy contributed to further structural regression over this period.

4.1.5. Corporate restructuring and financialisation

Macroeconomic policy and the lifting of capital controls had a significant effect on corporate operations and was to a large extent managed to enable the South African conglomerates to disinvest from the country (Fine, 2008:4). In 1997, South African companies increased outward investments and over the next few years several of the largest conglomerates secured primary and secondary overseas listings (Habib & Padayachee, 2000:256). This included many large corporations within the MEC such as Billiton which listed on the London Stock Exchange (LSE) in 1997, AAC which listed on the LSE in 1999 and Sasol which established a secondary listing on the New York Stock Exchange in 2003.

Rather than facilitating access to foreign capital for domestic investment, overseas listed companies tended to focus on outward acquisitions and investments, with little benefit accruing to the South African economy more broadly (Chabane et al., 2006:559). Consequently, while GEAR's economic strategy centred on attracting foreign productive investment, capital inflows were significantly short of projections and those that did occur tended to be short-term, highly mobile and volatile (Habib & Padayachee, 2000:258). Instead, liberalisation opened the floodgates for a mass exodus of domestic capital through legal and illegal capital flight, which rose from an average of 9.2% of GDP per year between 1995 and 2000, peaking at a staggering 23% in 2007 (Ashman et al., 2011:9).

[13] The strong performance of the automotives sector (which accounted for 21% of manufactured exports in 2007) is an important exception to this resource-based representation of manufacturing, with the industry having benefitted from targeted export incentives under the Motor Industry Development Programme between 1995 and 2012.

Ownership and market concentration

Liberalisation was accompanied by a period of corporate unbundling and consolidation throughout the 1990s and 2000s that led to much-reduced levels of overall concentration of ownership within the economy (see Table 2). This process was initiated by Gencor in 1993 when it sold off a range of non-mining assets to create Billiton, with several other companies following suit leading to a peak of unbundling deals in 1999 (Chabane et al., 2006:555).

	1985	1990	1991–1995	1996–2000	2001–2003	2004
Anglo American Corp	53.6	44.2	38.9	22.7	23.3	18.7
Sanlam	12.2	13.2	12.7	11.2	6.1	2.7
Stanbic/Liberty Life	2.0	2.6	5.8	9.0	5.2	4.7
Rembrandt/Remgro	3.8	13.6	13.2	10.2	9.2	7.9
SA Mutual/Old Mutual	10.6	10.2	11.2	10.4	9.9	4.5
Anglovaal	2.1	2.5	3.1	1.2	0	0
Black-owned groups	–	–	–	7.4	4.2	6.3
Top 5 groups collectively	82.3	83.9	85.9	70.6	53.6	38.5

TABLE 2 Control of Johannesburg Stock Exchange market capitalisation (% of total). Source: Chabane et al. (2006).

The selling-off of non-core assets through unbundling was accompanied by a simultaneous process of consolidation as companies sought to increase their control of production chains through vertical mergers and acquisitions, especially in upstream industries within the MEC (Chabane et al., 2006:557).[14] Consequently, while overall market concentration was reduced, concentration *within* industries remained high with unbundled conglomerate corporations often retaining their dominant market positions (Black & Roberts, 2009:228). High concentration within industries allowed upstream resource-based firms to leverage their market power by charging excessive import parity prices for products such as steel and basic chemicals that constituted critical material inputs for downstream manufacturers (Black & Roberts, 2009:230). As noted by Black & Roberts (2009:230) such pricing was effectively a costly transfer of rents to capital-intensive upstream industries from more labour-intensive downstream industries who received no benefits from the low-cost production of basic inputs.[15]

[14] AAC is a prime example of this process as it gradually sold off stakes in non-core operations to concentrate its core focus on mining.

[15] This is especially true for downstream industries where material inputs comprise a large portion of production costs such as the fabricated metal products industry where basic iron and steel make up 42% of inputs and the downstream plastics industry where polypropylene accounts for 51% of input costs.

As a result, while average corporate profits within upstream MEC industries were high, the profitability and international competitiveness of downstream industries was constrained by high material input prices leading to a perpetuation of past industrial patterns (Bell et al., 2018:22).

Financialisation

The processes of offshore listing and corporate unbundling in South Africa were accompanied by the rapid growth of the finance sector, with its contribution to GDP more than doubling from 6% in 1994 to 13% in 2010 – a rate of growth that outstripped all other sectors in the economy (Zalk, 2014:338). However, while the finance sector grew in terms of value added, this was not accompanied by growth in employment or increased levels of fixed investment in the economy (Bell et al., 2018:9). This was symptomatic of a much broader global phenomenon known as 'financialisation', which Epstein (2005:3) defines as "the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies".

In South Africa, financialisation has seen an increase in short-term speculative investment at the expense of long-term fixed investment in the economy (Isaacs, 2018:280). While financialisation is certainly a global phenomenon, in South Africa it has taken place against the backdrop of a system of accumulation defined by the MEC. Although the growth of finance may give the impression of a decline in the importance of the MEC, it is better understood as a shift in the scope of MEC influence beyond mining and related sectors alone (Ashman et al., 2011:14). Indeed, as noted by Newman (2019:27), financialisation has not only kept overall levels of private fixed investment low but has also reproduced patterns of investment favouring resource-based heavy industries, leading to a 'financialised MEC'. Of the limited investments in manufacturing, for example, these have tended to be skewed towards capital-intensive coke and refined petroleum products and basic chemicals (driven by Sasol, who has accounted for the majority of investments) while downstream investments in diversified manufacturing industries have remained low (Bell et al., 2018:14).

Changing composition of ownership

Liberalisation and financialisation were accompanied by changes in the composition of corporate ownership. In line with global trends, foreign ownership of the JSE increased 4% in the late 1990s to 42% in 2016 with the percentage of local institutional investors rising from 3.9% to 18.1% over the same period (Bell et al., 2018:20). Increases in foreign ownership were

mainly due to domestic companies listing overseas, rather than new greenfield investments. Additionally, the rise of institutional investors has focused attention on short-term financial gains while weakening the appeal of long-term fixed investments (Bell et al., 2018:19). This has been supported by post-apartheid economic policies such as the relaxing of capital controls and high interest rates.

Black Economic Empowerment (BEE) policies have also had a significant impact on the composition of ownership within the economy. BEE was initiated by the conglomerates as a means of bringing the black elite on-board with the existing, albeit evolving, system of accumulation under the MEC (Newman, 2019:13). Although ostensibly aimed at expanding economic opportunities for black South Africans disenfranchised by centuries of colonial and later apartheid rule, BEE policies have tended to focus on transfers of ownership (mainly in the mining sector) often benefiting a small politically connected elite (Hirsch, 2020:15) and have not been aligned or leveraged to achieve greater development of downstream labour-absorbing industries (Zalk, 2014:334).

Changes in ownership were further facilitated by privatisation which remained a central policy thrust in the first decade after democracy. Privatisation had already become state policy over the 1980s beginning with the privatisation of Sasol in 1979 followed later by the privatisation of Iscor in 1989, which was later acquired by ArcelorMittal. The post-apartheid push for the privatisation of SOEs and public services more broadly had important implications for the energy sector. While Eskom remained state owned, attempts to increase competition by restructuring the power utility and passing responsibility for building new generation capacity to the private sector were outlined in the 1998 White Paper on Energy Policy (DME, 1998:42). However, the inability of the Department of Minerals and Energy to secure investments from private sector Independent Power Producers (IPPs) led to a *de facto* moratorium on the building of new generation capacity (Trollip et al., 2014:11). By the time Eskom was given the go-ahead to carry out the next build phase in 2004 (involving the construction of two 4 800MW coal-fired power plants) it was too late to avoid a severe electricity capacity crisis which was officially declared in 2008 amidst bouts of load-shedding (Trollip et al., 2014:11).

4.1.6. Fragmented industrial support for heavy industries within the MEC

The ANC's embrace of free markets meant that industrial policy was not given a prominent role in shaping the direction of post-apartheid development. Instead, it was assumed that trade liberalisation would reveal the country's 'true' comparative advantage and that exposure to

international competition would enable the market to reallocate investment to more productive areas. However, despite the absence of an overarching industrial policy framework, a number of fragmented industrial policy programmes were nonetheless initiated with the intention of developing a more internationally competitive and outward-oriented manufacturing sector.

The initiatives adopted were mostly horizontal 'supply-side' interventions intended to establish the framework conditions for the efficient and competitive production of goods through subsidies and other incentives (Rustomjee & Hanival, 2010:26). In contradiction to the state's avowal of market mechanisms in revealing the country's true comparative advantage, public support through tax incentives, IDC finance and cheap electricity continued to disproportionately favour the expansion of heavy industry within the MEC (Burton, 2011:23).

Tax incentives

After the 37E Tax incentive (see Chapter 3) expired in 1999, it was replaced by the Strategic Industrial Projects (SIP) programme which provided R7.7 billion of tax relief during its period of operation between 2002 and 2007 (Burton, 2011:25). The SIP reinforced the predominance of the MEC by favouring capital-intensive upstream industries in metal smelting, chemicals and pulp and paper (Rustomjee & Hanival, 2010:47). Roberts (2008:24) notes that the average capital-labour ratio of SIP projects was R3.7 million per employee, making these projects some of the most capital-intensive activities in the manufacturing sector.

IDC funding

Furthermore, the IDC played a major role in supporting heavy industry and was one of the key determinants of manufacturing investment over this period. While IDC support accounted for a relatively small 4-6% of total national gross fixed capital formation, it was nonetheless concentrated in a few specific industries where it has had a disproportionate effect (Rustomjee & Hanival, 2010:58). As during apartheid, the IDC continued to favour capital-intensive projects in resource-based heavy industries such as large-scale minerals beneficiation projects. Consequently, during the first decade of democracy, the IDC reinforced the country's dependence on the MEC with 56% of IDC funding going to heavy industries in metals, machinery, mining, chemicals and minerals processing between 1995 and 2005 (Goga et al., 2019:1).

Electricity pricing policy

In continuity with arrangements under apartheid, low-priced electricity was leveraged to incentivise energy intensive investments during the first decade of democracy. Special pricing agreements with energy intensive industries resulted in electricity prices that were much lower than the industry benchmark (Black & Roberts, 2009:237). In 2005 for example, the Department of Trade and Industry (DTI) introduced a Developmental Electricity Pricing Programme (DEPP) which sought to encourage international investment in new energy-intensive projects by guaranteeing them an attractive rate of return based on low electricity prices (Winkler & Marquard, 2008:11). While low DEPP tariffs were ostensibly conditional on upstream firms passing on the cost savings to labour-absorbing downstream beneficiation industries, enforcement of this stipulation was weak (Burton, 2011:26). Besides these special pricing agreements, standard electricity tariffs (set under rate of return calculations) were based on Eskom's assets at historic cost which under-represented the costs of expanding generation and resulted in electricity prices that were far below the long-run marginal cost of supply (Black & Roberts, 2009:236). Consequently, during the early 2000s, electricity prices in South Africa were the lowest in the world, with the price of Eskom's electricity averaging 2.5USc/kWh up until as late as 2007 (Morris & Martin, 2015:46). Together, these policies ensured that low-priced electricity in the first decade of democracy continued to attract energy-intensive firms, thus reinforcing the dominance of traditional upstream industries within the MEC.

4.2. Introduction of industrial and climate policy frameworks (2007 – 2018)

Although GEAR was the guiding policy during the first decade of democracy, by 2006 government's enthusiasm for strongly market-led growth had begun to wane, with the publication of the Accelerated and Shared Growth Initiative for South Africa (AsgiSA) in 2006 being a clear indication of the government's shift towards a more interventionist stance. Consequently, landmark industrial and climate policies were adopted with several economic planning documents indicating the government's intention to shift towards an inclusive low-carbon society.

4.2.1. Formal industrial and climate policies

The year 2007 marked an important milestone in the development of South African industrial policy with the DTI's publication of its National Industrial Policy Framework (NIPF) along with a series of annually updated Industrial Policy Action Plans (IPAPs) that set out the key actions and timeframes for the implementation of various industrial policy interventions. While

fragmented industrial policy interventions had been carried out since 1994, until 2007 there had been no overarching industrial policy framework to guide these interventions. The NIPF signified an important break with previous policies aligned with the Washington Consensus by highlighting the need for more targeted government intervention in the economy. In this vein, industrial policy was considered essential for economic development with the NIPF stating that "there are virtually no examples of developing countries that have industrialised rapidly without a robust and well-implemented industrial policy" (DTI, 2007:10). The NIPF outlines a vision for South Africa's industrial development including: (1) diversification away from the country's current reliance on traditional commodities and non-tradable services; (2) the promotion of labour-absorbing industries with economic linkages that stimulate broader employment; and (3) greater participation of historically disadvantaged people in the manufacturing sector (DTI, 2007:2). From these objectives it is clear that the NIPF sought to shift South Africa away from its dependence on heavy industries within the MEC towards a more diversified, labour-absorbing and inclusive industrial development path.

Additionally, this period saw the emergence of significant policies and measures aimed at combating climate change specifically. A major catalyst for the development of these initiatives was the 2007 Long-Term Mitigation Scenarios (LTMS) process which provided the technical evidence base for the country's future climate mitigation policies (Scenario Building Team, 2007:11). Based on the LTMS's technical work and stakeholder process, Cabinet outlined a peak-plateau-decline emissions trajectory for South Africa in 2008. The outcomes of the LTMS informed President Zuma's speech at the 2009 Copenhagen negotiations, in which he announced a voluntary target for a reduction in national CO_2 emissions by 34% below business-as-usual by 2020, and 42% by 2025 (DEA, 2010:2).

These emissions targets informed South Africa's first Integrated Resource Plan (IRP) which outlined the country's future energy demand and the corresponding future energy mix which included an expanded role for renewable energy (RE) alongside continued investments in coal. Furthermore, the LTMS provided key information for the development of South Africa's principle climate change policy, the National Climate Change Response White Paper (NCCRWP) adopted in 2011, which outlines a vision for the transition to a climate-resilient and low-carbon economy through various adaptation and mitigation measures (DEA,

2011:5).[16] The White Paper acknowledges that the vast majority of South Africa's emissions come from energy supply (electricity and liquid fuels) and use (mining, industry and transport), and that mitigation actions in these areas offers the greatest potential for reducing national GHG emissions (DEA, 2011:26). In the same year, the Department of Energy launched the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) which gives effect to the need to reduce energy emissions by bringing private RE generation capacity onto the grid through a series of competitive bidding rounds. Finally, plans to introduce a carbon tax to internalise the cost of emissions were announced in 2012, indicating the growing seriousness with which climate considerations were being taken.

These industrial and climate policies were adopted in the context of broader national planning frameworks that set a vision for structural transformation towards inclusive low-carbon development. This was clearly apparent in government's publication of a New Growth Path in 2010 which identified the country's dependence on the emissions-intensive minerals value chain as one of the key factors hampering economic development (EDD, 2010:5) Similarly, South Africa's long-term development policy, the National Development Plan (NDP) (unveiled in 2011), dedicates an entire chapter to "Ensuring Environmental Sustainability and an Equitable Transition to a Low-Carbon Economy" (NPC, 2011:197). In particular, the NDP recognises the need to decouple the economy from carbon-intensive natural resource consumption by developing competitive advantages in RE and looking for synergies between employment creation and sustainability (NPC, 2011:206).

4.2.2. Policy in practice: misaligned and resisted by strong opposing coalitions

Despite formal industrial, climate and national planning policies coalescing around the need to transition towards a low-carbon development path, in practice, progress towards this end has been limited. In a review of South Africa's industrial policy from a green economy perspective, Montmasson-Clair & Chigumira (2020:56) conclude that despite many green shoots supporting a transition to low-carbon development, the economy has remained characterised by deep path-dependence with a politico-institutional environment that continues to favour energy- and emissions-intensive activities. The disjuncture between policy and practice over this period can be explained by two key factors, namely policy misalignment due to fragmented government

[16] Several climate policies had already been introduced since South Africa ratified the United Nations Framework Convention on Climate Change in 1997 – most notably the 2003 White Paper on Renewable Energy and the National Climate Change Response Strategy of 2004. Nonetheless, the post-2007 period saw the adoption of several climate adaptation and mitigation measures that represented a significant increase in climate change policy momentum over previous years.

responsibility, and the existence of strong coalitions opposed to a more rapid low-carbon transition.

Policy misalignment

The economy-wide nature of the transition to a low-carbon and inclusive development pathway poses a considerable challenge to the existing organisation of government in which responsibility for certain sectors and government functions is distributed across a range of departments. This has contributed to policy misalignment, particularly between industrial, climate and energy policy. Although a Green Industries Sector Desk was established within the DTI in 2010/11, with all subsequent IPAPs including a focus on the development of green industries, 'greening' the economy has still been perceived as a standalone and isolated objective rather than an economy-wide transformation that should be at the heart of industrial policy (Montmasson-Clair & Chigumira, 2020:6). Consequently, several policy instruments that could be operationalised under a coordinated industrial policy have been misaligned with the objective of shifting the country onto an inclusive low-carbon development path.

While energy policy has a critical role to play in reducing national emissions, the demand forecasts informing the IRP 2010 assumed significant increases in demand from energy-intensive industries, despite policies aimed at shifting the economy away from these industries (Burton, 2011:70). As argued by Trollip & Tyler (2011:20), the lack of integration between industrial and energy policy in this case resulted in industrial policy being determined by the IRP, rather than the other way around. Policy misalignment was further evident in the allocation of economic incentives. While climate policy has been based in the Department of Environmental Affairs, and the carbon tax has been administered by National Treasury, liquid fuels pricing – which effectively subsidises the carbon-intensive CTL sector – has fallen under the ambit of the Department of Energy (Burton et al., 2018:240). This has led to a clear contradiction in policy, with a carbon tax (in operation from 2019) existing incongruously alongside continued fossil fuel subsidies to carbon-intensive industries through Sasol (via the basic fuel price and infrastructure) and Eskom (through state support for coal-based power generation) (Burton et al., 2018:240). The misalignment of economic incentives is further evident in the allocation of IDC funding. While IDC funding to green industries (particularly those under the REIPPPP) has increased, between 2008 and 2017, resource-based heavy industries continued to receive the largest share of development finance (Goga et al., 2019:16).

Similarly, the fragmentation of government responsibility has hampered the ability of industrial policy to generate employment by stimulating the development of labour-intensive downstream manufacturing industries. While the NIPF identified the ability of upstream resource-based industries to charge excessive prices for material inputs as a key obstacle to the development of downstream industries (DTI, 2007:36), fragmentation of responsibility within government has hindered effective action to constrain the market power of upstream firms. In particular, the reliance on competition law as the primary mechanism for disciplining market power has not achieved the desired results. For example, while a 2014 Competition Tribunal ruling found that Sasol's pricing of propylene and polypropylene to downstream industries was excessive, this decision was overturned in 2015 by the Competition Appeal Court which found that Sasol's responsibility for passing on the low-cost advantages of the CTL process to downstream manufacturers was a question of industrial policy, not the competition authorities (Mondliwa & Roberts, 2019:20).

Strong opposing coalitions

The second factor responsible for the disjuncture between policy and practice centres on the ability of strong coalitions of actors with vested interests in the existing capital- and energy-intensive status quo to hinder a more rapid low-carbon transition. The ability of these coalitions to influence policy formation and implementation is linked to the fragmentation of the state, with the proliferation of government departments increasing the ability of large businesses to successfully lobby for suitable policies in their favour (Mondliwa & Roberts, 2021:331). This has been particularly acute in South Africa where economic power and responsibility for GHG emissions have been concentrated within a small group of fossil fuel-based actors that have traditionally opposed policies aimed at bringing about a low-carbon transition. These opposing coalitions have been led by Eskom and Sasol (which together emit over half of national GHG emissions) and includes a number of energy intensive firms, such as the 28 companies within the Energy Intensive Users Group (EIUG) who account for 40% of the country's electricity demand (Tyler & Hochstetler, 2021:S186).

Rennkamp (2019:7) has shown that coalitions of interest consisting of high emitting businesses (such as Sasol) and their associations (such as the EIUG and Business Unity South Africa (BUSA)) were successfully able to delay the implementation of carbon budgets outlined in the NCCRWP. Moreover, an opposing coalition led by Sasol (including Eskom, the EIUG and BUSA) was successfully able to delay the introduction of the carbon tax from its initial

pronouncement in 2012 to its postponed implementation in 2019 while winning a number of concessions such as a much-reduced tax rate, numerous exemptions (up to 95%), and the option to offset emissions in line with the international clean development mechanism (Rennkamp, 2019:9).

Similarly, while the REIPPPP successfully managed to bring RE onto the grid, its progress was nonetheless hampered by actors with strong vested interests in the coal-based electricity value chain. Intent on maintaining its monopoly on energy supply, Eskom delayed the progress of the REIPPPP by refusing to sign power purchase agreements (PPAs), imposing additional grid connection costs on renewable IPPs, and provoking unions to resist the programme on the basis of job losses from coal plant decommissioning (Ting & Byrne, 2020:11).This resistance strategy took place during a period of 'state capture' under the Zuma administration (2009-2018) whereby key state institutions (most notably Eskom) were co-opted into a clientelist system of rent extraction led by President Zuma and the influential Gupta family (and facilitated by a host of private intermediaries). The policy uncertainty that this resistance strategy created had a severe impact on the localisation potential of the REIPPPP with several local RE manufacturers having to close, including a wind tower manufacturing plant in the Eastern Cape and a solar PV manufacturing plant in KwaZulu-Natal (Andreoni et al., 2022:18). While the Department of Environment continued to champion decarbonisation, supporting institutions and departments within government were either weakened by state capture or actively involved in deepening coal path dependency, thus hindering a more rapid transition to a low-carbon society (Tyler & Hochstetler, 2021:S196).

In terms of industrial policy, heavy industries dominated by powerful interests who continued to benefit from the existing capital- and energy-intensive development path were naturally opposed to any reduction in state support (Black et al., 2016:21). Consequently, large dominant firms, particularly those in upstream resource-based sectors, have used their economic power to raise barriers to entry and lobby for favourable policies and regulations that have disadvantaged downstream labour-intensive firms (Goga & Mondliwa, 2021:171). This undermined the design and implementation of industrial policy and hampered South Africa's diversification out of industries within the MEC.

4.2.3. Deindustrialisation and the continued dominance of MEC industries in manufacturing

The aforementioned implementation challenges had significant implications for structural transformation, with the economy largely failing to shift to a low-carbon and employment-

intensive development path. Despite policies aimed at decarbonisation and economic diversification, manufacturing during this period shifted further towards capital- and energy-intensive industries within the MEC. Bell et al. (2018:6) note that there was a structural regression within the manufacturing sector as growth continued to favour resource-based industries. For example, as shown in Table 3, value added in coke and refined petroleum products increased at an average of 6% between 1994 and 2016 whereas diversified manufacturing only increased by 1% over the same period. Conversely, the contribution of diversified manufacturing as a share of total manufacturing value added fell 12.5 percentage points over the 1994-2016 period. The enduring centrality of the MEC in the manufacturing sector was further evident in the fact that heavy industries continued to dominate manufacturing investments, upstream resource-based industries continued to impose monopolistic prices on downstream industries, and primary and semi-processed mineral products continued to dominate the export basket (Zalk, 2021:37, 45).[17]

	Total Employment			Value Added			Average Real Wage/Employee (1994-2016)	Labour Productivity Index (2016) (1994=100)
	Growth (1994-2016)	Share of Total		Growth (1994-2016)	Share of Total			
		1994	2016		1994	2016		
Food	-0,7%	14,3%	15,6%	3,5%	11,7%	14,9%	118 293	238,1
Coke and refined petroleum products	2,0%	0,9%	1,6%	6,0%	4,3%	9,0%	173 589	221,3
Basic chemicals	-2,0%	1,9%	1,5%	2,8%	3,4%	3,8%	262 365	292,2
Basic iron and steel	-2,8%	3,7%	2,6%	4,9%	3,8%	6,4%	242 272	489,3
Basic non-ferrous metals	-2,4%	1,8%	1,4%	2,3%	3,2%	3,2%	144 890	266,6
Metal products excluding machinery	-0,6%	8,3%	9,2%	1,9%	6,8%	6,3%	110 823	167,2
Machinery and equipment	0,9%	5,3%	8,2%	2,9%	5,2%	5,8%	126 259	151,1
Motor vehicles, parts and accessories	-1,0%	6,6%	6,8%	3,8%	4,3%	5,9%	129 707	262,7
Other Diversified Manufacturing	-1,4%	57,2%	53,1%	1,1%	57,1%	44,7%	103 222	
Total Manufacturing	**-1,1%**	**100%**	**100%**	**2,3%**	**100%**	**100%**	**116 809**	**202,3**

Note: Employment figures include formal and informal employment. Average real wage/employee is in constant 2010 Rands. Growth rates are all calculated as compound annual average growth rates.

TABLE 3 Manufacturing performance: selected sectors. Source: Bell et al. (2018:8).

This lack of structural transformation has resulted in extremely poor manufacturing performance, with the share of manufacturing in GDP dropping from 21% in 1994 to 13.2% in 2019 (Black, 2021:510). While the declining share of manufacturing in GDP has been offset

[17] It is nonetheless important to note that while remaining high, the share of capital-intensive products in total exports (many of which derive from heavy industries within the MEC) decreased slightly from 49.4% in 1990 to 41.9% in 2013, largely due to the electricity supply crisis since 2008 (Black et al., 2016:18).

by growth in non-tradable service sectors such as communication, finance and insurance, this has not been accompanied by increased fixed investment in tradable sectors, with negative impacts on growth, employment and exports (Zalk, 2021:34). As noted by Andreoni & Tregenna (2021:251), South Africa's poor and declining manufacturing performance since the 1980s is illustrative of premature deindustrialisation, which has resulted in the country remaining stuck in middle-income status. Ultimately, despite the adoption of industrial and climate policies over this period, these were unable to bring about the necessary structural transformation to shift the country onto a sustainable development path, with MEC industries continuing to dominate the manufacturing sector.

4.3. Changing politico-institutional landscape (2018 – present)

The election of President Ramaphosa in 2018, who came to power on an anti-corruption ticket promising a 'New Dawn' for the country, marked a significant shift in the balance of factional power within the ruling party and a departure from the politics of state capture that defined the Zuma presidency. While many challenges remain, changes in the institutional, technological and economic landscape have created significant opportunities for a more rapid transition to a low-carbon and inclusive economy.

4.3.1. Institutional reforms

Several institutional reforms have been undertaken under the Ramaphosa presidency. As outlined in the Department of Trade Industry and Competition's Re-imagined Industrial Strategy (DTIC, 2019:22), industrial policy has shifted from the implementation of rolling IPAPs to the implementation of national priority sector master plans formulated through a socio-economic pact comprising the state, business and labour. Montmasson-Clair & Chigumira (2020:22) note that while this has the potential to mainstream low-carbon development across departments, the overall approach has not emphasised the importance of embedding green industrial development throughout all master plans, with the greening of the economy considered narrowly in terms of the development of green industries as an isolated sectoral objective. This disarticulation is evident in the Re-imagined Strategy which views gas as a priority growth sector with "the long-term potential to become a game changer given recent oil & gas finds in the sub-region", while simultaneously stressing the need to decrease GHG emissions by supporting the roll-out of RE (DTIC, 2019:27).

The gas master plan currently being developed by the Department of Mineral Resources and Energy (DMRE) also envisions a much-expanded role for gas in the economy, in stark

contradiction to the country's mitigation objectives. The DMRE's (2021:1) recently released *Basecase Report* for the master plan sees the development of gas-to-power facilities as a potential mechanism to increase energy stability while providing a significant 'anchor' for gas demand, which is assumed to lead to greater economic growth and job creation. This is despite the fact that there are significant risks to developing a gas-to-power sector in South Africa such as the increased carbon emissions from gas when compared with renewables, the risk of stranded assets, and an exacerbated just transition burden as the economy shifts away from fossil fuels (Halsey et al., 2022:8-12). Notably absent from the report is any consideration of the need to align the master plan with broader climate and green industrialisation objectives.

A more positive development has been the progress made on the Climate Change Bill, which was released for public comment in 2018, consulted on in 2019/20 and tabled before the National Assembly in February 2022. The Bill seeks to support a transition to a low-carbon economy through the enforcement of sectoral emissions targets and carbon budgets which provide a legal mechanism for aligning high emitting sectors and companies with the country's GHG emissions trajectory (DEFF, 2022:13). The Bill stresses the need for policy alignment and provides a legal basis for the Presidential Climate Commission (PCC) to advise the government on its climate change response towards the attainment of a 'just transition' to a low-carbon economy (DEFF, 2022:9). The formation of the PCC has the potential to ensure that a just transition is brought about in a coordinated and strategic way from the highest level of government thus elevating the importance of climate change from the relatively under-powered Department of Environment Forestry and Fisheries to the Presidency.

4.3.2. Electricity supply crisis and rising electricity tariffs

While South Africa has been facing an electricity supply crisis since 2008, load-shedding has increased dramatically in recent years, with the severity of outages (in terms of duration and energy shed) increasing every year since 2018 (Pierce & Ferreira, 2022:171). Load-shedding has constrained growth and accounted for an estimated loss of R169 –R338 billion between 2007 and 2020 (Crompton & Matsika, 2021:293). Eskom's ability to ensure an affordable and reliable supply of electricity is constrained by an ageing and underperforming coal fleet (with an average age of around 40 years) and an energy availability factor that has declined from 94% in 2000 to 62% in 2021 (Pierce & Ferreira, 2022:4) Furthermore, Eskom remains chronically indebted (to the tune of R392 billion) constraining its ability to drive new

investments in generation capacity and leaving the utility dependent on government bailouts and sovereign loan guarantees to remain operational.

While supply disruptions, rising electricity tariffs and Eskom's financial woes have certainly had a negative impact on the economy, there is nonetheless significant opportunity in crisis, with the REIPPPP being a key mechanism for ensuring security of supply, lowering electricity costs, and reducing South Africa's GHG emissions (Hanto et al., 2022:306). Soon after his election, President Ramaphosa instructed Eskom to sign the outstanding PPAs that had been awaiting approval since 2015. Moreover, in 2021, a fifth REIPPPP bidding round was launched, resuscitating the dormant renewables programme. The appeal of RE has been bolstered by the dramatic reduction in the costs of renewables over the past decade (See figure 3) to the extent that technologies such as solar and wind are not only cost competitive with traditional fossil fuels, but now significantly undercut them (IRENA, 2022:30).[18] This has been recognised by Eskom itself which now considers solar PV and wind as the most preferred technologies for new generation capacity due to their lower costs and shorter lead times compared to alternatives such as gas, nuclear and new coal (de Ruyter, 2021).

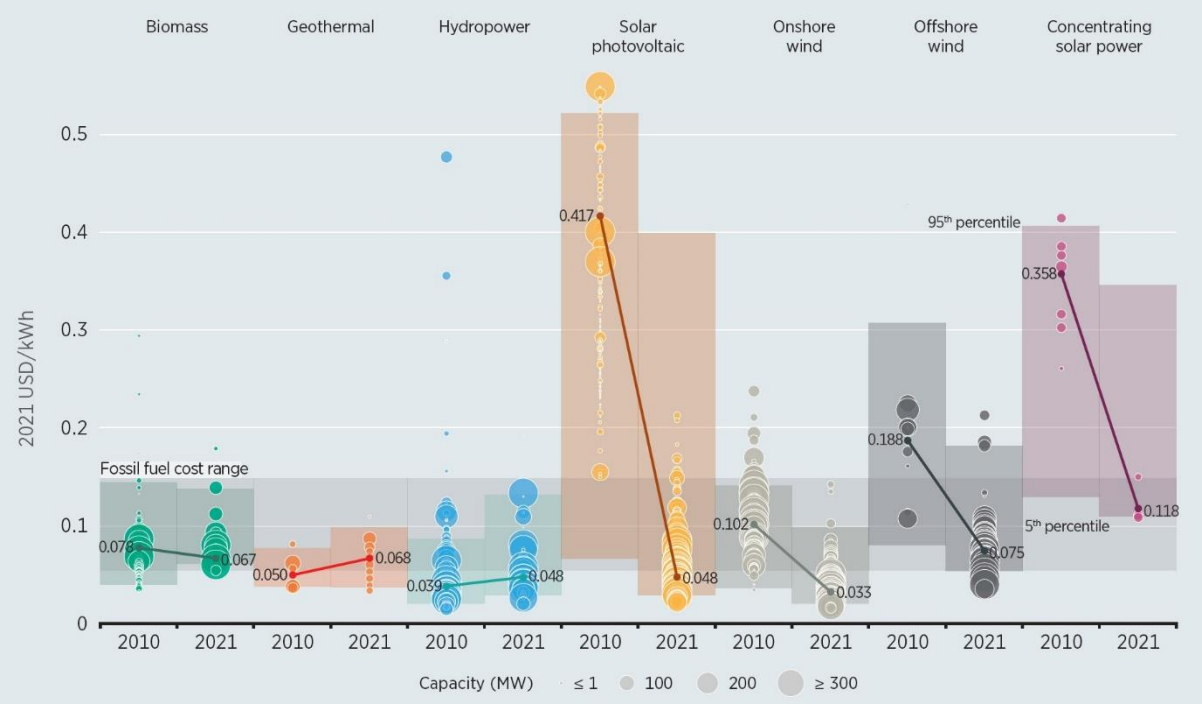

FIGURE 3 Global levelised cost of electricity from utility-scale renewable energy technologies. Source: (IRENA, 2022:32).

[18] The most dramatic RE cost reduction has been in solar PV with global utility-scale generation costs declining 88% between 2010 and 2021.

4.3.3. Shifting coalitions

The electricity supply crisis combined with the rapidly rising costs of electricity have begun to destabilise coalitions opposed to decarbonisation. Indeed, although the EIUG (along with Eskom) has played a role in delaying decarbonisation, its primary concern has centred on ensuring an affordable and reliable supply of energy (Morris & Martin, 2015:38). With the rollout of RE increasingly seen as the fastest and most cost-effective means of achieving this objective, coalitions opposing the decarbonisation of the energy system have been weakened. At the same time, supporting coalitions in the RE industry have grown, with new networks emerging, such as between the South African Wind Energy Association and the EIUG, indicating potential synergies between energy intensive users and actors within the RE industry (Baker et al., 2015:23). Furthermore, the framing of South Africa's decarbonisation in terms of a 'just transition', that emphasises the need to consider the impacts of coal closures on workers and communities, has gained traction within the labour unions (COSATU, 2022:25). Similarly, Eskom (now under a reformist CEO, Andre De Ruyter) has established an internal Just Transition Office indicating Eskom's unprecedented willingness to proactively engage in constructing a low-carbon and inclusive economy.

Despite these positive developments, significant resistance to a low-carbon transition remains. In particular, the DMRE has been a core site of resistance, with Minister Gwede Mantashe repeatedly stressing the need to consider the role of gas, nuclear and clean coal in ensuring an affordable and reliable electricity supply while warning of the dangers of a "violent pendulum swing" in the transition to RE (Mantashe, 2021). In November 2021, Mantashe together with a few large fossil fuel companies (including Sasol and Exxaro) launched the Energy Council of South Africa (ECSA), which purports to represent the "collective unified voice of energy" – despite the Council lacking any representation from the RE industry (Davies, 2021). ECSA's opposition to decarbonisation became clearly apparent in September 2022 when ECSA, along with several other business groupings, put out a joint statement on the carbon tax, arguing that existing tax allowances should be extended and that an increase in the carbon price should only be considered after 2035 (ECSA, 2022).

4.3.4. The unwinding of the MEC

Finally, supply interruptions combined with rising electricity tariffs since the mid-2000s have constrained growth in MEC sectors in recent years. Between 2004 and 2017, electricity prices increased more than 240% above inflation while load-shedding has had a severe negative

impact on the mining and manufacturing sectors (Zalk, 2021:44). As a result, Winkler & Black (2021:6) argue that the MEC is 'unwinding' primarily due to increasing energy costs and supply interruptions, along with infrastructure bottlenecks, the gradual withdrawal of state support for heavy industry and the underperforming mining sector. Newman (2019:15) notes that falling investment in MEC sectors since 2015 suggests that "the positive cumulative causal dynamics [of the MEC] are running out of steam". Indeed, in recent years, the expansion of heavy industry has tapered off further with declining levels of investment accompanied by plant closures, such as the mothballing of Arcelor-Mittal's Saldanha Steel in 2020 (Winkler & Black, 2021:6).

While the deteriorating performance of the MEC may appear to be a welcome sign given its capital- and carbon-intensive characteristics, if a transition away from South Africa's carbon-intensive development path is not managed in a strategic manner, there could be dire consequences for development priorities such as employment. Indeed, as the cost of electricity has risen, resource-based and energy-intensive industries have tended to seek out more lucrative opportunities abroad rather than investing in diversified manufacturing industries at home (Makgetla, 2021:12). Additionally, as outlined above, the unwinding of the MEC is currently taking place within the context of broader deindustrialisation and financialisation which is exacerbating existing inequalities while failing to create sufficient low- and semi-skilled skilled jobs for which South Africa has a significant labour surplus.

The dangers of an unmanaged energy transition are particularly acute in South Africa given that the coal sector is highly concentrated within a single province with 75% national gross value added and 85% of employment in coal coming from Mpumalanga alone (Makgetla & Patel, 2021:12). Acknowledgement of the distributional effects of transition have given rise to the imperative of ensuring a just transition that ensures that those whose livelihoods depend on fossil fuels (particularly coal) are not left behind in the transition to a more sustainable energy regime. Industrial policy has a crucial role to play in this regard, particularly in developing and implementing strategies to diversify regional economies away from coal by developing new industries and retraining and equipping workers with new skills.

4.4. Summary: Path dependence and a largely unaltered development trajectory

This chapter has continued the periodisation of South Africa's industrialisation process into the post-apartheid era in order to assess how the incoming ANC government sought to engage the MEC through industrial and climate policies. In terms of corporate structure, the post-apartheid

period has witnessed a number of important changes to the MEC. Key among these has been a significant decline in the concentration of ownership within the economy as well as corporate restructuring in which large, diversified conglomerates have sold off non-core assets and concentrated their attention on specific activities. Furthermore, liberalisation has allowed domestic companies to shift their operations offshore leading to an increase in foreign (and BEE) ownership in the economy. Additionally, the financial services sector has grown considerably over the post-apartheid period accounting for a much larger share of GDP than under apartheid.

Despite these changes, one of the most striking features of the post-apartheid period has been the strong continuity in the industrial structure of the economy, with the legacy of support for the MEC still evident in 2022. Rather than shifting towards a more diversified and employment-generating development path, the economy has experienced premature deindustrialisation with the manufacturing sector having performed extremely poorly since the 1980s. Moreover, the continued dominance of capital- and energy-intensive industries in the manufacturing sector has undermined the ability of the sector to create jobs for South Africa's burgeoning unemployed population, while GHG emissions have remained high.

Economic, industrial and climate policies have had a mixed impact on this structure. Over the first decade of democracy, liberalisation (pushed by big business during the transition period) tended to reinforce existing patterns of comparative advantage in energy-intensive resource-based activities. Similarly, the absence of a coherent industrial policy during this period resulted in a range of fragmented industrial incentives that on balance continued the historic pattern of state support for heavy industries within the MEC. The introduction of a formal industrial policy framework outlined in the NIPF from 2007 combined with growing climate policy momentum indicated government's more interventionist stance and an intention (as outlined in the NDP) to shift the economy away from the MEC towards an inclusive low-carbon development path. However, the achievement of this objective was frustrated by policy misalignment due to fragmented government responsibility, and the existence of strong opposing coalitions with vested interests in the capital- and energy-intensive status quo. As a result, progress on climate mitigation was delayed with the manufacturing sector continuing to be dominated by MEC-industries while exhibiting signs of premature deindustrialisation.

Since 2018, several developments have occurred that provide new opportunities for a shift towards a low-carbon development path. Institutional reforms have seen the elevation of

climate policy to the Presidency with the establishment of the PCC increasing the potential for climate mainstreaming and policy coordination across government. Additionally, while the electricity supply crisis has had damaging effects on the economy, it nonetheless presents an opportunity for a more rapid shift towards RE – the prices of which have fallen dramatically over the past decade. Although considerable resistance remains, these developments have begun to weaken coalitions opposed to decarbonisation with the framing of a just transition gaining currency among several actors previously opposed to the rollout of RE.

Finally, rising electricity costs and supply interruptions are leading to an unwinding of the MEC with declining levels of investment in heavy industries accompanied by recent plant closures of energy-intensive firms. While this presents an opportunity to shift the economy onto a green industrial development pathway, this will not happen automatically. A coordinated green industrial policy geared towards decarbonisation and a labour-intensive development trajectory will be needed to rejuvenate the manufacturing sector while at the same time enabling and supporting a just transition to a low-carbon society.

5. Synthesis: Engaging the MEC through an integrated green industrial policy

Having traced the history of South Africa's industrial development (Chapters 3 and 4), this chapter provides a synthesis of the core features of the MEC that have contributed to the country's high-emissions low-employment development path. The role of industrial policy in shaping this development trajectory is then evaluated leading to some findings on the need for an integrated green industrial policy going forward.

5.1 The MEC and high-emissions low-employment development

In tracing South Africa's industrialisation process, two primary features can be distilled from the MEC that provide an explanation for the link between South Africa's low employment and high emissions. These two features are: (1) high capital intensity, which has limited the labour absorption capacity of the manufacturing sector contributing to high unemployment; and (2) high energy intensity, which has resulted in high GHG emissions largely due to the dominance of coal in the country's electricity mix as well as its use in the production of liquid fuels.

5.1.1 Capital intensity and low employment

As outlined in Chapter 3, the growth of heavy industries within the MEC in the leadup to the 1994 elections ensured that the incoming ANC inherited a highly capital-intensive economic structure with the manufacturing sector unable to absorb the increasing numbers of unemployed South Africans. With the weight of state support after democracy continuing to favour heavy industries within the MEC, the capital intensity of manufacturing has remained high. Moreover, the expansion of heavy industries within the MEC has occurred at the expense of labour-intensive non-MEC sectors. As a result, the capital intensity of manufacturing has increased after 1994, with the rapid growth of heavy industries within the MEC and a concomitant decline in labour-absorbing light manufacturing particularly in the clothing, textiles and footwear industries (Black et al., 2016:12).

Indeed, there has been a hollowing out of downstream capabilities in the metals, machinery and equipment industries due to an overvalued exchange rate, a lack of sufficient downstream investment, continued support for upstream basic metals industries, and increasing import penetration (Bell et al., 2018:iv). Liberalisation has had a particularly damaging effect on labour-intensive industries such as the clothing sector which saw an increase in import penetration from 8.1% in 1994 to 58.3% in 2016 (Black, 2021:516). Consequently, the textiles and clothing sectors' share of manufacturing value added declined from 7.8% in 1996 to stabilise at 1.8% from 2014 onwards (Black, 2021:523). Overall, for both investment and value added in the manufacturing sector, capital-intensive heavy industries have performed better than the sector average (Zalk, 2021:34). This increase in capital intensity has occurred in the context of broader deindustrialisation as manufacturing performance as a whole has been in decline since the 1980s.

These sectoral trends towards capital-intensity (as well as broader deindustrialisation) have had dire consequences for manufacturing employment which peaked at 1.79 million in 1981 but has since declined to 1.22 million in 2019 (Winkler & Black, 2021:6). Much of the manufacturing sector's inability to generate employment can be explained by further increases in capital intensity due to the large share of heavy industry, the weakness of labour-intensive manufacturing and shifting factor proportions within sectors towards capital (Black et al., 2016:8). Light manufacturing has performed especially poorly with the employment in ultra-labour-intensive sectors (clothing, leather, footwear, and furniture) declining by 47.4% between 2000 and 2019 (Black, 2021:522). Of employment growth since 1994, much of this

has been in low-wage service sectors such as private security and outsourced cleaning services with a reduction in labour-intensive manufacturing leading to a decline in low- and semi-skilled jobs (Newman, 2019:30). The growth of the financial services sector on the other hand has tended to provide work for skilled labour, with finance and insurance having the highest average worker remuneration across sectors, further exacerbating inequality in the country (Newman, 2019:34). While high unemployment is often blamed on market inflexibility due to stringent labour protections, a far more plausible explanation lies in the fact that investment has continued to favour capital-intensive heavy industries within the MEC, while diversified manufacturing exhibits low profitability and has attracted low levels of investment.

5.1.2 Energy intensity and high emissions

In addition to their capital intensity, industries within the MEC have tended to be highly energy and emissions intensive. For example, the 25 members of the EIUG (75% of which fall within the mining and manufacturing sectors) consume 40% of the country's electricity (EIUG, 2018). This has had a considerable impact on the carbon-intensity of the economy since the majority of electricity has been (and continues to be) derived from coal. Despite the gradual increase in RE through the REIPPPP, coal continues to dominate making up 81.4% of the country's electricity mix in 2021 (Pierce & Ferreira, 2022:2). In addition to electricity, the liquid fuels sector contributes significantly to national GHG emissions. In 2021, GHG emissions from Sasol's Secunda plant alone totalled 57 359 ktCO2e (Sasol, 2021:45). This equates to over 10% of national GHG emissions, making Sasol second only to Eskom as the most polluting company in South Africa, with its Secunda plant widely recognised as the single largest point-source of CO_2 in the world. The heavy dependence on coal for electricity and liquid fuels has made energy supply and use the largest contributor to national GHG emissions (DEFF, 2020:78).

However, despite the continued dominance of heavy industries within the MEC, emissions trends indicate a reduction in the carbon intensity of the economy, which declined 22.7% between 2000 and 2017 (DEFF, 2020:81). Similarly, the annual GHG emissions growth rate declined from an average of 2.3% between 2000 and 2010 to 0.4% between 2010 and 2017 (DEFF, 2020:77). Nonetheless, it would be mistaken to point to declines in carbon intensity and the rate of emissions growth as evidence that South Africa has made significant progress in restructuring the economy towards a green industrial development path.

Instead, declining emissions should rather be attributed to the declining share of emissions-intensive sectors such as mining and manufacturing (largely due to deindustrialisation), the

increasing contribution of the financial services sector in the economy, and low levels of aggregate economic growth (DEFF, 2020:81). Similarly, declining emissions in the power sector should not be attributed to a successful low-carbon energy transition since the share of RE in the electricity mix has increased only marginally from 0.14% to 4.7% between 2000 and 2020, with coal remaining by far the most dominant electricity source (Hanto et al., 2022:305). Instead, declining power sector emissions can be attributed to falling electricity demand due to slower growth, load-shedding and significantly increased electricity tariffs, which have increased over 300% over the past 10 years (Merven et al., 2021:6). Despite a slowing rate of emissions growth, South Africa's emissions intensity remains remarkably high, measuring 2.5 times the global average and nearly seven times that of the EU (Winkler & Black, 2021:9). Therefore, the declining carbon-intensity of the economy cannot be attributed to low-carbon structural transformation but is better understood as a by-product of the poor performance of the economy as a whole and the manufacturing sector in particular.

In sum, the high capital- and energy-intensive characteristics of the MEC have been key factors underlying South Africa's high-emissions and low-employment development path. However, the emergence and maintenance of this MEC-dominated industrial structure did not occur automatically, with the state playing a critical role in shaping this unsustainable development path by providing critical industrial support to the MEC.

5.2 The role of industrial policy

From an historical perspective, industrial policy has been instrumental in shaping the MEC and the direction of South Africa's economic development more broadly. As outlined in Chapter 3, 20th-century industrial policy was premised on a strategy to develop upstream resource-based industries that would make cheap industrial inputs available for the further development of the mining and manufacturing sectors. However, this economic rationale for industrial policy was complicated by the political imperative of integrating Afrikaner capital with the then dominant English mining capital (Fine & Rustomjee, 1996:181), strategic concerns relating to South Africa's international isolation as a pariah state (Marquard, 2006:286), and efforts to attract energy-intensive industries due to overinvestments in electricity generation capacity during the 1970s and 1980s (Steyn, 2006:37). These imperatives resulted in considerable state support (primarily through the operation of SOEs) to industries within the MEC to such an extent that by the dawn of democracy in 1994, the MEC represented the core system of accumulation within the country.

However, the impact of industrial policy in the post-apartheid era is more ambiguous, and an assessment of its efficacy is complicated by a range of industrial support measures that have occurred in parallel to official industrial policy objectives. Indeed, despite official recognition of the need to develop a more diversified industrial base in the post-apartheid era, industrial incentives (particularly during the first decade of democracy) continued to provide disproportionate support to heavy industries within the MEC. Continued support further reinforced the capital- and energy-intensive development path inherited from the apartheid era. Ironically, much of the considerable support given to industries within the MEC, including subsidies, tax incentives, infrastructure, artificially low-cost electricity and IDC finance, occurred at a time when official industrial policy was largely neglected, with liberalisation considered the principal mechanism for revealing the country's 'true' comparative advantage.

The incongruence between official industrial policy aimed at diversifying the economy away from its dependence on natural resources towards a more labour-absorbing development path and industrial support which continued to reinforce the MEC points to what Kaplan (2007:37) has termed a 'hidden' industrial policy. This refers to selective state interventions that inherently favour certain sectors/activities over others, constituting a *de facto* industrial policy that is independent of official industrial policy objectives. In South Africa, the existence of such a 'hidden' industrial policy is illustrative of the path dependency that has occurred as a result of technological lock-in to a mining and coal-based economy, institutional inertia, and the presence of powerful vested interests tied to the MEC.

Although the publication of the NIPF in 2007 signalled government's acknowledgement of the need for a more active industrial policy, the coexistence of official industrial policy aimed at diversification and a 'hidden' industrial policy reinforcing the MEC has hampered progress towards a sustainable and employment-generating growth path. Progress towards this end has been further undermined by challenges relating to policy implementation, namely policy misalignment (particularly between climate, industrial and energy policy), and the existence of strong coalitions with vested interests in the capital- and energy-intensive status quo.

5.3 Lessons for a future green industrial policy

Having located South Africa's industrial structure as being at the heart of the country's unemployment and emissions challenges, industrial policy becomes an essential component not only for addressing unemployment but also for decarbonising the economy in line with the country's mitigation objectives. Although the MEC has been weakened, in large part due to

sharply rising electricity prices and supply disruptions, transitioning the economy to a low carbon and employment generating growth path will not happen automatically. A green industrial policy that seeks to align the structure of the economy with the requirements of sustainable development needs to be at the centre of the country's just transition to a low-carbon and inclusive society.

The adoption of a green industrial policy has the potential to respond to several of the key industrial and climate policy challenges identified in this thesis. Indeed, by embedding climate mitigation within industrial policymaking, green industrial policy can increase policy coherence and reduce conflicting priorities between industrial development and climate mitigation (Ramkolowan, 2014:4). Additionally, having the achievement of a low-carbon society at the heart of a coherent industrial development strategy (rather than a mere add-on) reduces the possibility of a pernicious 'hidden' industrial policy from taking root and derailing official objectives. This would nonetheless require simultaneous measures to shift the balance of economic and political power towards coalitions in support of a more proactive decarbonisation agenda. The adoption of a green industrial policy can contribute to the growth of such supportive coalitions by providing concentrated benefits to low-carbon firms, thereby increasing the acceptability of climate policies that impose costs on high emitting industries (such as the carbon tax) (Meckling et al., 2015:1170).

Choices nonetheless remain regarding the focus and objectives of a green industrial policy, particularly in terms of the extent to which South Africa should attempt to reshape its comparative advantage. One option would be for the country to maintain its revealed comparative advantage in capital- and energy-intensive industries by prioritising the rollout of low-cost RE to reduce emissions and stabilise the electricity supply for the purpose of restoring the international competitiveness of the country's energy-intensive industries, although with a new emphasis on 'greening' exports such as hydrogen, steel, and chemicals (Andreoni et al., 2022:19). Although this 'greening of the MEC' has the potential to halt the decline of the underperforming manufacturing sector and reduce GHG emissions, a challenge remains in that the capital-intensive nature of these activities would require that employment is generated elsewhere in the economy (Black, 2021:527). While industrial policy could spur employment growth by developing forward economic linkages from upstream heavy industries to more labour-absorbing downstream industries (such as plastics, metals, machinery, etc.), this remains dependent on the so far intractable challenge of confronting the economic power of upstream firms (Goga & Mondliwa, 2021:183).

An alternative more interventionist option stems from a recognition that South Africa's revealed comparative advantage in capital- and energy-intensive products is largely the result of significant economic distortions, such as the considerable state support provided to heavy industries in the MEC (Black & Hasson, 2016:293). With widespread chronic unemployment representing 'the most glaring inefficiency' in the economy, Black & Hasson (2016:303) argue that it is necessary to tilt the playing field away from capital- and energy-intensive industries towards more labour-intensive activities. Consequently, it may well be necessary for South Africa to adopt a more ambitious approach that uses green industrial policy to reshape the country's comparative advantage by developing capabilities in more labour-absorbing and low-carbon industries outside of the MEC. One example of such an industry is agriculture, which has great potential (with sufficient support) to ameliorate South Africa's unemployment problem without significantly increasing national GHG emissions (Winkler & Black, 2021:22). Agriculture has also been identified as one of several potential avenues for economic diversification in coal-dependent communities in Mpumalanga, since the province accounts for 46% of South Africa's high-potential arable land (Montmasson-Clair et al., 2022:26). While sectoral employment and emissions intensity should certainly not be the sole criterions in determining areas for industrial support, a green industrial policy that incentivises labour, training and economy-wide decarbonisation (as opposed to further support for capital- and emissions-intensive activities) is a critical component necessary for steering the economy onto a sustainable and inclusive development trajectory.

6. Conclusion

This thesis has traced South Africa's industrialisation process from the mineral revolution to the present with the intention of (1) identifying the key factors that have contributed to the country's high-emissions and low-employment development pathway; and (2) assessing the role of industrial policy in shaping this unsustainable development trajectory.

The analysis shows how the emergence of the MEC during the 20th century resulted in an industrial structure dominated by resource-based heavy industries that imparted a capital- and energy-intensive structure onto the economy. This economic structure was not only incapable of generating sufficient employment but also led to high carbon emissions due to the presence of energy-intensive industries dependent on a coal-based electricity system. Although the MEC has undergone significant changes post-1994, particularly through processes of internationalisation and financialisation, this has not engendered a shift towards a more

inclusive and sustainable development pathway. Instead, diversification beyond industries within the MEC has been limited, with resource-based heavy industries remaining central to the manufacturing sector.

Two key factors can be distilled from the MEC that explain the persistence of the country's high unemployment and high GHG emissions. First, the capital-intensity of production within the MEC has meant that the manufacturing sector has been incapable of providing sufficient jobs, especially given the poor performance of more diversified labour-intensive industries. Second, with the vast majority of the country's electricity generated from coal, the energy-intensity of industries within the MEC has resulted in very high GHG emissions relative to the size of the economy. These two factors provide a compelling explanation for the high-emissions low-employment development path that South Africa has followed.

While this capital- and energy-intensive economic structure emerged through the exploitation of South Africa's rich natural resource endowments, this was far from an automatic process. The analysis has shown that the state played a critical role in supporting the MEC from the mid-20th century well into the post-apartheid period through a range of mechanisms including the provision of industrial incentives, development finance and supportive infrastructure; the establishment of SOEs; and the drafting of favourable electricity pricing policies. While this support was clearly instrumental in shaping South Africa's high-emissions low-employment development path, the extent to which these interventions were driven by official industrial policy objectives is more ambiguous. Indeed, in the post-apartheid era, much of this support was provided despite shifts in official industrial policy which from 2007 onwards implicitly sought to diversify the economy out of the MEC.

The presence of a 'hidden' industrial policy at odds with official industrial objectives combined with implementation challenges resulting from policy misalignment and the existence of strong coalitions opposed to a low-carbon transition have together constrained the ability of industrial policy to bring about substantial structural change. Despite these challenges, industrial policy remains a critical tool in the state's toolbox to steer the country towards an inclusive low-carbon future. In particular, the adoption of an integrated green industrial policy has the potential to overcome several of the key policy challenges identified in this thesis by mainstreaming climate mitigation in industrial planning and building supportive coalitions in favour of a low-carbon transition. Moreover, by creating comparative advantage in labour-absorbing low-carbon industries (as opposed to providing further support to capital- and

emissions-intensive activities), green industrial policy has the potential to support South Africa's just transition to an inclusive low-carbon society.

Some limitations of this thesis are that while a case has been made for a future integrated green industrial policy, the focus of this analysis has been historical and thus not principally concerned with identifying future pathways towards sustainable development. Consequently, identifying the optimal configuration of instruments, policies and incentives as well as the most beneficial sectors for industrial support is beyond the scope of this thesis and remains an important avenue for future research. Additionally, given the extensive time period under study, this thesis has sought to identify general trends and relevant features of South Africa's political economy at a macro scale. As such, the specific constraints and challenges faced by individual departments and industries at a more granular level have not been assessed. This is therefore a second potential area for future research.

In conclusion, the roots of South Africa's high-emissions low-employment development path lie in the country's capital- and energy-intensive economic structure based on the MEC. The emergence of this development path was not an inevitable outcome arising out of South Africa's rich endowments of mineral resources but was actively shaped and supported by the state in cooperation with fractions of capital within the MEC. Rather than minimising the role of the state, the imperatives of climate mitigation and employment creation in South Africa call for concerted action by government and all stakeholders in actively shaping a more sustainable development pathway. Industrial policy has a critical role to play in supporting this objective by cultivating green industries, shifting support away from polluting capital- and energy-intensive activities, and creating new jobs to ensure that no one is left behind in the transition to an inclusive low-carbon society.

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