A Qualitative Analysis of the South African Just Transition

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This thesis is built out of research arising from a project co-lead by OneWorld Sustainable Investments for the National Planning Commission, South Africa. The thesis was authored by a current employee of OneWorld and draws on the data gathered for the project from a number of bilateral stakeholder engagements, nine provincial stakeholder workshops and a national level concluding conference.

Abstract

The threat of climate change has been identified as one of the leading challenges facing humanity. As such, there is a necessary global transition to lower-carbon economies and societies to reduce the harmful emissions caused by human activities to mitigate the growing climate crisis. Yet, there are fears that there will be job losses and economic hardships as the world transitions away from the carbon-heavy dependence of the past. The Just Transition principle has emerged globally as a framework of ensuring these potential job losses and economic hardships are planned for, and the people inherently at risk in the transition are protected. The Just Transition is built on the acknowledgement that climate change must be averted, but it must be done so justly. In South Africa, there is a particular need for the Just Transition, based on the country's historic dependence on coal, the broad socioeconomic challenges and the country's vulnerability to climate change. This thesis explores hundreds of qualitative views from numerous stakeholders around the country on what the Just Transition will mean for South Africa. It analyses the current Mineral Energy Complex and climate change situation in South Africa, and examines the stakeholder determined vision for the country for 2050. Synthesised from views from across South Africa, this thesis furthermore established the four interrelated and stakeholder determined pathways which could facilitate the South African Just Transition – namely an Energy Transition, Restoring Land Resources, providing Safe Water for All, and utilising Green Growth.

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1. Background and Context to the Just Transition

1.1 Introduction

As the world has developed it has experienced many different transitions, from the creation of industry, to the uptake of automation, from the emergence of globalisation to the rise and collapse of the global financial sector. These transitions have been driven by technology and opportunity, yet have also led to significant job losses and economic hardships – instilling a fear that future transitions have the potential to be equally painful.

Around the world the transition away from historically and traditionally fossil fuel intensive development is underway, along with the transition to a more climate resilient[1] planet. This low-carbon transition and the transition toward growing climate resilience is based on the growing awareness and understanding that human activities, in particular the generation of energy and the transportation of goods and people, have been the greatest contributor to climate change, a growing crisis and an increasing threat to humanity (IPCC, 2018).

Climate change is a severe threat to humanity. Already it has led to increased incidence of drought and more intense and frequent extreme weather events. Agricultural productivity is eroded as increasing water insecurity and rising temperatures alter the growing conditions. These effects are perpetuated and reinforced by rising global temperatures and, according to the Intergovernmental Panel on Climate Change (IPCC), they will get significantly worse as temperatures continue to rise (IPCC, 2018). Already the planet has experienced warming of around 1°C since pre-industrial times and is predicted to reach at least 1.5°C of warming by 2050, with recent estimates showing that warming of 2-3°C is likely unless the global economy transitions away from the widespread, entrenched anthropogenic impacts of human activities (IPCC, 2018).

As such, there is an urgency for a low-carbon transition to slow the rate at which the planet is warming, as the impacts of climate change are significantly worse at 2°C than they are at 1.5°C (IPCC, 2018). Already many of the impacts of current global warming are permanent, such as the destruction of coral reefs, the shifting of ecosystems, permanent changes in climate and weather patterns, sea level rise, the loss of biodiversity, insects and vertebrates, declines in marine fisheries and a reduction in global crop yields (IPCC, 2018). These permanent consequences of climate change have made it necessary that development itself transitions to focus on building climate resilience as society will face the impacts of climate change forever, thus necessitating adaptation to it.

Unfortunately, the world is also facing an inflection point where global warming of 1.5°C is predicted to become irreversible, where even if all the anthropogenic activities were to cease the world would still

[1] The IPCC defines Climate Resilience as the capacity of social, economic and environmental systems to cope with climate change (IPCC, 2018).

experience warming of 1.5°C (IPCC, 2018). This underpins the necessary urgency of the low-carbon transition, as without this urgency a warmer world is an increasingly possible reality.

This transition to low-carbon economies and societies around the world, however, is a significant threat to the established fossil fuel sector industries and the jobs therein. Much of the global energy demand is catered by coal-fired power (IEA, 2019), which in turn is fed by an extensive coal sector – including mining and transportation. A transition to a low-carbon world puts these jobs and the livelihoods of these people at significant risk.

Nevertheless, this transition is urgent and necessary as countries face up to the realities of climate change and the detrimental environmental and health effects which fossil fuel dependent development cause. There is, however, an important principle which will allow this transition to be fair and just so that workers and the people whose lives will be affected as the economy and society shift to one that is lower carbon are protected and not made to shoulder the burden of the transition. This principle, ***the Just Transition***, has been included in the Paris Agreement and can minimise the negative impacts and maximise the positive opportunities of the transition.

This Just Transition is not a fixed set of rules, but rather is a vision and a process based on dialogue so that the agenda of the transition can be codetermined with the needs of workers, communities, businesses, unions and the government in mind, so that it is fair.

Moreover, the Just Transition contains the potential for creating a more inclusive and equal society as the low-carbon transition offers opportunities for job creation, inclusive decision making, equal rights to resources and inherently will ensure the protection of the environment and biodiversity.

South Africa is a country in desperate need of a low-carbon transition while also needing to increase its resilience to the impacts of climate change as it is at particular climate risk. The country has developed off the back of mining and heavy industry, fed by a stream of cheap coal generated electricity. The result of which has been a path dependency on coal for the country's energy needs, with 85 percent of the country's power generated by a huge, centralised coal-based energy sector (StatsSA, 2016). This high-carbon lock in has resulted in carbon dioxide emissions per capita twice that of the global average (Pegels 2014), higher than the average of the rest of the G20 nations (Climate Transparency, 2018; Marquard, 2017). This significant contribution to global emissions (South Africa is the 15th largest total emitter in absolute terms of annual greenhouse gas emissions (Crippa et al., 2019)) is disproportionate and not only has consequences for the international commitments the country has made to reduce emissions, but also leads to environmental and health challenges locally.

The foundation of this thesis is the formalised, countrywide Just Transition dialogue in South Africa, led by the country's National Planning Commission (NPC). The Just Transition concept is garnering an increasing amount of attention in media and literature globally, but also locally in South Africa. This

thesis will provide an exploration of the Just Transition from a qualitative point of view, built off the foundation of what various stakeholders from across the country have been saying about the Just Transition.

This thesis is organised as follows. The rest of Chapter 1 explores the global Just Transition in more detail, providing a working definition of the principle, and the global relevance of the Just Transition. Chapter 2 will then illustrate the methodology used in this thesis in the collection of data and the strategic framework with which the data was applied. Next, in Chapter 3, a contextual analysis of South Africa will provide an overview of country at present. After which, Chapter 4 will provide a synthesised summary of the stakeholder views around the country on the Vision for South Africa based on the opportunities and challenges inherent in the Just Transition. Chapter 5 will explore the key pathways along which South Africa will transition, again based on the stakeholder engagements throughout the country. Chapter 6 will provide a conclusion for the thesis.

1.2 Origins of the Just Transition

Around the world there is substantial scientific evidence that without urgent, ambitious and far reaching action the world faces global temperature increases of more than 2°C in the next century and irreversible changes in its climate thereof (ITUC, 2015). These climactic changes will severely affect human populations around the world and will affect those poorest worst as drought becomes more prevalent, oceans rise, and extreme weather becomes more frequent and more severe. The evidence also points to human activities as the most significant contributor to this climate change (IPCC, 2018). A transition away from current, carbon-intensive[2] activities has been touted as one of the major solutions to limiting climate change, in particular the transition away from coal-fired power which is the major contributor to the greenhouse gas (GHG) emissions globally. A zero-carbon future, one in which human activities do not emit any carbon dioxide and other harmful GHG, is potential solution for reversing climate change (IPCC, 2018).

Countries around the world have therefore begun the transition. This, however, has and will continue to have major consequences for the massive workforces involved in high-carbon practices. In particular those who have the most basic (and often most hazardous) jobs in these high-carbon sectors who depend on these activities for their livelihoods entirely and who often do not have alternate employment options, such as coal miners. As economies and societies transition all over the world, these workforces will be made to shoulder the burden of the transition, facing unemployment and poverty as most of these workers do not have readily available alternate options. So, although the transition away from high-carbon activities is underway, justice is not.

[2] Carbon-intensive/ high-carbon practices and activities are those which result in a large emissions of carbon dioxide and other harmful gases. Low-carbon practices on the other hand are those which emit less.

Herein lies the significance of the Just Transition. The Just Transition, a principle born out of social and environmental justice, has been formalised and expanded to encompass a range of social interventions needed to secure fossil fuel workers jobs and livelihoods as economies transition to sustainable production and low-carbon development (ILO, 2018; ITUC, 2015). It seeks to align this global transition with socioeconomic and environmental goals at a local level, by creating benefits and job security for those most impacted in the transition, as well as those who will be most affected by climate change.

The Just Transition has its roots in the United States, where the labour-led environmental justice movement drew attention to the linkages between environmental problems and social and economic exclusion in the early 1990's (ILO, 2018). The International Trade Union Confederation (ITUC), brought it to the 2015 Paris Agreement where it was formalised into the agreement. In so doing, the countries that signed the agreement not only agreed to fight climate change by reducing GHG emissions, but also to secure the futures and livelihoods of workers and communities as the world transitions to low-carbon economies and societies (ITUC, 2015). More recently the International Labour Organisation (ILO) has adopted and mainstreamed the principle by promoting and assisting the Just Transition movement around the world through the creation of a set of guidelines.

This Just Transition framework calls for the guarantee of better and decent jobs, social protection and greater training opportunities for all workers affected by global warming and climate change policies. Yet, the original, labour-specific definition is being broadened as there is an awareness that the Just Transition can be a mechanism for change which benefits all (Overy, 2018).

Due to the momentum its gaining around the world, the Just Transition has been evolving and there are a number of applications of the principle. Apart from ensuring the protection of those employed in fossil fuel sectors, it is also seen as an enabler of the green economy as it can facilitate green growth based on the low-carbon future being a source of new profit in the form of carbon markets eco-system services (Swilling et al, 2015; Overy, 2018).

There are others who view it from the standpoint that the new energy regime will provide a new set of green jobs, and that the new markets and technologies inherent in this regime shift will be the solution to the climate crisis (Cock, 2015).

The last predominant thought on the Just Transition is one that views climate change as the catalysing force for massive transformational change which will change how humans produce and consume (Cock, 2015; Overy 2018). Inherently, as societies transition away from high carbon economies, they must do so in such a way that does not replicate the injustices of the past. This is perhaps the most holistic view of the Just Transition, as it considers more than just energy and labour, not because they are not important, but rather because there are other critical areas such as food production, greater employment

opportunities, safer, greener housing and cities, and cleaner transport systems, which the Just Transition can influence. The Just Transition, in this view, should lead to a just society.

For the purposes of this thesis the following definition will be used:

The Just Transition encompasses a range of social interventions needed to secure workers' jobs and livelihoods as economies shift away from coal dependence to sustainable production, focused on climate resilient economies and societies which focus on protecting biodiversity and people.

1.3 The Need for the Just Transition

1.3.1 Climate Change

Climate change is one of the most dangerous threats to humankind. There is unequivocal scientific evidence that human activities have led to the warming of the planet – underpinned by the United Nations Intergovernmental Panel on Climate Change (IPCC) – who have released a Special Report on the impacts of global warming of 1.5°C above pre-industrial levels. This Special Report is based on the contributions of a plethora of scientists from multiple scientific backgrounds and can be thought of as one of the most academically rigorous reports on climate change to date.

For a number of years, there has been a growing realisation and consensus around the world that climate change will severely affect human populations, as well as natural biospheres and biodiversity. The seriousness with which governments around the world have taken the climate change threat has been increasing recently and has led to the signing of the Paris Agreement in 2015 by 187 countries – who in principle agreed to limit global warming to 2°C by 2050.

More recently, however, the IPCC 2018 report states that a 1.5°C degree future would be significantly less damaging (IPCC, 2018). This report indicated that human activities have already caused approximately 1.0°C of global warming since pre-industrial levels, with global warming set to reach 1.5°C between 2030 and 2050 at the current rate of human activity (IPCC, 2018).

Nevertheless, the current trajectory of increasing temperatures will have catastrophic implications for the globe at large. It will lead to a huge loss of biodiversity, increased frequency and severity of extreme weather events and a greater prevalence of drought (IPCC, 2018). These impacts will be especially dire and drastic for the poor and most vulnerable people in society – due to their relatively greater exposure to climatic disasters, coupled with having a lower climate resilience. The poor and vulnerable will be exponentially more affected by food and water insecurity, population displacement and serious health effects (Nazrul Islam & Winkel, 2017).

All of these climate effects will be significantly worse at 2˚C of warming. The report argues that limiting global warming to only 1.5˚C requires unprecedented, immediate, rapid and far-reaching transitions in energy, land, urban landscapes and infrastructure, and industrial systems.

Climate change will disproportionally affect the poor. Africa for instance, although being the lowest contributor to global GHG emissions, pays the highest price for climate change. Evidence suggests that wealth is one of the strongest descriptive variables in predicting people's capacity to adapt to climate change (Burton, et al., 1998). There are three main channels through which the inequality aggravating effect of climate change materialises (Nazrul Islam & Winkel, 2017):

1. Disadvantaged groups are increasingly exposed to the climate hazards.
2. They also face an increased susceptibility to the damage caused by climate change.
3. Lastly, these groups have a decreased ability to cope and recover from damages suffered.

For instance, poor people often are forced to settle in areas which are more prone to flooding, thus increasing their exposure to flooding (underpinning channel 1). Then, when flooding occurs, poor people suffer greater damages as their homes are less sturdy or resistant to flooding. They may also be unable to evacuate effectively, and thus face greater damages to their health (channel 2). Lastly, the poor may not be able to afford insurance, and thus have to absorb the financial loss of all damages – on top of which they don't have the financial resources to repair or replace everything that was damaged (channel 3).

In South Africa, the deeply embedded triple challenges of inequality, poverty and unemployment therefore significantly contribute to the vulnerability of the poor to climate change. As such, South Africa needs to reduce its GHG emissions and increase its capacity to adapt to the impacts of climate change through increased climate resilience.

1.3.2 Climate Change and the Just Transition

Climate change, at least the most current incidence of it, has been attributed to human activities. The burning of fossil fuels for energy have resulted in an immense amount of GHG emissions, which have been absorbed into the atmosphere on a planetary scale. These emissions trap heat in the atmosphere, slowing building global temperatures. Currently, the globe is warming at around 0.2 ˚C per decade (IPCC, 2018). These small temperature increases have dramatic downstream effects on the climate, which in turn have dramatic effects on human populations around the world.

Therefore, the IPCC report emphasises that there is a need for "*urgent and unparalleled"* cuts in current GHG emissions (IPCC, 2018). These anthropogenic emissions from human activities are the greatest contributor to climate change. These gases, largely emitted through the burning of fossil fuels for power, such as burning coal for electricity or petrol for transportation, trap heat radiation in the atmosphere (like a greenhouse), which cause temperatures to rise. These rising temperatures drive climate change as the delicate balance of the global climactic system are disrupted, bearing in mind that seemingly small temperature changes, on a global scale, can have dramatic influences on the climate (IPCC, 2018).

Countries around the world have been taking note of this growing climatic threat and are increasing their efforts to reduce their carbon emissions in order to limit, and perhaps even reverse climate change. The Just Transition is therefore inherently underpinned by climate change. It is built on the foundation that current human activities must change to be more restorative, else there will be dire implications for the whole of humanity.

1.3.3 The Transition away from Fossil Fuels

In 2017, electricity generated from fossil fuels (coal and coal products, oil and oil products, and natural gas) accounted for over 81 percent of the total electricity generation in the world (IEA, 2019). Since 2010, however, global growth in electricity generation has been driven largely by non-OECD[3] countries, while the growth in OECD countries electricity production has slowed. So, although the current climate crisis is based largely off the historical GHG emissions of these OECD countries – the current growth of electricity based GHG emissions is to a large extent due to emerging countries electricity growth (Pegels, 2014).

The costs of industrialising on a business-as-usual, emission-heavy approach are thus unacceptably high (UNECA, 2016). As such, economic development and particularly energy generation needs to be decoupled from resource depletion and waste production (Altenburg and Assmann, 2017). There is both the need for emissions to be reduced from the already established electricity generation of the OECD countries, as well as reducing emissions from the growing electricity generation of non-OECD countries.

As such, there has been a global response away from fossil fuels as the world begins to transition to low-carbon economies.

Despite the global response, however, the use of coal for electricity and energy production is sharply differentiated between industrialised and developing countries: industrialised countries are phasing out coal, while much of the developing world continues to expand coal generated electricity. Thus, despite a shift in many economies demand for and use of coal power, global coal consumption remains relatively high – albeit growth has stagnated (IEA, 2018).

Coal, in its various forms, is the most carbon emission intensive energy source (IPCC: Schlomer et al, 2014) and makes up more than 38 percent of the world's energy generation needs, the highest contribution of any one source to electricity generation (IEA, 2019). As such, transitioning away from coal power is a fundamental target for the reduction of carbon emissions.

Global investments in coal power have thus fallen about 25 percent, from 175 billion USD in 2015 to 132 billion USD in 2017 (IEA, 2018). There is additional pressure as over 100 globally significant

[3] OECD – The Organisation for Economic Co-operation and Development

financial institutions (those which have at least US$ 10 billion assets) divest from coal, with banks no longer willing to lend to coal, insurers no longer willing to insure it and investors no longer wanting to invest in it (Buckley, 2019).

At the same time as coal stagnates, investments in renewable energy[4] have consistently outstripped investments in fossil fuel energy generation over the last few years. In 2017, capacity totalling 157 GW of renewable power was commissioned (UNEP, 2018), far outstripping the 70 GW of net fossil fuel-generating capacity. This was driven by significant decreases in the capital costs of wind and solar plants, and a substantial fall in the unit price of electricity generated by renewable energy sources. In 2015, the majority of this investment was in developing economies and, by 2017, developing countries accounted for 63% of the total global investments in renewable energy sources, compared to 37% in developed countries (UNEP, 2018).

[4] As mentioned in the South African Department of Minerals and Energy's 2003 White Paper on Renewable Energy, renewable energy harnesses naturally occurring non-depletable sources of energy, such as solar, wind, biomass, hydro, tidal, wave, ocean current and geothermal, to produce electricity, gaseous and liquid fuels, heat or a combination of these energy types (DME, 2003). These sources of energy offset their GHG emissions in their lifecycle (eg as trees used for biofuel grow they offset the carbon dioxide that will be produced when they are burned, and the GHG emissions which result from the creation of solar PV cell, or wind turbine, materials and the construction thereof are then offset within a relatively short time frame through its operations.

2. Methodology

This thesis has been constructed using the qualitative data collected from a project carried out by *OneWorld Sustainable Investments* (OneWorld) and *Sustainable Energy Africa* (SEA) for the South African NPC and the governmental Department of Planning, Monitoring and Evaluation (DPME) on "*Developing models and pathways for a low-carbon economy and climate resilient society*". The author of this thesis was employed by OneWorld and consulted on this project, which entailed attending multiple stakeholder engagement workshops across South Africa with tasks which included extensive note taking and detailing of the engagements. These notes have been drawn on in this thesis as evidence on the Just Transition, with the author gaining particular first-hand experience on the reaction of stakeholders around the country on the Just Transition.

The NPC is an independent advisory body set up by the President of South Africa tasked with updating the National Development Plan 2030 (NDP), the overarching plan for South Africa's development which calls for a social contract to develop the country as well as build a more cohesive and equitable society. This project in particular fell under Chapter 5 of the NDP, the Transition to a Low Carbon Economy. When the original NDP was developed, climate change was less understood and not a priority for the country, and thus the chapter never had a particular vision for development, nor the targets and pathways which will allow that vision to be reached. Since then, however, climate change has been starkly brought into the limelight as a critical threat to humankind. Thus, the NDP is being updated to reflect the increasing need for urgent change.

The NPC decided upon a year long stakeholder engagement approach where engagements were held around the country to come up with a high-level plan for a Just Transition, and selected OneWorld and SEA to carry out the work. The NPC results feed directly into the NDP, which in turn feeds the country's development planning – thus under the auspices of the NDP the NPC has particular convening power to facilitate change. The project entailed developing the pathways for South Africa to transition along to become a low-carbon and climate resilient economy by 2050. These pathways were constructed based on a collective vision of the different economic futures under this transition for the South African economy and society, and the implications thereof for poverty and inequality. The ultimate view of the project was to provide a consensus macro-view of what a low-carbon and climate resilient economic transition could look like, based on views of stakeholders from different constituencies from around the country. The eventual goal was to create the foundation for a social compact to be formed between Government, Labour, Business and Civil Society, so that the four constituencies cooperate together for greater social and environmental benefits.

To achieve this, one high level social partner dialogue, nine provincial stakeholder workshops, three community workshops and six bilateral consultations (with youth representatives, labour, Sasol, the Energy Intensive User Group (EIUG) and the South African National Energy Development Institute

(SANEDI)) were convened by the NPC, facilitated by OneWorld and SEA over a 13-month period, from mid-2018 to mid-2019. These consultations and workshops were made up of stakeholders invited from local businesses, key experts in particular sectors, municipal, provincial and national government officials, labour union representatives, civil society organisations such as Non-Government Organisations (NGOs) in the spheres of climate change, social justice and environmental protection, local universities and youth organisations, as well as community members from local communities. Table 1 below illustrates a snapshot of some of the organisations in attendance, along with the overall number of stakeholders per constituency. This provided a wide lens from which to view the Just Transition – allowing insight from all aspects of society to be included in order to present well represented views and eliminate sectoral or individual bias. It must be noted however that there was a poor attendance from labour union representatives in these workshops.

Table 1: List of stakeholders who were involved in the various engagements, meetings and bilateral consultations

Constituency	**Organisation**	**Number of Stakeholders**
Government	Department of Monitoring, Planning and Evaluations; Department of Environmental Affairs; Municipal representatives from around the country; Department of Economic Development; Department of Rural Development and Agrarian Reform; ANC Youth League	308
Business	Sasol; The Energy Intensive User Group (EIUG); Eskom; Volkswagen; Beijing Automotive Industry Holding Co., Ltd. (BAIC); CNdV Africa; Pegasys Strategy and Development; Industrial Development Corporation;	216
Labour	National Union of Metalworkers of South Africa (NUMSA); National Union of Mineworkers (NUM); Congress of South African Trade Unions (COSATU); National Education, Health and Allied Workers' Union (NEHAWU)	12
Civil Society	<u>NGOs:</u> GroundWork; SouthSouthNorth; WWF-SA; Alternative Information and Development Centre (AIDC); Project 90 by 2030; GreenCape; Earthlife; South African NGO Cooperative (SANGOCO); <u>Universities and Research Institutions:</u> University of Cape Town (UCT); Energy Research Centre (under UCT); Council of Scientific and Industrial Research (CSIR); University of Stellenbosch; University of Witswatersrand; University of Rhodes; Nelson Mandela University;	237

	Stenden South Africa; Communities: Community representatives from Mpumalanga, Eastern Cape, North West	
Overall		770

The reason for these workshops being in every province was so that the views on the pathways which were needed could be built from the ground up, using consensus from stakeholders within the specific provincial workshop as a form of validation on particular issues. This thesis has then analysed these agreed upon pathways between provinces and stakeholders to synthesise the key pathways, based on which specific solutions and pathways were brought up the most across the country.

Each workshop was scheduled to run for between 7 and 8 hours over a single day. Bilateral meetings and consultations over 3 hours. Workshop attendees were introduced to the Just Transition and the NPC process during a short introductory presentation. After which the main opportunities and challenges of the Just Transition were discussed within small groups and each groups views were relayed back to the workshop. Following this, workshop attendees could join one of three breakaway sessions which framed the Just Transition under Energy, Land-use or Water. In these breakaway sessions, workshop attendees were asked about the 2050 Vision for South Africa, the Actions needed to accomplish that vision and the Key Players in making it happen.

These workshops provided a very wide representation of South Africa's views regarding the various facets around the Just Transition. The roughly 767 stakeholders who took part in the engagements provided a plethora of views, facts and opinions from almost every aspect of society. There was more or less even representation between Government, Business and Civil Society, but there was an underwhelming response from labour unions. Also, although invited, very few mine owners attended the engagements. So, unfortunately the views of two parts of society which will be majorly affected by the Just Transition were underrepresented.

It was also necessary to gain extra depth on these issues from key stakeholders. As such, separate roundtable meetings were held with Executives from the Energy Intensive Users Group (EIUG) of South Africa, and the Environmental and Strategic Services of Sasol. These in-depth discussions allowed for a deeper dive into the mechanics behind the Just Transition from two institutions with heavily vested interests in South African energy.

Additionally, OneWorld and SEA interviewed several key experts to review and validate the wider stakeholder views – providing validation to crucial issues where necessary and highlighting key gaps and barriers in the stakeholder views. Table 2 below illustrates who these experts were interviewed for greater depth around many of the points raised.

Table 2: List of Experts Interviewed

Expert Name	Area of Expertise	Occupation
Harald Winkler	Energy Expert	Professor at the Energy Research Centre, UCT
Simon Nicks	Sustainable Land Use Expert	Managing Member, CNdV Africa

A roundtable discussion was set up with the University of Witwatersrand School of Governance with Oliver & Adelaide Tambo Foundation and United Nations Development Programme to provide perspectives from the youth of the country. There were 14 non-project related people at the Youth roundtable, providing key insights. This was necessary as they would be the ones to suffer from climate change and would be the ones overseeing a large proportion of this transition.

Lastly, the voice of local communities is central to the Just Transition. To fully understand the nature of the issues faced by those most vulnerable in the country to climate change and to the transition itself, three community meetings were held. The first, in Mpumalanga, organised by GroundWork, a social justice NGO with deep ties to the abject mining communities in Mpumalanga, was attended by 9 leaders from surrounding local communities and provided some key outputs from the marginalised communities whose voice was not being heard. The second community meeting was held in the Eastern Cape, organised by (South African NGO Coalition) SANGOCO, and was attended by 7 community members who raised important challenges that they faced, such as the challenges of urban sprawl and poor upstream water resource management which severely affects them. Lastly, a community in North West Province was held. The 13 community members involved had all been heavily affected by local mining in the area, which provided added insights into the plight of mining communities in South Africa. Both sets of community members in these discussions came willingly to the meetings, without coercion, such that their voices could be heard.

All of the views and understandings which have come out of these smaller, more focused discussions have been used to underline the views coming out of the stakeholder workshops where applicable – to give expert weight and grounding to the views raised by stakeholders.

Dedicated note takers recorded each workshop and meeting, with all references to individuals anonymised. Where applicable, however, the respondent's organisation, sector or affiliation (government, business, civil society, labour) was recorded, to categorise what segment of society the particular views were coming from.

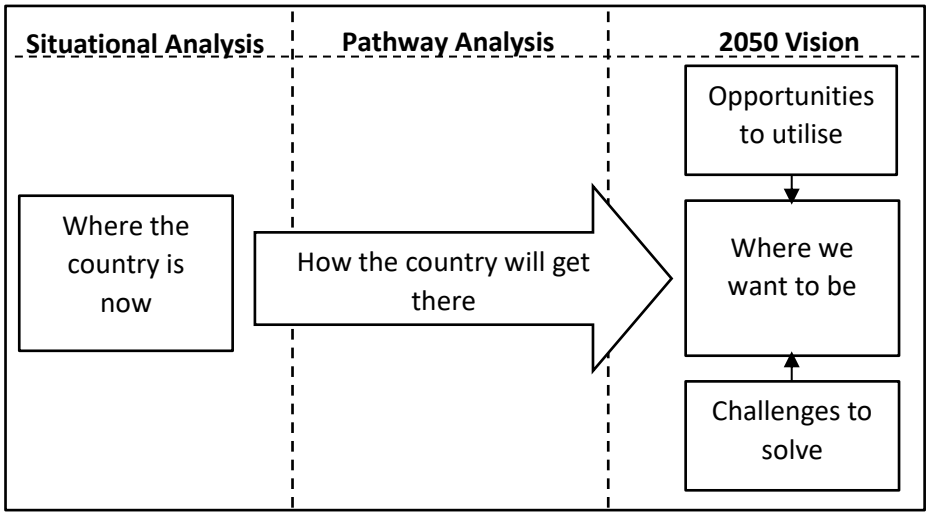
This thesis has synthesised these views to form a cohesive, country-wide representation of the Just Transition, based on secondary, qualitative data collected as part of OneWorld and SEAs wider project. The author was (and is) contracted to OneWorld at the time and the company was aware of the intention

to submit a thesis based on these results – and thus shared the data collected. There is a draft report out from the NPC on the project which can be found by following the link in the footnote below[5].

The data collected forms part of a strategic framework which illustrates the pathways which lead from a baseline situation to an unknown future state, based on the views of stakeholders. This thesis uses such a strategic framework to define a long-term goal, and then maps backwards to identify the pathways required for change from a present situation. The present-day situation of South Africa will be explored by examining a number of factors in the current context of the country relevant to the Just Transition. This will form part of a Situational Analysis, based on underlying theory from around the country, and brought to life using stakeholder voices regarding the key challenges and opportunities of the Just Transition in the present. This will be followed by identifying the critical Vision stakeholders had for the country for 2050, making up the long-term idealised goal for the country. Then, the pathways which will steer the country from where it is today, to where stakeholders believe it should be in the future, will be explored. This will provide a lens to the South African Just Transition, synthesising key stakeholder voices from around the country.

It should be noted that these pathways are a consequence of the interrelationship between water, energy and land throughout South Africa. Each pathway therefore is not independent, and these pathways look to maximise these interdependencies between the resources. They have had to be deconstructed to be analysed and have thus been separated, yet, these interdependencies are constantly referred to.

Figure 1: A high-level representation of the strategic framework of this thesis



[5] The draft report has been circulated by the NPC and a copy can be found on OneWorld's website, https://oneworldgroup.co.za/wp-content/uploads/2019/10/NPC-JT-Vision-and-Pathways-draft-2-final.pdf

3. The South African Situational Analysis

So far, this thesis has established a working definition for the Just Transition and has explored the need for the Just Transition based on mitigating and adapting to climate change and improving equality and ensuring the transition is fair. The broader energy transition has also been explored, with the rise of renewable energy and the decline of coal in particular noted.

This background to the Just Transition from a global perspective provides a useful starting point from which to now explore South Africa's own Just Transition. The primary impetus for the Just Transition, climate change, is an international crisis which has to be solved locally. South Africa, as this chapter will explore, is a significant contributor to climate change and is also particularly at risk from the consequences of climate change.

Yet, although there are signs that a transition to low-carbon energy systems has at least started in many countries around the world, in South Africa there is still no clear direction or urgency to the transition. Indeed, there are instead several significant hurdles which must be cleared for any transition to occur, and then ensuring that the resulting transition is just will be another challenge in and of itself.

For instance and most important, the country historically has a high dependence on carbon-intensive coal generated electricity with a vertically-centralised, powerful, state owned monopoly which exerts control over the Electricity Supply Industry (ESI) and has multiple vested interests in it – which makes any deviation from the energy status quo difficult. Moreover, climate change will affect South Africa dramatically, especially due to the high levels of poverty which reduce people's capacity to withstand climactic events. Yet, as Perez (2013) advises, crises are an opportunity for massive change and the encroaching climate crisis may give impetus to the facilitation of a Just Transition in South Africa.

The Just Transition presents an opportunity for the country to break the shackles of its coal dependence, lighten the socioeconomic burden faced by many as well as reduce the country's contribution to climate change and become more climate resilient in the process. Yet, the process requires urgent, widespread and planned action which takes those most vulnerable into account. This chapter will explore the factors underlying the need for the Just Transition in South Africa and will highlight the factors which constrain and enable this transition. Throughout this chapter the relevant voices heard throughout South Africa will be entwined with the prevailing books, reports and papers around the Just Transition.

In outlining the status quo in South Africa, this section will establish the present baseline of South Africa relevant to the Just Transition. This will provide a situational analysis, a snapshot of where the country is currently situated in terms of the need for a Just Transition.

3.1 South Africa's Dependence on Minerals and Energy

The South African economy has been built off the country's mineral wealth, with an abundance of minerals such as gold, platinum and coal. The prevalence of precious metals led to extensive mining,

which required extensive power where coal-based energy was provided as cheaply as possibly to a number of energy-intensive users (Winkler & Marquard, 2009). Eventually the state centralised electricity generation, transmission and distribution in a state-owned entity, Eskom (Overy, 2018).

Originally, Eskom was mandated to provide cheap electricity for mining (and eventually industry) in order to build a competitive advantage for the country in cheap power, drawing in a wealth of foreign direct investment (Overy, 2018). Eskom could provide incredibly cheap electricity based on the ability to buy large, cheap, locally sourced quantities of lower-grade coal based on favourable price agreements with coal suppliers, along with exploitive labour prices and by keeping tariff increases significantly below inflation (Lloyd, 2012; Winkler & Marquard, 2009).

These very low electricity prices created an energy-intensive economy (Lloyd, 2012). Heavy industry and mining flocked to the economy and Eskom, even after it became profit-seeking (after apartheid), remained geared towards their interests (Overy, 2018). Today, the Energy Intensive Users Group (EIUG), a collection of the 31 largest energy consumers in the country, consume over 40 percent of the energy and dominate the drafting of energy policy and energy pricing (Swilling et al, 2015).

Additionally, Eskom has remained a state-owned enterprise, even after it became a for-profit company. Yet, as a for-profit company Eskom was obliged to pay massive dividends to its shareholders, the State. These enormous dividends (R1.6 billion in 2006 (Styan, 2015)) instead of being reinvested in infrastructure, were paid to the government (Overy, 2018).

Moreover, there were never any incentives to move away from coal for the country's power needs, as preferential agreements locked Eskom into purchasing agreements with coal mines for the mutual exchange of cheap coal prices for cheap electricity prices (Winkler & Marquard, 2009). Also, the country has massive coal reserves obfuscating the need for an alternate power source. Consequently, coal power accounts for around 85 percent of South Africa's electricity needs (StatsSA, 2016)

Eskom, as a result of their supply side mandate to ensure cheap power for industry, began to fall short of meeting demand after apartheid when there was an increased rate of electrification and high GDP growth (Eberhard, 2011). Eskom had been unable to finance base load expansions due to their pricing structure, and so there had been a lack of supply side investment in new power plants (Lloyd, 2012). Eventually, demand outweighed supply and Eskom were forced to begin planning the construction of new power stations, which would be funded by an electricity tariff increase. This, however, led to price increases, making electricity less affordable – leading to underfunding (Eberhard, 2011).

Today, Eskom dominate the ESI. They are responsible for generating 95 percent of the country's electricity needs, 100 percent of electricity transmission (as they own the transmission grid) and distribute 45 percent of all electricity to end users (Styan, 2015). The energy sector alone is responsible

for 83 percent of South Africa's total greenhouse gas emissions (DEA, 2014). This heavily contributes to South Africa's being the 15th largest carbon dioxide emitter globally[6] (Crippa et al., 2019).

South Africa is also the one of the largest producers of coal in the world. Coal mining create nearly 87 000 direct jobs and contributes around R24.7 billion in terms of employee earnings (Minerals Council South Africa, 2018). Around 75Mt of coal are exported every year (Nicholas, 2019; IISD, 2019). Eskom buys around 120 Mt of coal annually, however the minerals council note that with the declining life of several coal mines, around R20 billion worth of investment into coal mines is needed to keep supplying Eskom with coal (Minerals Council South Africa, 2018). The global transition therefore poses a significant threat to this sector. Already coal exports have declined as a result of weaker demand (Nicholas, 2019).

Over 100 globally significant financial institutions[7] have divested from coal. This includes a number of the largest global banks and 20 large insurers, who have announced the end of lending money to, or insuring, coal (Buckley, 2019). At the end of 2018, 415 global investors who manage a collective US$ 32 trillion called for a coal phase out by 2030 to counter climate change (Buckley, 2019). These significant shifts of global finance will have large repercussions on the domestic South African coal market, who export around 26 percent of the coal mined locally (Minerals Council South Africa, 2018). Demand for South African coal has dropped by 4 percent (Nicholas, 2019) and there is a rather a bleak outlook for the future of coal exports.

South Africa has a domestic electricity generation capacity of just over 51 Gigawatts (GW), around which 85 percent comes from an extensive thermal power station fleet. Yet, much of this fleet is aged and is nearing the end of its useful life – requiring decommission. Around 28 GW is set to be phased out by 2030 and 35 GW by 2050 (CSIR, 2017a) – implying that coal will contribute less than 20 percent of the country's power by 2050 (DMRE, 2019).

Thus, as it stands the majority of the current coal fleet is set to be phased out of electricity supply anyway. There have also been widespread calls for "*No New Coal*", as people from around the country are trying to prevent the addition of any additional coal power, due to the unsustainability of it as a power source, and the fear of creating further potential stranded assets. Already, there are a number of power stations at risk of becoming stranded assets in South Africa, especially under the current mitigation targets as set out in South Africa's Nationally Determined Contributions (NDCs), in line with the Copenhagen Agreement and the Paris Agreement (Burton et al., 2016).

Additionally, Eskom is currently in a financial crisis, owing around R492 billion (Burkhardt, 2019) and unable to meet the interest repayments, despite government bailout and increased electricity prices. The

[6] This ranking is based on the country's fossil fuel emissions, excluding emissions from land use (Crippa et al., 2019)
[7] Institutions with assets of at least US$ 10 billion

reasons for this include budget over-runs, late delivery and the ongoing failure of Medupi and Kusile power stations to function at full capacity. In addition, Eskom has not kept up with maintenance of its plants and some are reaching the end of their life span. Maintenance problems led to power outages at the beginning of 2019, deeply affecting small businesses in particular. The unstable supply as well as the increase in efficiency and cost effectiveness of renewable power sources have led many high-income households and companies to turn to other solutions, such as rooftop PV, further reducing Eskom sales (OneWorld, 2019a).

Most experts believe that South Africa's energy supply industry (ESI) is well behind the global curve (OneWorld, 2019a). Over 100 countries have partially or fully unbundled their ESI sectors, thereby enabling more privatised energy generation, which in turn has improved the productivity and quality of power supply (OneWorld, 2019a). Productivity and quality are critical elements for the financial feasibility of power utilities.

South Africa is a member of the United Nations Framework Convention on Climate Change (UNFCCC), and have therefore made international commitments to mitigating climate change. This commitment (under the Copenhagen Accord) is to reduce emissions below business as usual by 34 percent by 2020 and 42 percent by 2025[8].

The National Development Plan contains a target to limit GHG emissions to between 398 and 614 million tonnes of CO_2 emissions over the 2025–2030 period. However, this target is considered "highly insufficient" by the Climate Action Tracker, an independent scientific analysis produced by two research organisations tracking climate action, which identifies whether countries around the world are in line to meet their NDCs, keeping in line with their commitments to the Paris Agreement. The score of "highly insufficient" means that South Africa's current climate commitment is not consistent in keeping with limiting the global increase in temperature to below 2°C, let alone limiting it to 1.5°C as required under the Paris Agreement. Instead, the "highly insufficient" score is consistent with warming between 3°C and 4°C – and if all countries were to follow South Africa's approach, global warming could reach over 3°C and up to 4°C by 2050 (Climate Action Tracker, 2018; DEA, 2014; IPCC 2018).

3.2 Climate Change

Many parts of Africa have experienced significantly higher warming than other parts of the world, around twice the global average (Engelbrecht et al, 2015). With this level of warming, the frequency and intensity of extreme climate events, such as droughts will increase dramatically. Therefore, the risks of climate change should be taken even more seriously on the continent as the effects of global warming

[8] Based on a communication between Mr Alf Wills, Deputy Director General: International Cooperation, Department of Environmental Affairs and Mr de Boer, Executive Secretary UNFCCC on 4 February 2010 regarding South Africa's obligation to the Copenhagen Accord. Available: https://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/southafricacphaccord2_app2.pdf

will be much more dramatic and impactful. This is unfortunately as true for South Africa as it is for the rest of the continent.

Additionally, the consequences of climate change disproportionately affect the poor (IPCC, 2018) who have the lowest resilience to climactic events. Poor and vulnerable people are the most dependent on ecosystems and services and climate change impacts have the potential to cause food insecurity, as well as exacerbate unemployment and impede livelihood activities.

South Africa has a huge portion of the population who live in poverty (approximately half of the adult population) (StatsSA, 2015) and thus will be affected by climate change to a large extent. These people in particular need to be protected as the world becomes more dangerous as a result of climate change.

Already the impacts of climate change are already evident in South Africa. The prevalence of drought has risen, and the country is experiencing more frequent extreme weather events. These effects are amplified as a consequence of climate change and not only affect the health of people throughout the country, but also affect livelihoods and the economy (OneWorld, 2016).

Additionally, South Africa is considered a water scarce country – and already the country struggles to provide adequate amounts of clean water for its population and economy (OneWorld, 2016). The increasingly unpredictable rainfall, and more intense droughts and floods associated with climate change will therefore be strongly felt.

Water scarcity also increases the stress on land-use systems. Under-maintained water systems cannot lessen the impacts of droughts and floods on land use. Ecosystems need to be managed for optimal water service provisioning, and infrastructure such as dams and reticulation systems need to be built and maintained.

The climate change related risks facing agriculture and human settlements in South Africa include changing rainfall patterns, increased evaporation rates, higher temperatures, increased pests and diseases, shifting growing regions and reduced yields. These effects can have dire consequences for jobs in the agricultural sector, as well as affecting the food security[9] of the nation. This is a particular risk in light of the growing population of the country.

3.3 South Africa's Triple Challenge

South Africa faces what is called the triple challenge of persistent poverty, high unemployment and entrenched inequality. Policy development has focused on transforming and growing the economy, building a unified society and, above all, reducing poverty and inequality. Although progress has been

[9] Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996)

made, including the building of nearly three million houses for the poor, the triple challenges remain deeply entrenched in South African society – with an official unemployment rate of 27.6 percent (StatsSA, 2019) and one of the highest levels of inequality in the world, with a Gini coefficient of 0.63 (World Bank, 2019a).

South African cities also have a higher than average level of unemployment among the youth (Juech, 2014). Official unemployment among young people (15–34 years) is disproportionately higher than the overall unemployment of the country, at 38.2% in 2018 (Stats SA, 2018b). The South African economy needs to find a way of absorbing nearly 27 million new job seekers over the next 15 years (Stats SA, 2018a). Unless many jobs are created rapidly, the number of people living in poverty is likely to increase above the 30.4 million people in 2015 (StatsSA, 2018b), and this will have a serious impact on the grant and subsidy system, and the provision of education, housing and basic services.

The looming climate catastrophe will be significantly worse for those mired in poverty, which is an unfortunate reality for more than half of the South African population (55.5 % of the population live on less than R992 per capita per month, the Upper bound poverty line) (Stats SA, 2018b). The poor are much more vulnerable to climate change as they have a much-reduced level of adaptability and less access to resources such as water, food, housing and energy. Climate change is therefore a tremendous concern for South Africa due to the socioeconomic threat it poses, particularly for the poor.

Employment and job creation are central to solving South Africa's triple challenge. Job creation is urgent and necessary in South Africa, firstly to ease the socioeconomic challenges the country currently faces, and to also improve the adaptability of the population to the risks of climate change.

Additionally, the potential job losses from the mining sector and the multiple interrelated sectors, if not considered, will exacerbate the triple challenge the country faces – hence deepening the need for a Just Transition.

South Africa clearly faces a wide range of social and economic challenges which must be addressed as they constrain current development, reduce the wellbeing of the population, and contribute to climate change. Climate change poses a tremendous socioeconomic threat to South Africa and will make solving all the challenges much more difficult. As such, and due to the increasing urgency for change, there is a need for South Africa to transition to a low carbon, climate resilient economy and society which protects and supports those most vulnerable in the country. This makes up the framework of the Just Transition.

3.4 Water Considerations

Water is the most valuable natural resource for humankind. There is no alternative to water – it is key to life and vital to the health of ecosystems as well as social and economic systems, and is therefore key to human development. Water is also the main channel through which unsustainable resource

management practices and stresses permeate through socioeconomic and environmental systems (Turton, 2012).

Additionally, water is seen as a stress multiplier in Africa. It is a resource which is directly impacted by climate change, and by climate change and development decisions, and water security is affected by poor governance (Petrie, 2017).

Yet, water resources are under increasing pressure in an uncertain future. Population pressure, urbanisation and economic growth result in increased demand for water, placing a massive burden on the already scarce resource. At the same time, climate change is also influencing global trends in access to water – water scarcity is now recognised as a permanent and significant threat to economies and societies in many parts of the world (World Bank, 2016). As global temperatures rise, rainfall is anticipated to become more unpredictable which will lead to more instances of drought, as well as flooding (IPCC, 2018).

In South Africa, the demand for domestic water use (currently 35% of total demand), and industry (currently 10% of total demand), are expected to increase as the population and economy grows (WRC, 2015). This will increase the competition for increasingly scarce water resources – as mean annual rainfall in South Africa is predicted to fall by 49.2mm by 2050, around 10 percent of the current annual rainfall (World Bank, 2019b).

Nevertheless, water is vital to the health of ecosystems and the viability of social and economic systems – thus it is key to sustainable development. As such, water – and its governance in the face of uncertainty – is at the heart of the nexus with other key sectors, such as land-use and energy (UNECA, 2016). For example, agricultural development is a key in South Africa, and is largely dependent on water availability and access. Land-use resources are critical for agricultural development and therefore, food security. The irrigated agricultural sector is also the biggest water user in South Africa, accounting for around 60% of overall consumption (WRC, 2015), a trend that is likely to remain stable toward 2050. Therefore, exacerbated water scarcity and the increased frequency of extreme weather events, such as drought and floods, have serious negative implications for food security, which, in turn, negatively impacts on human health and wellbeing (UNECA, 2016).

3.5 Land-Use in South Africa

Land-use resources are critical for agricultural development and therefore, food security. The irrigated agricultural sector is also the biggest water user in South Africa, accounting for around 60% of overall consumption (WRC, 2015), a trend that is likely to remain stable toward 2050.

Yet, much of the country's fertile land has been irreparably damaged by mining and some 12 percent of the arable land in Mpumalanga alone, the breadbasket of South Africa, is under threat from mining

(CER, 2016). The country should be fundamentally focussing on the preservation of fertile land, or at least the regeneration of used mining land, in order to boost food security in a less water secure future.

Additionally, there are around 6000 abandoned mines in the country (DMR, 2009). These abandoned mines lead to critical issues, such as acid mine drainage and the leeching of heavy metals into soils – significantly degrading the water quality of surrounding water resources (Oelofse, 2008). Also, these abandoned mines can experience spontaneous combustion which can lead to underground fires, contributing to the already significant air pollution in mining regions (Groundwork, 2018). Dust and mining particulate matter from blasting, mine dumps and off the back of mine vehicles is also blown into the air, also adding to the poor air quality (CER, 2016).

4. A Vision of a Just Transition for South Africa

This thesis has so far explored a number of factors which illustrate the need for the Just Transition from a theoretical point of view. This has included South Africa's energy context and the need for cleaner electricity solutions in light of climate change's growing impact on the country. Additionally, the overwhelming socioeconomic troubles the country faces emphasise the need for a transition that is just. Lastly, inherent in the Just Transition is sustainability – with the need for cleaning and improving the sustainable use of land and water resources key in the transition. These outcomes will lead to mutually beneficial outcomes for society too, thus highlighting the cobenefits arising from the Just Transition.

Understanding what the current scenario for South Africa is important in understanding what needs to be focussed on in a Just Transition. At the same time, however, it is important to have an idea of the end state in mind, so that the right steps are taken for country to undergo a Just Transition. Having an idea of a vision of how a Justly Transitioned South Africa might look (by 2050) also allows the developmental pathways which will facilitate the Just Transition to be conceptualised, developing a roadmap for how the country can transition.

To set up this future, the key opportunities for, and the key challenges which must be solved by the Just Transition are highlighted, based on what stakeholders have put forward. Based on these, a 2050 stakeholder determined Vision for South Africa will be determined.

4.1 Key Opportunities

Stakeholders were asked about their thoughts on what the key opportunities were for the Just Transition in South Africa (the full list can be found in Appendix A). These views were extensive, with a total of 272 opportunities brought up across the nine provincial workshops. The most frequently raised opportunities are depicted in table 3 below, with renewable energy the most frequently cited at 54 times.

This section will explore the most opportunities brought up most frequently, roughly using this as an estimation of consensus, the more frequently raised the opportunity the greater resonance it has for the people of South Africa.

To counter potential bias in this estimation, the key opportunities will receive a score out of 9 based on how many workshops they were brought up at. This will help to illustrate whether an opportunity is represented widely across South Africa, and not just mentioned frequently in one place.

Table 3: The Key Opportunities of the Just Transition

Frequency Brought Up	Opportunity	Description
54	Renewable energy 9/9	• Costs of renewable energy are falling. • South Africa has advantageous conditions for renewable energy (based on consistent wind in many parts of the country, and a high number of sunshine days per year). • Alternative energy can capacitate communities. • Renewable energy has high job creating potential.

35	Education and awareness 6/9	• Develop new skills, create new businesses, industries and markets. • Climate relevant materials. • Awareness campaigns so people live within the available resources. • Educate a future of entrepreneurs.
32	Sustainable Land Practices 9/9	• Climate smart agriculture. • Small scale agriculture. • Land rehabilitation. • Denser, sustainable cities • Invest in biodiversity.
24	Behavioural Shift in Water Use 9/9	• Rainwater harvesting. • Wastewater and grey water reuse. • Behavioural change for households to save water.
12	Integrated Resource Planning 9/9	• The Land-Water-Energy Nexus

Renewable Energy

Stakeholders from all over the country highlighted the opportunity for renewable energy to replace coal-fired power in South Africa, for a number of reasons.

Firstly, it was recognised that the country has one of the highest global sources of solar radiation and significant wind resources (Appendix C: Northern Cape #75, North West #206)[10]. This makes a strong case for a more aggressive roll-out of renewable energy as South Africa has an abundance of clean energy supply which needs to be tapped into to a larger extent. Studies by Pegels (2010) and Winkler (2005) illustrate the renewable energy potential in South Africa.

The cost effectiveness of renewable energy has also significantly improved, increasing its competitiveness (Gauteng #37, Mpumalanga #92). Since 2010, solar photovoltaic prices have decreased by 81 percent, and the costs of wind turbines are down by 45 percent (UNEP, 2018). Adding to this, the feed in tariff pricing of renewable energy ensures that renewable generated electricity prices are lower than coal generated electricity prices (CSIR, 2017b). Thus, the demand appeal of renewable energy has significantly upsides for electricity consumers as well as producers.

Although these two factors increase the appeal and viability of renewable energy, it is the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP), established in 2011, which has provided great impetus for the introduction of renewable energy into the country's energy mix. REIPPPP has been characterised as a very successful renewable energy bidding programme and led to the inclusion of 6.4 GW installed capacity from solar and wind generation in 2016, with a target of 17.8 GW for 2030 (Eberhard & Naude, 2017). It must be noted however, that the implementation of

[10] These references indicate the particular provincial stakeholder engagement workshop the view arose from, and the indicative number of the quote, as per Appendix C

REIPPPP has been largely blocked by Eskom, who have delayed signing the policy (Morris and Martin, 2015).

There was also widespread praise for the job creation potential of renewable energy (Gauteng #33, Mpumalanga #93, Eastern Cape #109, North West #190, Free State #255). The job creation potential of renewable energy has been widely researched, with the CSIR identifying that transitioning to renewable energy can lead to net job gains (CSIR, 2017a) with a power sector transformation creating around 1.6 million jobs by 2050 (Cobenefits Study, 2019).

Education and Awareness

Stakeholders from two-thirds of the provincial workshops noted that there was a particular opportunity for increased awareness regarding climate change and an education system focussed on relevant knowledge and skills for the present.

Awareness campaigns, particularly in people's mother-tongue, will firstly make people aware of the threat of climate change (Eastern Cape #161). Building this awareness in broader society lays the foundation for more climate sensitive behaviour, ensuring people live lives within the available resources (Western Cape #9, Gauteng #68, Northern Cape #84). Creating a greater understanding of climate change can also lead to innovative solutions as people will begin to develop sustainable solutions, which can empower people, lead to greater job creation and help the country transition to a more sustainable economy (Eastern Cape #134).

Parallel to the raising of awareness exists an opportunity to equip the youth with the relevant knowledge and skills for a future which will be afflicted by climate change. The youth are particularly easy to target as schools are an ideal place to teach them about the threat of climate change, what some solutions are to it, etc (Gauteng #51). This will firstly unlock jobs and interest in new sectors for the youth (Western Cape #6, Gauteng #26) and it will instil and foster climate sensitive and sustainable habits for the future generation (Eastern cape, #106).

Additionally, the raising of awareness can lead to outcomes such as increased water saving and greywater reuse (Limpopo #218), environmental rehabilitation (Limpopo #219), reuse of waste (North West #200, Limpopo #222) and energy saving (Limpopo #224). Need to have awareness of the entire water cycle e.g. river systems. We should be using grey water for flushing toilets and irrigation (Youth #11).

Stakeholders stressed that although large macro solutions to the country's energy problems were needed, there should also be a focus on instilling climate sensitive behaviour in society, which would "build sustainability into the fabric of our Nation" (Western Cape #9).

Sustainable Land Practices

There was a number of opportunities which stakeholders identified arising from using land efficiently and sustainably. Chiefly in this was using climate smart agriculture, smaller scale agriculture and reducing destructive land practices.

It was widely viewed that there are many opportunities for agriculture – based on climate smart and regenerative agricultural methods (Northern Cape #88, Mpumalanga #100, Eastern Cape #149, Free State #256) which would underpin and ensure food security in a future where agricultural conditions may be worse off. Agriculture also should take into account water (utilising agroecology methodologies) (Eastern Cape #150), and the waste outputs of agriculture should be used as a means of energy in the form of biogas and biofuel (Gauteng #42, #72, Eastern Cape #148).

Additionally, small scale agriculture was seen as a vital opportunity for the country, as opposed to large scale, commercial agriculture which was seen as a challenge. Stakeholders believed small scale agriculture provides an opportunity for empowerment as there would local business owners and not just farm workers (Western Cape #23, Mpumalanga #99, Free State #255). It would also assist in general job creation as smaller farms will require more labour as they will not have access to the capital equipment that commercial farms have (Gauteng #38).

An opportunity was also identified for rehabilitating land. For instance, there are numerous abandoned mines in the country in which an opportunity exists for rehabilitation. The rehabilitation of this land could be used for agriculture or renewable energy production and would at the very least prevent the current negative environmental impacts they have (Mpumalanga #91). This rehabilitation provides opportunities for jobs too (Western Cape #12). It will also improve water quality and soil which will have implications for food production (Eastern Cape #131).

Another opportunity for sustainable land practices identified was that of establishing and enforcing sustainable land use practices (Gauteng #63, Limpopo #216). Part of this is that mining should be more strictly monitored and regulated, including enforcing rehabilitation efforts (Limpopo #217).

Additionally, an opportunity exists, according to stakeholders, to make cities sustainable and climate smart using various mechanisms (Western Cape #20, Gauteng #44, Mpumalanga #97, Eastern Cape #139, Kwa-Zulu Natal #237). The main opportunity to make cities more sustainable was the densification of residential areas. This, according to stakeholders, would mitigate urban sprawl and allow numerous benefits to accrue to people – such as better service delivery, lower transport costs, less pollution, etc.

Behavioural Shift in Water Use

Water is one of the most important resources which human populations depend on. Due to its importance, stakeholders from around the country in every province mentioned a number of opportunities for water which would ensure a fairer and more secure water future.

The water opportunity raised most frequently was that of a shift in how South African's use water. This opportunity, identified in 6 provinces, entailed South Africa's using water more sustainably at a household level – with there being less water wastage, more wastewater and grey water reuse and utilising micro-rainwater harvesting techniques (Western Cape #23, Gauteng #59, Eastern Cape #135, Limpopo #218, #220, Kwa-Zulu Natal #245, Free State #268). Also, as mentioned by a member of the Youth Consultation, "As a citizenry we need to learn to save water. Problem is not water per se but awareness" (Appendix C: Youth 10).

Integrated Resource Planning

Stakeholders in every province recognised that water, energy and the utilisation of land are all essential for human life. It was widely acknowledged that these resources do not exist independently of one another as there are deep interdependencies between land, water and energy, forming the Land-Water-Energy Nexus.

The nexus determines in many instances how these resources can be used. For instance, water is a critical input for all agricultural production and is central in the production of energy. Energy is required to extract, treat and deliver clean and safe water for human use. Food production, a major use of land, requires energy in various forms for harvesting, planting, transport and fertilizing. Thus, one cannot attempt to view these resources in isolation – they both constrain and benefit each other, forming multiple inextricable interlinkage with one another.

Stakeholders put forward that the nexus offers a great opportunity for the sustainability of land, water and energy, as by securing and improving one resource, benefits would be amplified through the nexus, improving the health of other resources. A stakeholder from Gauteng mentioned that "simple measures such as providing basic insulation for low-income housing lead to far greater benefits than just providing extra warmth. Rather, added insulation reduces peoples use of electricity or other, dirtier forms of energy like fires for heat, which contributes to improving air quality." (Gauteng #41).

At the same time, damages to one resource can have implications for other resources. For instance:

- Water scarcity – as well as extreme rainfall events – increase the stress on land-use systems (Western Cape #16). Under-maintained water systems cannot lessen the impacts of droughts or floods on land use – which can lead to severe implications for resulting food production and human populations (Petrie and Rawlins, 2019).
- Mining, a major use of land in South Africa, supports many jobs and contributes to the livelihoods of thousands of South Africans. Yet, it can also contribute significantly to air and water pollution, is a significant consumer of energy, and threatens much of the arable land in the country (CER, 2016). Also, mining operations rarely rehabilitate the land around the mine upon its closure – leading to a host of problems such as acid mine drainage, underground fires and safety hazards to

surrounding communities. Yet, if these abandoned mines were to be rehabilitated, water quality would improve, and the land could be used productively for renewable energy generation or agriculture (Mpumalanga #92, North West #192).

- Small scale farming and climate smart agriculture was seen as a possible opportunity in addressing the extreme consumption of water by the agriculture sector (Northern Cape #88, Mpumalanga #100, Eastern Cape #149, #150, Free State #256)

The land-water-energy nexus is a fundamental opportunity inherent in the Just Transition. The nexus ensures that benefits and costs are amplified, thus often cleaning up a resource and using it more sustainably leads to greater benefits as well as the avoidance of costs.

4.2 Key Challenges

As with the key opportunities, stakeholders were asked to share their views on the key challenges which the Just Transition can and must solve. The full list of challenges can be found in Appendix B. Again, the most frequently uttered challenges are captured in table 4 below, along with the resonance the challenge had around the country, based on how many workshops it was mentioned in.

Table 4: The Key Challenges for the Just Transition

Frequency Brought Up	Challenge	Description
47	Government Coordination 9/9	• Three spheres of government work in silos. • Government departments also work in silos. • Lack of political will with regards to climate change. • Corruption.
32	The Current Minerals-Energy Complex 9/9	• Unaffordable energy. • Eskom. • Coal lock in. • Heavy resource extraction-based economy. • The emissions status of South Africa, with coal being the main contributor to it. • Destruction of the environment and pollution of air and water.
28	Unsustainable and Inefficient Land Use 8/9	• Overexploitation of resources. • The domination of large scale, commercial agriculture. • No emphasis on sustainable practices or biodiversity. • Population growth with increase pressures on land use.
28	People are Uninvolved in the Just Transition 8/9	• Lack of climate awareness around climate change. • No interaction from Government with the communities or civil society.
22	Job losses 9/9	• The jobs which will be lost in the transition.
18	Water Resource Challenges 9/9	• Water supply shortages. • Water pollution. • Water wastage.

Government Coordination

It was clear from stakeholders that the Government was the central challenge to the Just Transition, with the majority of challenges raised by stakeholders, over 20 percent of all challenges, involving an aspect of the Government. In particular it was raised that the lack of coordination between government

departments is a difficult challenge, as well as stakeholders raising that the population had lost faith in the government and that government officials were not capacitated sufficiently to deal with the cross-cutting issues of climate change. These will all be explored in more detail below.

The clearest and most commonly referred to challenge regarding the government was that government departments tend to work in silos (Western Cape #3, Gauteng #19, #20, Northern Cape #36, Mpumalanga #36, Eastern Cape # 74, #83, #112, North West #174, Limpopo #181, #183). There is misalignment around the implementation of policy between the three spheres of government (Northern Cape, #36). This means that National Government's policy and guidance does not filter down to provincial and municipal agents and is thus not implemented – undermining the collective vision (Gauteng #19).

Moreover, the alignment of policy between departments is also a challenge to the Just Transition. The lack of coordination between different departments within government leads to policies which are often in conflict with one another (Kwa-Zulu Natal #202). This lack of an integrated approach and synergy between the three spheres and between policy poses as a challenge to the Just Transition as one department says and does one thing, while another may do something which conflicts with that (Eastern Cape #112, North West #174). Altogether, this often results in a contradiction in what is said by National Government and what is seen on the ground (Western Cape #5).

This governmental challenge is also based on government taking a top-down approach to decision making, with little to no consultation from policy makers, often obfuscating the real challenges people face (Western Cape, #3, Northern Cape #26). Decisions made also are not done so transparently (Mpumalanga #52) which often makes it seem like decisions are being made for the government official and not for the people (North West #165). There is also no way to contact or hold these decision makers to account, which makes it difficult to discuss the decisions that they are making (Kwa-Zulu Natal #218). This challenge is exacerbated by the lack of accountability within government ranks – as no one is held to account for a decision taken or mistake made (Eastern Cape #87). Decisions are also made by politicians who are chasing short term goals, and as such the longer term but ultimately more beneficial goals (such as the health of the environment) are not priority for them (Northern Cape #21). Which then affects political will on issues like the environment and climate change as "*there's no will to implement long term goals, especially at a municipal or provincial level"* (Limpopo #194) and "*There is no evidence of political will - policies are contradictory and low carbon development is not being broadly implemented*" (Free State #221).

Additionally, decision makers also don't necessarily have an awareness of climate change and so it is unprioritised (Northern Cape #38). This was echoed in consultations with the youth who noted that climate change is not a priority for politicians who instead focus on poverty, which is also necessary

but climate change is a quickly growing issue which will affect human lives to a great degree (Youth #8).

There are also power dynamics and political forces which affect that implementation of policies at various levels (Western Cape #6). The political situation in the country is also marred by deep rooted corruption which was seen as a huge impediment to the implementation of any plans developed (Northern Cape, #22, Eastern Cape #86, North West #165, Kwa-Zulu Natal #209). These both contribute to a lack of trust in the government, which proves a barrier to forming partnerships for change and for economic gain (Gauteng #18).

It was noted by Sasol that there is not currently a unified approach to climate change, which results in it being addressed in pockets of excellence – resulting in isolated initiatives which could synergise with other initiatives (Appendix C: Sasol #1).

The Current Minerals-Energy Complex

Electricity is unaffordable for many poorer people in the country (Mpumalanga #56, North West #158). Rising electricity prices also erode business competitiveness, particularly energy intensive businesses and industries – as well as driving away foreign investment (Appendix C: EIUG #4). This affordability challenge must be resolved as it affects the country significantly. But, current coal-fired power has witnessed and continues to witness tariff increases to cover Eskom's debt, thus affordable electricity will have to be facilitated by another means of energy.

Every community engaged on the project mentioned that electricity prices were too expensive, so that even if they had access, they could not afford electricity (Appendix C: Mpumalanga Community #5, Eastern Cape Community #8, North West Community #3). The Department of Energy (DOE) estimates that between 40 and 49 percent of households are energy poor[11] (DOE, 2015). What's more, many of these households can't afford electricity and thus rely heavily on unclean and unsafe energy sources, such as firewood and paraffin (Northern Cape #23).

The investment that is still on-going into the MEC (new mines, new coal fired power stations, etc) will have long-term consequences for the environment and for people and contribute to climate change for longer than it should, all for the sake of short-term gain (Kwa-Zulu Natal #213).

"*Eskom faces debt of nearly R500 billion, which is so large that if it is not handled urgently will sink the ESI and quite possibly the country"* (Appendix C: Energy expert, #1). This debt is the immediate concern of Government and will require delicate manoeuvring so that it doesn't hold the country to ransom. This poses a particular challenge for the Just Transition as the country will be hesitant to transition away from coal power stations until they have received maximum value from them. For

[11] Energy Poverty: Someone is considered to be in energy poverty if they spend more than 10 percent of their after tax income on meeting their energy needs.

instance, South Africa's newest and largest thermal power stations, Medupi and Kusile, have only recently become operational, albeit at a huge cost with significant overspend. As such, there are incentives around the country to get use out of these assets (sentiment shared by Gauteng #17, Mpumalanga #48, Eastern Cape #71 and Limpopo #188). This, however, is not aligned with the Just Transition as these power stations will still operate and emit GHG for decades to come.

Additionally, as mentioned by Sasol, current emissions cannot be mitigated immediately as the country still requires power (Appendix C: Sasol #5). The country cannot shift the current energy mix overnight, which has implications for South Africa's GHG emissions, their NDC's and the county's contribution to climate change.

This is particularly problematic considering the emissions status of South Africa, which has a higher GHG emission per capita than the average of the G20 (Climate Transparency, 2018), and is the 15th largest annual emitter of GHG emissions worldwide (Crippa et al., 2019).

The MEC furthermore poses a particular challenge as the mines and coal-fired power stations damage the land and dust from their activities affect the agricultural productivity in nearby regions (Mpumalanga #43, Appendix C: North West Community #2, #8).

It was also raised that the MEC contributes to the destruction of the environment (Easter Cape #89, North West #173, Limpopo #196). This was raised as a challenge as mines do not rehabilitate their damages which leaves land unproductive and dangerous which continues to pollute water and air resources (Mpumalanga #42, Appendix C: Mpumalanga Community #1).

Another major challenge created and perpetuated by the MEC is that of seriously poor air quality. This air quality is a particular challenge in the Highveld, where the majority of coal-fired power stations and mining operations are (Gauteng #14, Mpumalanga #41, #42, North West #157, #164, Free State #222). This poor air quality imposes severe health challenges on local residents who are exposed to the air on a daily basis.

Poor air quality stems from a number of sources, mostly related to human activities. The burning of coal for power is a significant contributor, as is the dust from mining (through blasting as well as transportation and storage). On top of this, the burning of firewood for heat, a main energy source for the majority of the poorer population, contributes heavily (Gauteng #14). Abandonde mines also can cause spontaneous underground fires which lead to vast amount of air pollution (GroundWork, 2018).

The result is a massive number of health-related issues in the area, mainly respiratory illnesses. Additionally, many deaths are directly related to air quality. This air quality costs the country 2.4 billion US dollars a year in terms of lost productivity, health costs and deaths (Holland, 2017).

One community member in Mpumalanga shared a vital insight, that the families who live in areas where there is mining cannot themselves get jobs in the mines. The air localised around mines and power stations is so bad for people's health that they do not pass the health tests required to work in the mines. Ironically, it's the very people who should be benefitting from jobs due to their proximity to mines who are precluded (Appendix C: Mpumalanga Community Member, #3).

Unsustainable and Inefficient Land Use

Mining, although a major land use in South Africa has been separated out as an MEC related challenge, above. What follows are the other challenges which stakeholders raised pertaining to the other uses of land. Land use was seen as a great challenge that the Just Transition needs to resolve to ensure food security, better livelihoods and improved urban sprawl for the country.

Firstly, it was noted that South African land is often used unsustainably, which leads to the destruction of ecosystems and biodiversity which has big consequences for the country (Western Cape #9, Northern Cape #31). Inherent in using land unsustainably is that short term gains from the exploitation of land appeal more than the long-term benefits from land conservation, which also affects downstream water resources (Northern Cape #33). As such, practices such as deforestation, mining without rehabilitating and the prioritisation of water intensive cash crops occur at accelerated rates throughout South Africa (also due to poor enforcement of licenses and laws) which contributes to the overall destruction of land (Gauteng #16).

Also, currently large commercial farming dominates the country's agricultural land use which is a particular problem as it crowds out small-scale and subsistence farms and do not necessary provide much for the greater population other than basic jobs as farmworkers (Youth #7). Also, often these commercial farms grow water-intensive cash crops for profit purposes which can have significant impacts on the ecosystem (Eastern Cape #67, #68). This lack of sustainable agriculture jeopordises people's access to nutritious, affordable food as we are forced to import produce which is less profitable to grow, and thus commercial farms aren't incentivised to grow it (Kwa-Zulu Natal #215).

Using land and natural resources unsustainably also will be exacerbated as the population grows as the demand for resources increases which will invariably lead to environmental degradation (Limpopo #191). This is also unfortunately affected by poverty, as those in poverty are concerned only with survival, which often results in the overutilisation of natural resources, dirty energy generation, etc (Northern Cape #23).

People are Uninvolved in the Just Transition

In 8 provinces it was raised as a challenge that there was not enough involvement of communities and ordinary people in development planning and future decision making. This is seen as a challenge which the Just Transition must resolve as the transition cannot be just if it does not involve people as part of the solution.

The first challenge is that many people and communities at large lack any information on climate change. Thus, they do not know how it will impact them and don't know how to prevent or address it, and so people aren't empowered to try and aid in climate change mitigation and don't try build their climate resilience (Western Cape #7, #8, Northern Cape #30, Mpumalanga #41, Eastern Cape #58, #63, Limpopo #187, Free State #221). They also therefore do not pressure decision makers with regard to policies which are implemented which contribute to climate change as they aren't always aware of the damages that it can have on them.

Another important challenge is that communities are not consulted on the decisions made by Government which affect them (Mpumalanga #51, Kwa-Zulu Natal #214, #216, Free State #231). This top down approach from decision makers often ignores community needs in favour of political gain (Mpumalanga #51), or because of the lack of consultation a decision gets made which is not what the community actually needs (Kwa-Zulu Natal #214, Appendix C: Mpumalanga Community #11). The lack of participation from government means they do not promote a people centred economy and developments do not uplift the people that they are supposed to (Kwa-Zulu Natal #216). People from poorer communities also feel they cannot approach municipalities and the government, where community members say they have lost the impression that civil servants are there to serve the people (Appendix C: Mpumalanga # 8, Eastern Cape #3). These communication challenges from the top down (government not engaging with communities) and from the bottom up (communities not engaging government) impact on social cohesion and social development (Free State #231).

Job Losses

"*There will be real sacrifices in the Just Transition. As a country we need to be realistic about the enormous challenges we will face, and that thousands of people will lose their jobs*" (Gauteng #12)

With global coal demand decreasing and the energy transition away from coal power starting to gain traction locally, the coal sector is likely to face significant challenges and many workers may lose their jobs. This, as understood by stakeholders around the country, is the basis for the Just Transition. It is a grave challenge which must be solved for the transition to a low-carbon economy to be just. creating new jobs and reskilling these workers so they are not unduly affected by this is central to the Just Transition, but these jobs have to be planned for (Western Cape #2).

As mentioned previously, there is an opportunity for renewable energy to be a source of job creation, especially if the linkages of green manufacturing are explored, although these may not necessarily all be new jobs – as new renewable energy jobs may absorb a large proportion of the jobs lost in the coal mining and power sector. Yet, one of the challenges is the spatiality of job losses versus where jobs will be created. As noted by a stakeholder from Mpumalanga, a significant proportion of mines and coal power stations are found in the Highveld, particularly in Mpumalanga. However, the areas with some of the highest potential for renewable energy are in the Northern Cape (solar power) and along the coast

(wind power). Thus, the people who lose jobs will either be forced to migrate in search of jobs, or else others will get these jobs (Mpumalanga #45).

Moreover, as highlighted by stakeholders from the Eastern Cape (#132), perhaps the government should ensure that particular jobs are earmarked and only allocated to those who lose jobs in the coal transition. This will ensure that the people who face job losses in the wider coal sector are prioritised in the transition. Yet, often miners are only trained the skills necessary for mining – thus the workers will require significant reskilling to do other jobs (North West #169). Another solution from a stakeholder from KwaZulu Natal was that a grant should be allocated to the coal workers who are nearing retirement anyway.

At the same time however, a major challenge in South Africa is that overall unemployment is endemic to the country (Northern Cape #32, Eastern Cape #121, Kwa-Zulu Natal #204). Thus, many people are seeking employment in the country, over and above those who will lose their jobs in the transition. There is a challenge to ensure these workers are fairly treated, but there is also a need to ensure that jobs are accessible for the greater unemployed parts of the population. There was a sentiment from a local community member from North West that the miners "*Have had their turn at the buffet, they have managed to eat for years while most of us have starved. Why should they be protected more than me*?" (Appendix C: North West Community, #10).

The jobs which will be lost in the transition to a climate resilient and low-carbon economy is a deep-seated challenge that the country faces, and although green growth and renewable energy provide the opportunity for net job growth, the difficult reality is that millions of people need jobs, not just those in extractive sectors.

Additionally, labour unions in South Africa have a great deal of bargaining power on behalf of employees. Unfortunately, however, it is difficult creating a dialogue with labour unions at the moment because they witness the Just Transition as a threat to many of the jobs and people they represent. As such, there was difficultly in getting labour to engage in the discussion and hear their views on the Just Transition and explaining the inherent opportunities and benefits a Just Transition represents for the people of South Africa. This was echoed by Sasol, who understand that labour unions are an important partner but also have had difficulty in engaging them and getting them on board with the transition to make it more manageable (Sasol #8). Labour unions would have particular relevance as jobs are lost in the overall transition, on the one hand they could make the transition much more difficult but if engaged correctly and partnered with they can help allay fears with their particular unions, direct labour into new professions and sectors, etc.

Water Resource Challenges

Various water challenges were raised around the country in all 9 provinces. The core challenges were a lack of water supply, high-water pollution and water wastage.

- A lack of water supply via either drought, inadequate infrastructure or as other users were using up most of the available water was raised as a key challenge. It was noted that a lot of water is lost due to leaking pipes which is shrinks the overall water supply (Gauteng #20). Climate change will lead to increasing invariant rainfall which overall is expected to decrease water supply further which was raised as a key concern (Northern Cape #25, North West #158). The allocation of water to commercial agriculture also was raised as a challenge (Eastern Cape #68).
- Water pollution was raised as a key challenge across most of South Africa (Western Cape #8, Gauteng #20, Northern Cape #25, Mpumalanga #47, Eastern Cape #69, #96, North West #158, #164, Kwa-Zulu Natal #200). These discussions centred around how water pollution, often from mines, means that what little water is left is often unusable for human purposes or for subsistence agriculture, which reduces people's food security and potential livelihoods of small-scale farmers. This is especially problematic for downstream users as they have no control over what the upstream users do to water resources. Poor water quality also contributes to people getting sick which then is an increased health cost. The youth discussion also touched on the lack of quality of drinking water as a concern and that people don't have access to clean water (Youth #12).
- Water wastage was also raised as a key challenge. Poor water infrastructure such as un-serviced pipes and blocked and under maintained storm drains can lead to a massive amount of water wastage and can contribute to flooding (Gauteng #20, Kwa-Zulu Natal #201).

4.3 The 2050 Vision for South Africa

Stakeholders were additionally asked to share their individual beliefs regarding their future vision of South Africa in 2050, having undergone a Just Transition. These visions have been synthesised and collated to form an overarching 2050 Vision for South Africa based on the key points below.

- The country by 2050 would be supported by decentralised, diversely owned renewable energy which is affordable for all and accessible by all. The energy sector would furthermore produce no emissions and the country would run on clean energy.
- Water resources would be clean and allocated equitably. Water security should be at a household level, with households having access to rainwater harvesting and society would use and re-use water efficiently.
- Land devastated by mining would be rehabilitated and made productive again.
- Cities would be densified to provide homes for the growing population.
- There would be more affordable, accessible and emission free public transport available for all, lessening the traffic on roads, decreasing emissions from the transport sector and increasing road safety.
- Natural resources would be conserved, and biodiversity protected.
- Land would be used more efficiently and equitably.

- Small scale agriculture based on indigenous vegetation and water conservative crops would provide food security as well as efficiently use water. This would provide food and water security in a future where the effects of climate change are uncertain.
- The economy would be growing, based on green growth and the creation of a circular economy.
- There would be jobs available for all, particularly in the green economy.
- Society would be more aware and conscious of climate change and their behaviour would change accordingly, minimising waste and pollution.
- Decision making would be based on the needs of society, with all people having a voice in the decisions which affect them.

Collated Stakeholder Vision 2050

South Africa will have achieved a low-carbon economy by 2050, built on a foundation of decarbonised energy generation – providing decentralised and affordable electricity for all. The conservation of natural resources and the sustainable use of land resources is paramount, and everyone in the country has fair access to clean water. Prospering green growth has established the green economy in the country, providing employment, growth and deep linkages to the rest of the economy. All people in the country, particularly those most vulnerable to climate change, are protected against its ill effects (NPC, 2019).

5. The Pathways of the Just Transition

So far, this thesis has established a current perspective of South Africa, along with a future goal for the country based on stakeholders' views. This chapter will focus on the development of a number of pathways along which the country can justly transition from the current situation to the future goal.

Stakeholders at the provincial workshops were split up into groups and asked to discuss what they believed the pathways were which could facilitate the Just Transition. Once the breakaway groups had debated the particular pathways, they were asked to present back to the entire workshop. Thus, the pathways identified here have firstly gained a measure of consensus from within each breakaway group as only the agreed upon thoughts were fed back to the workshop. Then secondly, only pathways which were highlighted across at least 6 different workshops are considered for this analysis. So, there's in essence a double form of consensus for the development of these pathways.

All in all, stakeholders identified 34 different pathways, which are more broadly represented in the NPC's Visions and Pathways Document (NPC, 2019). This thesis focuses on only 12 of these, as they were the ones brought up across at least 6 different workshops. These 12 pathways can be categorised broadly into 4 overarching pathways, listed below. The rest of this chapter then breaks down and assesses some of the stakeholder views which make up each specific pathway.

1. **The Energy Transition**

   The transition of the current energy system is needed to eradicate the country's energy poverty. This transformation is based on decentralised, diversified sources of renewable energy. Electricity is more affordable and electricity supply is secured.

2. **The Restoration of Land**

   Stakeholders envisioned 2050 South Africa to be a place where citizens lived in densified cities. People would have access to safe, affordable and zero-carbon public transport. Food security, importantly, would be secured as fertile land would be used responsibly and in a sustainable manner, which, along with rehabilitated land would allow the growing population of South Africa to be fed. An emphasis on small scale farming and equitable land ownership based on the sustainable use of land will lead to a more equitable and inclusive land use system.

3. **Safe Water for All**

   South Africa's current water resources are unequally shared and face mounting pollution. As such, in order to reach the vision of equally accessible, clean water resources a lot of change is needed. People should be at the centre of South Africa's water solution, ensuring everyone can afford and access enough clean water. Greater enforcement of water policies is also crucial, to ensure water polluters and over users are punished.

4. **Green Growth**

The Just Transition will be facilitated by growth of the green economy. This green economy has the potential to provide many jobs and will be underpinned by a circular economy which minimises waste. Important in this is reskilling existing workers in unsustainable industries and ensuring that relevant skills are taught to the youth so that they can access the green economy.

The qualitative data of the selected pathways can be found in more detail in Appendix C, which illustrates the views of stakeholders from different workshops per pathway, as well as highlighting the main points from the community meetings and bilateral consultations.

5.1 The Energy Transition

Although the Just Transition is more than just about energy, there is a core need for the fundamental shift of South Africa's economy from one that is highly extractive in nature and extremely dependent on coal for power, to one that is regenerative and has either zero or carbon neutral emissions.

The most contentious issue arising from discussions was that of the issue around whether the country should aim for zero-carbon or for carbon neutrality. Stakeholders largely from the private sector and civil society advocated for a zero-carbon target for South Africa by 2050, as set out by the latest IPCC, while large pockets of government members advocated for the less ambitious carbon neutral future.

There is a clear difference between these futures, where zero carbon refers to the absence of GHG emissions from anthropogenic sources (human activities such as energy generation and land use). As a result of zero emissions, no carbon needs to be captured, or offset. On the other hand, carbon neutral refers to achieving net zero carbon emissions by either balancing emissions with carbon offsetting or through the use of energy sources which have no emissions (such as wind or solar power) (IPCC, 2018). The difference between these two futures was a particular point of conflict as a zero-carbon future would unequivocally end coal-fired power in the country. There are, however, deeply vested political interests in coal power – who advocate for carbon neutrality instead as it leaves the door open for new coal power stations in the future.

The IPCC has identified that there is a need to more than just balance emissions with offsetting as there is a need to reduce the existing emissions if the world is to avoid global warming of 1.5° C, which in and of itself has significant implications for the planet (IPCC, 2018). The majority of stakeholders firmly supported the zero-carbon target, based on the realisation that a carbon neutral target is not ambitious enough and would still be pushing the country towards a 2°C warmer future and the drastic implications of this thereof. Moreover, many stakeholders voiced concerns that a carbon neutral target leaves too great a grey area as coal-fired power stations would still be free to generate electricity, as long as they offset an equivalent amount. The concern from stakeholders was that it's difficult to measure the exact quantities of emissions produced, and that unfortunately energy suppliers would have incentives to offset less than they emit. Thus, there'd be a need for a regulator and a high degree of

monitoring and evaluation with adequate enforcement and suitable punishment – which many stakeholders did not believe was realistic. Yet, there was a firm hesitancy from government to advocate for a zero-carbon future, based on the complicated intricacies and vested interests between the current coal based mineral interests and government.

Although both a carbon neutral and a zero-carbon future depend on transitioning away from coal power, the former allows provision for new coal-fired power stations to be built while the latter will see the latest thermal power stations, Medupi and Kusile, as the last.

Unfortunately, although the consensus from most stakeholders was that of a zero-carbon future (barring the hesitation of government to commit), the latest (2019) Integrated Resource Plan (IRP), the blueprint for development for the country, identifies micro coal builds as a key future source of electricity – thus clearly is set on carbon neutrality (DMRE, 2019). This regrettably goes against what most stakeholders were advocating for, as it will perpetuate the coal dependency of South Africa and will continue South Africa's contribution to climate change.

The rest of this section will analyse the just energy transition from the points of view of stakeholders across South Africa. There are a number of important aspects which make up the pathway which will help enable an energy transition, represented in table 5 below. Stakeholders were asked to list the actions which would facilitate the Just Transition. The below activities were the four activities raised consistently and most frequently, with the table illustrating which provinces raised them as key to the Just Transition, with the (X) representing a province which brought it up as a major solution. Table 5 can therefore be interpreted as the strength of consensus around the activities which together will result in an energy transition, according to stakeholders.

As it can be seen, renewable energy was raised across the entire country as an enabler of the Just Transition. Decentralised energy was consistently brought up too as key to the Just Transition as it was understood to have the potential to decrease the energy poverty faced by South Africa as well as provide empowerment and create jobs. Thirdly, more affordable energy for South Africa was identified as key as it will both provide a more competitive industrial market, but also alleviate energy poverty among the poor. Lastly, the creation of a more competitive energy market in South Africa was seen as an integral mechanism which will enable a Just Transition. These four pathways are explored in more detail below.

Table 5: The Pathways which will assist the Energy Transition

Pathway	Western Cape	Gauteng	Northern Cape	Mpumalanga	Eastern Cape	North West	Limpopo	Kwa-Zulu Natal	Free State	Total
Renewable Energy	X	X	X	X	X	X	X	X	X	9
Decentralised Energy	X		X	X	X	X	X	X	X	8

Affordable Electricity	X		X	X		X	X		X	6
More Competitive ESI		X	X	X	X	X	X			6

5.1.1 Renewable Energy

Indisputably, renewable energy is one of the most crucial components of helping facilitate a Just Transition in South Africa. Embracing renewable energy was seen as the solution to end the country's coal dependence across all the workshops and was reinforced as a critical solution by the energy expert interviewed. Stakeholders viewed renewable energy as the prime alternate to coal-fired power as it is clean, has the potential to create many jobs, is cheaper than other forms of power, has potential as a decentralised energy source, and it can be used to develop the green economy.

There was a strong belief that the energy sector needed to be decarbonised based on the growing understanding that carbon dioxide emissions have detrimental effects on the environment and on people, as well as being a massive contribution to climate change. This decarbonisation is the heart of the just transition, yet because South Africa is highly dependent on coal for power (with coal generating around 85 percent of their energy needs (StatsSA, 2016)), there is a need to balance the transitioning away from coal with the energy needs of the country.

There was a firm stance taken by stakeholders against the adoption of new nuclear power as it was seen as too expensive and untrustworthy (Gauteng #47, Eastern Cape #60). There was mention of using gas from Mozambique (Mpumalanga #41) which was echoed by Sasol as they begin to look at new, cleaner energy generation (Sasol #3). However, the overwhelming majority of stakeholders saw renewable energy, particularly wind and solar power, as the only solution to power South Africa's low carbon future (Western Cape, #46, Gauteng #47, Northern Cape #52, Mpumalanga #57, #58, North West #63, Limpopo #65, Kwa-Zulu Natal #68).

According to stakeholders, renewable energy would create a healthier South African environment, particularly in the Highveld regions such as Witbank where the air pollution from coal-fired power stations is unbearable for the local populations. Additionally, the land degradation which accompanies coal-fired power would be remedied by including renewable, heavily, into the energy mix.

It was furthermore pointed out by a stakeholder in the Eastern Cape that the prices of renewable energy are becoming more competitive and in some instances are cheaper than coal-fired power – thus the uptake of renewable energy would see a drop in the price of electricity. This would decrease the country's energy poverty, an important facet of the Just Transition.

A community member from North West Province declared that "*South Africa could be an energy super-power on the continent"* (North West #61). This belief was based on South Africa being one of the

strongest economies on the continent, as well as having favourable conditions for renewable energy. Thus, the argument, echoed stakeholders in Kwa-Zulu Natal and the Free State was that it would be possible to create a competitive advantage in renewable energy – allowing South Africa to be an energy super-power on the continent (Kwa-Zulu Natal #68, Free State #69).

Although there was an overarching belief from stakeholders that renewable energy and a much decarbonised energy generation system was necessary for the future, there were calls from a select few for coal to still be utilised for the country's electricity generation needs. An Eastern Cape stakeholder said that the country had been blessed with great mineral wealth and that ignoring that would jeopordise potential development (Eastern Cape, #59). Similar arguments were made in North West (#62) and Limpopo (#64), maintaining that there was still room for coal power, albeit in a much-reduced role. This was largely based around not wanting to create stranded assets from power stations which still have use left in their lifespans.

These views were, however, from a relatively minor fraction of stakeholders with the greater majority advocating for the complete phase out of coal power. These views reflect the scientific argument that investment in renewable energy and energy efficiency is important to reduce the negative economic, social and environmental impacts of energy production and consumption in South Africa (Winkler, 2005).

All in all, there was a clear message from stakeholders that an energy mix featuring more renewable energy was a clear lever which will aid the Just Transition. This is based on country's beneficial conditions for renewable energy and its cost upside versus coal and nuclear.

5.1.2 Decentralised Energy

"The government must ensure solar power is in every household for their energy needs. This will enable households to generate energy for their own needs and receive income for spare energy by feeding it to the grid." – Limpopo #12

Renewable energy is crucial in the Just Transition. Yet, electricity generation from renewables does not have to come from a large solar or wind farm. Instead, stakeholders highlighted that decentralised power, such as small-scale embedded generation (SSEG) and community owned renewables were another important solution to the transition away from centralised coal power. Decentralised energy and generation technology was seen as critical for the future of the country (Youth #4). Furthermore, as a community member mentioned in North West, "*energy plans must be inclusive of communities, people need to be prioritized over businesses for a just transition"* (North West #16).

Many stakeholders highlighted that community owned renewable energy systems in rural areas would provide these communities with a means of power as well as a means of income. This was highlighted

as one of the benefits of decentralised energy as it means that the costlier, centralised energy option of a formalised grid (which often is not financially viable to rural populations) can be bypassed (or leapfrogged) based on decentralised energy technology like solar generators and wind turbines. It was also mentioned that waste could be used as an input into biogas/ biofuel which then could be used as energy fairly easily – creating a "*decentralised, circular energy system at a household level, similarly to India where the majority of the population create and use their own biogas"* (North West #14).

These community owned renewable energy systems could also be used to create micro-grids for widespread rural communities which could be "*built close to communities and run by communities"* (Eastern Cape #8). The construction, maintenance and operation could be performed by community members, with some training, and would provide a viable solution to their energy needs as well as empowering and upskilling these rural communities.

These views reflect the scientific argument that decentralised energy production through small scale embedded generation could allow electricity to reach these small rural households for a fraction of the infrastructural cost of creating a centralised energy system (Filipova and Morris, 2018).

At a household level, stakeholders believed the introduction of SSEG would be an incredibly useful intervention. Not only would solar panels on every household's roof allow households to become self-sustaining, it would also aid in job production (Eastern Cape #13). Moreover, the decentralisation of energy to the household level would give households the ability to feed excess energy back into the grid for income (Limpopo #17). SSEG would thus provide sustainable energy production per household, supplementing household energy needs at a micro level. Even at a macro level there would be benefits as firstly households would be consuming less energy from the formal power sector, freeing up supply (albeit fractionally as these households do not consume much energy), as well as feeding excess energy generated back into the grid – boosting supply. This duality, as mentioned by stakeholders from the Free State (#20), Limpopo (#17), Mpumalanga (#5) and the Northern Cape (#4) believed would be a useful solution in the just transition as it has applications in making energy access more equitable, in improving the livelihoods of the poor as well as aiding in the energy transition.

Ownership is vital if the transition to low-carbon energy is to be just (Overy, 2018). SSEG and community owned renewables are methods of increasing the ownership of energy around the country – which would also allay the fears of labour unions that renewable energy will lead to privatisation and be exclusive (Energy Expert Review #2).

Therefore, overall, SSEG and community owned renewables would increase peoples' access to electricity – which will see the decrease of energy poverty – providing power to more households across

the country. Additionally, the social ownership of energy generation would allow the energy transition to be just, as well as providing a means of boosting livelihoods and empowerment.

5.1.3 Affordable Energy

For many people in South Africa electricity is too expensive. This affordability issue was raised by multiple stakeholders at 6 workshops as a great challenge, particularly for poorer communities who spend a large proportion of their income on electricity, but it was also noted that the rising electricity prices affect business competitiveness.

Many people don't have access to electricity even though they can see the power stations. Even those that do have the access can't even afford electricity (Mpumalanga #5).

Eskom has witnessed a dramatic increase in prices over the last 5 years where tariffs have risen by over 500 percent (EIUG #2). This has eroded and continues to erode the competitiveness of the country's industrial sector, which has been developed largely on the competitive basis of South Africa's cheap power. The rising tariffs cut into company profits, which in turn forces them to lay off labour (EIUG #3).

Moreover, the electricity prices are becoming higher in South Africa than in other developing nations. This is driving away foreign investment and foreign companies, who are instead taking business elsewhere and establishing industries and industrial complexes in other similar countries with lower energy prices. This also is detrimental to South Africa's overall employment, as each foreign investor or company that leaves people unemployed in its wake (EIUG #4).

With the current price of electricity, the poor resort to cheaper alternatives such as firewood, paraffin and coal, as one Mpumalanga community member told: *"People then use dirty coal to supplement their energy needs*." (Mpumalanga Community #6). Yet, these cheaper sources pollute heavily and are more dangerous than electricity, leading to fires.

Additionally, since 2008 Eskom's reliability has been poor with frequent issues causing rolling blackouts throughout the country. This has caused foreign market belief in the country to drop, driving away both foreign direct investment and foreign industry. This has downstream effects on South African jobs and growth (EIUG #5).

The rising price of coal-fired power should be motivation enough to seek alternative power sources. Yet, renewable energy is also becoming a cheaper alternative to coal-fired power (Oyewo et al, 2019). Tariffs are cheaper for renewable energy than coal-fired power, with wind and solar tariffs at 0.62 R/kWh, while coal power tariffs were 1.03 R/kWh in 2015 (SAWEA, 2019). The price per unit of renewable energy is expected to drop even further based on the estimates of the CSIR which will have marked effects on the affordability of energy (CSIR, 2017b).

Additionally, decentralised solutions have the potential to provide clean energy to households for free once the installation costs have been taken into account (Kwa-Zulu Natal #19). This would have implications for the affordability of households who will not have to direct as heavy a portion of their incomes to energy as a result.

The decreasing costs of renewable energy coupled with the increasing costs of coal fired power and the implications thereof illustrate the affordability mechanism of the Just Transition. The Just Transition has the potential to solve the affordability of energy problem in the country, which in turn has consequences for energy poverty of South Africans, as well as foreign investment and local industry – which has effects on the labour market and on growth in the country.

5.1.4 Creation of a more competitive energy market

Stakeholders across the country echoed the call for the unbundling[12] of Eskom. Although there was little consensus on how best to go about it, it was clear that at the very least unbundling would introduce more competition into the energy sector, allowing for greater energy efficiency, which stakeholders believed was key. The EIUG further supported the notion, noting that leaving Eskom as a vertically integrated monopoly would prevent the energy market from developing naturally (EIUG #12).

Worldwide more than 100 countries have partially or fully unbundled their ESI sectors – which has allowed greater levels of competition in the generation of energy. This, in turn, has improved the productivity and quality of power supply – which are essential elements for the financial feasibility of power utilities (OneWorld, 2019a).

South Africa, according to multiple experts, is well behind the global curve of unbundling – with political barriers historically stalling any progress on power sector reform (OneWorld, 2019a). A stakeholder from the Western Cape noted that Eskom's monopoly on the country's ESI meant they could get away with being unreliable as there is no other electricity supplier for consumers to turn to (Western Cape #39).

It was noted from the EIUG, however, that unbundling Eskom alone will not fix the structural issues that the country faces, such as poverty, unemployment and inequality. These challenges require much further reaching policy interventions. Instead, the unbundling of Eskom can assist in the easing of challenges such as Eskom's relationships with municipalities, IPPs and labour unions (EIUG #8).

The primary challenge is that Eskom is a massive organisation with a lot of institutional power that has prevented proper regulation of the energy market and has prevented the evolution of ESI. "O*ne vested interest has all the power and thus the system has become unbalanced"* (Gauteng #318). For example,

[12] Splitting up the generation, transmission and supply of the ESI.

wheeling[13] is blocked by National Energy Regulator of South Africa (NERSA), through Eskom's influence. Based on this, unbundling can remove the current red tape which exists due to the *"archaic regulatory processes*", which blocks potentially critical success factors such as wheeling (EIUG #14).

5.2 The Restoration of Land

The Just Transition is about more than just the transformation of the South African energy system. With a growing population, rapidly increasing urbanisation and a relentless and environmentally damaging coal-based interests, along with the growth of climate change related risks, the land in South Africa faces mounting challenges.

There was therefore acknowledgement from stakeholders that the country needs a targeted, multifaceted approach which affects issues of energy, land and water in order to transition to a low-carbon economy and society, justly.

There were massive concerns for the future of land-use in the country. It was noted that land provides the fundamental backbone to food security in the country, along with providing economic gains from South Africa's vast mineral wealth. Unfortunately, however, these two land-uses often clash as mining, particularly open cast coal mining has led to *"the widespread destruction of fertile land"* (CER, 2017).

Stakeholders also identified cities as a grave concern for the future of the country. The country faces significant urbanisation – with the country predictions of over 71 percent by 2030 and nearly 80 percent by 2050 (IUDF, 2016). There are already high spatial challenges in the country and all cities suffer from urban sprawl. Generally, poorer segments of the population push outwards from city centres, minimising their access to public services and encroaching on agricultural land. Public transport in cities was also noted as a particular issue, as transport is a significant contributor to climate change and the poor availability of safe public transport leads to a large proportion of the population singularly using vehicles for transport. With the growing rates of urbanisation and population growth, these challenges will severely impact on South African cities.

Nevertheless, the vision for 2050 for South African land-use from stakeholders was positive, believing that a Just Transition could restore land and make cities and damaged land healthier. This would be facilitated by the restoration of land resources in South Africa – based on sustainably using current land, densifying cities and rehabilitating damaged land.

Table 6 below illustrates the resonance these activities had throughout the country, highlighting how many times and which provinces brought up these activities as enablers of the Just Transition. Sustainable land use was the most widely cited pathway, followed by greater densification of South

[13] Wheeling: the delivery of electricity generated by a private operator in one location to a buyer or off-taker in another location via a third party network, such as Eskom's transmission grid

African cities, while lastly two thirds of the country's provinces mentioned the rehabilitation of land as critical.

Table 6: The Pathways which will aid in the overall Restoration of Land

Pathway	Western Cape	Gauteng	Northern Cape	Mpumalanga	Eastern Cape	North West	Limpopo	Kwa-Zulu Natal	Free State	Total
Sustainable Land Use	X	X	X	X	X	X	X	X		8
Densification of Cities	X	X	X	X	X	X		X		7
Land Rehabilitation	X		X	X		X		X	X	6

5.2.1 Sustainable Land Use

As explored in the situational analysis, much of the land in South Africa is used unsustainably – with mining being a leading contributor to the destruction of land. This unsustainable use of land has detrimental effects on the agricultural potential of the country, contributes significantly to water and air pollution, and has severe health effects for both those working on (or under) the land and local populations.

The Mpumalanga community was most vocal of the damages coal mining has wrought to local people. One community member intoned that "coal has destroyed the Highveld" (Mpumalanga community #4), while another mentioned that mining prospecting and mining rights were awarded without consultations with people who live on or nearby the land, resulting in them being pushed off the land (Mpumalanga community #12). Another community member stated that there is no access to information about the mines and that when they try to speak to the mine bosses, local government officials as well as municipal officers they get ignored (Mpumalanga community #13). Hence the local communities felt they had no voice and that decisions were being made which affect them, without their consultations and without their consent, and they could not even speak to any decision makers about it. The voices heard from the community meeting in Mpumalanga, the heart of coal mining and electricity generation in the country, were ones of woe and people were downtrodden. They advocated heavily for the land around them to be used sustainably, for agricultural purposes, so that the local people could stop being harmed by mining. They also wanted a voice, they wanted to be heard as they "are the ones who suffer when mines open, as well as when mines close" (Mpumalanga community #14).

Most of the land in Mpumalanga is under mining proposals, which means communities are forced to concentrate as there is no space for people and no space for subsistence agriculture (Mpumalanga community #7).

"Mpumalanga has been ravaged by mining. The mines destroy land that can be productive for a thousand years for the sake of ten good years (of mining)." - Mpumalanga community member, #10

Although it was noted that mining is still a necessary function, it was emphasised that mining companies should pay for rehabilitation upfront – before the mine is set up – so that land is actually rehabilitated once a mine is finished (Gauteng #84). Additionally, it was mentioned that mining should not take priority on fertile land, as although over a short-term mining could produce more gain, over a longer-term agriculture is far more beneficial to the country (Gauteng #103, Mpumalanga #110).

Stakeholder views were unified in the sustainable use of land, advocating for land to be used for agriculture, conservation or to foster biodiversity. In 8 provinces across the country there were perceived benefits from these sectors, noting the potential for employment they provide, as well as their contributions to the country's GDP. Agriculture provides food security as well as food exports, conservation draws in tourism and biodiversity allows the natural environment to prosper, which in turn can aid human development (Northern Cape #122, Kwa-Zulu Natal #117, North West #128, 129).

Many believed that the current agricultural system itself also needed to become more sustainable, based on the principles of agroecology. Aligned with this, stakeholders believed in a water scarce future that agriculture should be based on the most efficient resources for the particular area (Eastern Cape #112). This stakeholder went on to say that "*we produce vast amounts of macadamia nuts, which are incredibly water intensive to grow. This is unsustainable, farmers should rather be growing other beneficial crops based on what's best for the land*."

The suitability of crops and the food people eat was highlighted as a crucial activity as part of using land more sustainably. Stakeholders mentioned that consumers needed to shift their consumption patterns and behaviours in line with a more sustainable lifestyle, emphasising that cutting down on produce which requires a lot of water and energy is necessary (Western Cape #120). Stakeholders mentioned that the country should transition our diet away from the Western diet, which is based on the consumption of a lot of animal produce and rather consume based on the Afrocentric diet – with a focus on fresh plant foods, tubers and roots, nuts and grains with poultry and fish – with a reduction in meat (Limpopo #115, Kwa-Zulu Natal #118, Eastern Cape #126).

"*We should update our diets. Less meat, less cash crops. We need to realise that although we can enjoy food, we cannot always have everything that we want – we need to consume food responsibly.*" (Eastern Cape, #126).

This sustainable land use pathway and responsible resource consumption is an important mechanism which can aid the Just Transition. Sustainable land use has benefits for the health of land systems, allowing them to be productive over much longer periods of time than unsustainable land uses. Moreover, it is imperative South Africa grow their food security as population growth and climate change will severely limit it. Lastly, there are numerous green jobs which arise out of using land sustainably.

5.2.2 Densification of Cities

"South Africa suffers from massive urban sprawl problems. People are pushed to the peripheries of cities which perpetuates many issues around inequality in the country." – Eastern Cape #74.

South Africa faces rapid urbanisation, coupled with population growth. Citizens from rural areas view cities as places of opportunity and move in search of a better life. Urbanisation is seen as an accelerator of growth and development and can bring about huge changes in the spatial distribution of people and in the use of land (IUDC, 2016).

Yet, at its current rate urbanisation is causing dramatic urban sprawl in cities as they cannot cater for the numbers of people who arrive. The lack of proper spatial densification and a problematic use of land forces people, particularly poor people, to the peripheries of cities. This perpetuates urban sprawl which leads to a range of other problems. For instance, those who can least afford high travel costs (both in terms of time and financially) are forced to travel the furthest and spend a high proportion of their incomes on transport. Some community members in the Eastern Cape spend as much as thirty percent of their daily income on taxis to and from work (Eastern Cape Community, #6). Additionally, it continually forces people outwards, away from the city centre and away from potential jobs (Western Cape #70, Gauteng #70, Eastern Cape #74, Kwa-Zulu Natal #82). This leads to increased travel times, adding to the traffic on the roads, which contributes to air pollution from traffic.

Additionally, urban sprawl limits the access to services. As mentioned by a city planner in North West, it's difficult to get the infrastructure in place for electricity and water access in the outskirts of a city (North West, #77). The people who get pushed outwards from the city tend to be poorer, and so this lack of services harms them significantly. A lack of running water is bad for people's health and a lack of electricity means people turn to more dangerous sources of energy (Gauteng #71).

Stakeholders advocated for a suitable, implementable city densification strategy, which would alleviate urban sprawl. In particular the development of alternative housing based on vertical, densified designs would be a useful mechanism of limiting urban sprawl. This was shared between stakeholders from 7 provinces and clearly affects many people.

Densification provides numerous benefits for cities. There would be less pollution from transport as people would have less distance to travel to work centres (Eastern Cape #74). People's access to infrastructural services such as sanitation, water and electricity would improve as its easier to provide these services to a building over a smaller area than it is to provide to a sprawling settlement (North West #78). Moreover, it would improve people's access to social cohesion services (police stations, fire stations, hospitals and clinics) as there would be a higher number of people per square kilometre within densified buildings, allowing these services to better serve these people (North West #80). There was

also a sense that densification could also offer an avenue for job creation (Eastern Cape Community #9, Mpumalanga #73, Kwa-Zulu Natal #82).

It was noted with some concern that people are not sensitised to the idea of vertically dense living, and thus a behavioural programme may be required to incentivise people to live more densely (Eastern Cape #76). Moreover, the development of affordable housing is a particular issue in the country as developers have little incentive for it, and land in the city is generally quite expensive. As such, suitable incentives need to be put in place (North West #78).

5.2.3 Land Rehabilitation

Land rehabilitation was the last critical land pathway, with two thirds of the workshops bringing it up as a crucial action which will facilitate the Just Transition. Land rehabilitation takes many forms, but the prevailing thought from 5 out of the 6 provinces was that it related specifically to the rehabilitation of mining land.

It was agreed upon by stakeholders at the Northern Cape workshop that investment was needed for land rehabilitation as the costs of rehabilitating damaged mine land is exceedingly high and benefits only accrue once the land has been rehabilitated. They thus conceded that although very necessary, without investment from government or a large private sector entity the chances of land actually being rehabilitated was low (Northern Cape, #85).

Yet, this does not obfuscate the fact that land rehabilitation was necessary, which was reiterated strongly from stakeholders from Mpumalanga. They believed the long-term benefits could incentivise rehabilitation as once rehabilitated the land could be productive once more, used for potentially renewable energy or livestock farming (Mpumalanga, #86). Stakeholders in the Free State added that at the very least, rehabilitation would minimise acid mine drainage, a massive contributor to the overall pollution of South Africa's water resources (Free State, #92).

Yet, it was not just about the benefits accruing from rehabilitated land which interested the stakeholders from the Western Cape, who also identified the job creation potential that the rehabilitation process would provide (Western Cape, #83).

5.3 Safe Water for All

Water is one of the most valuable natural resources, vital to the health of ecosystems, populations and at the heart of many economic systems. As such, water – and the governance around it in the face of increasing uncertainty around climate change and population growth – is critical to the Just Transition.

Climate change will significantly affect South Africa's water resources. There is an overall expected decrease of 49.2 mm in the mean annual precipitation levels by 2050 due to the effects of climate change (World Bank, 2019b). Coupled with this, anticipated increases in temperature of 2.1°C, is expected to

increase the prevalence of drought (World Bank, 2019b). In a water scarce country such as South Africa this is a particular challenge as people's access to water will be further reduced – particularly the poorest in society who may not have access to piped water. Thus, the Just Transition needs to ensure that water resources are more equitably shared and accessible so that everyone in South African society can prosper.

Table 7 illustrates the pathways which were most widely mentioned across the country by stakeholders. There was particular emphasis on water in the Just Transition due to its relevance in the Water-Energy-Food Nexus which was brought up strongly in every province. Water is vital for the production of food and energy, and in turn is deeply affected by land-use and energy which added to the resonance the nexus had with stakeholders. If the transition to a low-carbon economy is to be successful as well as just, there is an emphasis on ensuring that the interconnections between all these resources is planned.

Moreover, the allocation of water was widely determined to be unequitable by stakeholders in 7 provinces. Commercial agriculture was seen as the main culprit, consuming the majority of water in the country. As per the vision, this water allocation needs to be addressed, allowing for a fairer share of water.

Water was seen as central to the Just Transition as it is vital for human development and it has deep connections with other resources such as food and energy production. According to stakeholders, ensuring that water resources in the country were allocated fairly was crucial to the Just Transition. More than this though was that there was a great need for cleaner water too. Therefore, cleaner water and fairer allocations thereof were seen as a pathway to facilitate a Just Transition.

Table 7: The Pathways which will facilitate Fair, Clean Water Resources

Pathway	Western Cape	Gauteng	Northern Cape	Mpumalanga	Eastern Cape	North West	Limpopo	Kwa-Zulu Natal	Free State	Total
The Nexus	X	X	X	X	X	X	X	X	X	9
Fairness in Water Use	X		X	X	X	X	X	X	X	7
Enforcing Water Laws			X		X	X	X	X	X	6

5.3.1 Land-Water-Energy Nexus

Water, energy and food are all essential for humans and are inherently interconnected as the use or misuse of one generally has deep implications for the others. The set of these connections between these resources has been described as the Water-Energy-Food Nexus (WEF Nexus). The importance of the nexus came up around the country as a key pathway for the Just Transition. It was recognised, however, that the nexus connections are not just limited to water, energy and food, and that land-use as a whole

can have dramatic implications for water and energy. As such, the definition of the WEF Nexus was broadened to the Land-Water-Energy Nexus, which will be referred to as just the Nexus from here on.

Currently in the country, water is generally looked at in isolation, without considering how in particular land uses can affect it. Land use and land rights have significant impact on the access and distribution of water. Land use also impacts the surrounding ecosystem, including water, agriculture and livelihoods. There is currently no regulation to ensure that land use does not interfere with water resources (Western Cape, #256).

"*The contamination of water especially from the mining sector who are currently not managing acid mine drainage properly is a huge issue for the health of water assets"* – Northern Cape #260

The dialogue from Mpumalanga indicated that holistic approaches were required to water management, as the stakeholder involved vehemently believed that water cannot be looked at in isolation. Rather, it should be integrated with land-use and energy in an equitable way that could drive social change. Therefore, they mentioned the need for government departments need to align their goals, collaborate and coordinate in a much stronger way (Mpumalanga, #261).

Water is a nationally shared asset that is critical for human survival, drives the economy and is important for food security. Therefore, there's a need for all stakeholders to work together to ensure that water is protected and consumed sustainably and equitably (Mpumalanga, #68). Projects need to be co-created between different government departments, spheres of government and include business and the public at large (Eastern Cape #263).

Stakeholder across the country also mentioned that most of the available water in the country is allocated to agriculture. They went on to say, however that the allocation was very poorly monitored and over users were not punished (Eastern Cape #264). This allocation of water, being biased toward the current agricultural system, is because there is no forward thinking of agriculture. We should be looking at smart agricultural production based on agroecology to ensure water is not only allocated to food systems (Youth #19)

5.3.2 Fairness in Water Use

Current allocations of water were raised across 7 provinces as being highly unequitable. Priority of access to water is given to commercial agriculture, which often leaves very little for small scale farmers (Free State #284).

80% of the stakeholder workshops reiterated that the poorest communities are the most vulnerable to water scarcity. These communities should be cared for the most in terms of policy so that their interests are looked after.

The dialogue resulting from one of the Eastern Cape breakaway groups was that the country should "Focus on Fairness" as everyone has a right to water access, even the poorest consumer. They actually probably use the least water but need it the most" (Eastern Cape #273).

The dialogue emerging from the Western Cape, Mpumalanga and Kwa-Zulu Natal highlighted that most shared water resources are polluted upstream which affects downstream users (Western Cape #270, Mpumalanga #271, Kwa-Zulu Natal #295). Many local communities also don't have access to municipal water and thus rely on natural water resources, which is unfair in and of itself, but none of the upstream polluters care for the water which affects these users. If downstream users were considered and catered for there would be less upstream pollution (Eastern Cape #273).

The coastal provinces of Kwa-Zulu Natal and the Eastern Cape raised points about having to also take the sea into consideration when thinking about water solutions. The ocean is the largest water resource but it is the least looked after, which could become a huge issue for the country (Eastern Cape #286, KwaZulu Natal #295). It was thus brought up that government needs an integrated plan which considers the human impact on water resources, and the long-term effects of this damage on economic sectors, and human lives thereof. It was given as an example that water pollution has severely impacted the fisheries sector resulting in unprofitable and unsustainable operations, and significant damage to the health of consumers (Western Cape, #297, Kwa-Zulu Natal #304).

5.3.3 Enforcing Water Laws

A resounding problem with water allocations in the country, raised in 6 provinces across the country was that government does not enforce the numerous water acts and bylaws effectively (Eastern Cape #299). For instance, an output coming out of the Western Cape workshop was that there is no enforcement of water treatment and disposal, so local rivers get polluted in with no consequence for the polluters (Western Cape #297). An outcome from the consultations with the youth was that "the polluter has to pay", ensuring that those who are responsible for water pollution are fined and that the health of water then becomes prioritised (Youth #18). Moreover, these water laws need to comply with groundwater regulations to ensure that water supply is not jeopardised (Limpopo #302).

A mechanism for ensuring water conservation is the stricter implementation and use of water meters to incentivise water saving where possible and penalise extremely high-water users (Western Cape #298, Eastern Cape #299, Free State #305). At the very least, the country needs stricter monitoring and enforcement of existing water policies – else water gets overused and over polluted (Kwa-Zulu Natal #304). To this end the verification and validation of proper water licenses would alleviate some of the over extraction of water challenges the country faces (North West #300, #301).

5.4 Green Growth

Inherent in the Just Transition is that the opportunity for green growth. Green growth was strongly viewed as something that can facilitate the Just Transition, both because it will in and of itself lead to a lower-carbon economy as well as being a means of job creation, empowerment and increased ownership. Table 8 illustrates this, highlighting that the two pathways which would contribute to the country's green growth were together raised in 89 percent of the workshops.

Table 8: The Pathways which will enable Green Growth

Pathway	Western Cape	Gauteng	Northern Cape	Mpumalanga	Eastern Cape	North West	Limpopo	Kwa-Zulu Natal	Free State	Total
Reskilling of Fossil Fuel Workers	X	X	X	X	X	X	X	X	X	9
Green Economy	X	X	X		X	X		X	X	7

5.4.1 Reskilling of Fossil Fuel Workers

An absolutely critical pathway which will assist in facilitating the Just Transition according to stakeholders is that of the reskilling of current fossil fuel workers. Table 8 highlights how strongly stakeholders believed in the reskilling of fossil fuel workers, with it being brought up as a solution to job losses in every stakeholder engagement workshop.

It is important to note that in this context, reskilling – the process of learning new skills to do a different job, has been separated from upskilling – the process of learning new skills. Although similar, the key distinction between these is that upskilling applies to anyone in the population, for instance the youth could benefit from learning skills relevant in a low-carbon future (upskilling is discussed in further detail below). Alternatively, reskilling in this context applies specifically to developing new skills for workers currently in fossil fuel industries who are at risk of losing their jobs as the country transitions to a low-carbon economy.

This pathway is key in ensuring that any transition is just, as the people who will be directly, negatively affected by the country becoming a low-carbon economy and society are the workers employed in the coal sector in coal mines, coal-fired power stations and coal transport. Reskilling, according to stakeholders from the Northern Cape, needs to take place along the entire value chain of the current energy sector. *"All sectors need to plan for job losses and plan how they can absorb those jobs in addition to creating jobs. This is critical and urgent – at the moment the country does not have a plan, and we cannot repeat what happened to Welkom (where mines closed and people lost their jobs which caused a huge crash in the local economy)"* (Northern Cape, #29).

Another thought from a stakeholder from the Western Cape workshop believed it to be "*important that these workers are made readily aware of the realities they face in terms of the term expectancy of their*

work. It is important for them to know what the future holds for their jobs. This understanding is a crucial first step in empowering these workers to make decisions about their own employment" (Western Cape, #22). It was however noted that these decisions have largely been taken out of their hands, there will be millions of fossil fuel related workers who face unemployment with a fairly similar set of skills, and they may not have the necessary time, income or awareness to reskill themselves (Cobenefits South Africa, 2019). Hence, "*the South African government should conduct a skills audit, to understand where and how the opportunities exist for coal workers based on their current skills. After which there should be a large reskilling initiative to transfer coal jobs to climate jobs"* (Western Cape #24). A clear example of this would be reskilling power station construction crews and transferring these jobs (which are at huge risk as the country has no new coal power stations planned) to the construction of wind turbines and solar energy farms.

There was consensus from around the country that the renewable energy sector could provide a sink for these jobs lost in the current energy sector (North West Community #9, Youth #21, Western Cape #25, Mpumalanga #30, Eastern Cape #32 #33, North West #35, Kwa-Zulu Natal #37, Free State #38). This is echoed by the CSIR who have identified that renewable energy have a higher job creation potential than current coal energy practices and that a net increase in jobs would be possible even if all coal jobs were lost (CSIR, 2017). Additionally, the Climate Action Tracking team found in their analysis of South Africa that transitioning from high carbon to a low carbon electricity supply would create as many employment opportunities in South Africa as it would make obsolete (CAT, 2018).

Yet, reskilling does not have to be limited to renewable energy as stakeholders from North West pointed out. Rather, "*miners could be reskilled and taught how to rehabilitate the environment, starting with mines"* (North West #312). This would allow land to be rehabilitated to be used productively again as well as offering a mechanism for job creation.

5.4.2 Green Economy

It was also emphasised from 7 provinces that the creation of a renewable energy manufacturing industry, in essence creating a backward linkage to renewable energy, would allow the renewable energy sector to create more jobs, as well as stopping the sector from relying on imported parts (Western Cape #306, Gauteng #309, North West #313, Free State #317). Building these linkages is an important mechanism for generating sustainable growth (Kaplinsky and Morris, 2016).

Furthermore, establishing skills at multiple points on the renewables value chain would position South Africa very favourably in the technologies and sectors which will form the core of future electricity supply. The potential exists for South Africa to have a future competitive advantage in renewable energy development (installation, manufacturing and maintenance) as the country could export renewable energy parts, at least into the rest of Africa (Western Cape #308). More importantly, this would provide

the possibility to create horizontal linkages in exporting of services – e.g. training in how to establish renewable energy programmes, project management of constructing renewable plants, logistics, developing knowledge activities, etc.

The development of South Africa's green economy is crucial in transitioning the current economy to one which is less reliant on coal, less carbon intensive and less destructive for the environment. The green economy envisioned by South African stakeholders is made up of a number of different factors.

Stakeholders believed that the development of a strong manufacturing base in renewable energy components (such as wind turbine blades, solar panels, etc) would contribute to the development of a green economy. This renewables industry would allow these components to be manufactured locally, crucially providing job creation as well as establishing the vital linkages which are key in the development of a renewables value chain (Gauteng #309).

A Western Cape stakeholder argued that the development of a Special Economic Zone (SEZ) for the manufacturing of renewables would greatly aid the creation of a renewables manufacturing industry (Wester Cape #306).

It was brought up by stakeholders in North West Province that there are links between the green economy and the circular economy (an economy which uses waste as inputs) (North West, #314). An example was given that used motor vehicle tyres could be used as an input in the building of roads – providing a means of reducing the overall waste, creating additional jobs and creating value out of these waste products.

The development of a stronger green economy in South Africa would greatly aid the Just Transition. It would create jobs, as a sector it would contribute to the greening of the country either through cleaner products or through actually cleaning up processes and it would also promote green growth.

5.5 Summary

Table 9 below illustrates a high-level overview of the overarching pathways which will facilitate the Just Transition. Also represented are the 12 particular pathways which contribute to the overarching pathways, showing the resonance they received throughout the country. Additionally, the specific opportunities and challenges highlighted by stakeholders which are relevant to the pathway are illustrated in table 9, thus illustrating a combined stakeholder mapping. Below a brief synopsis of each pathway is provided.

Table 9: Summary of the Pathways of the Just Transition

Overarching Pathway	Pathway	Resonance	Opportunity Leveraged	Challenge Solved
Energy Transition	Renewable Energy	9/9	• Renewable energy conditions in SA • Falling costs of renewable energy • Job creation	• Unaffordable electricity • Coal lock in • Emissions status of the country • Job losses • Air and water pollution
Safe Water for All	The Nexus	9/9	• Leveraging the Land-Water-Energy Nexus	• Water pollution • Destruction of the environment • Abandoned mines
Green Growth	Reskilling Fossil Fuel Workers	9/9	• Job creation • Developing new skills	• Job losses
Energy Transition	Decentralised Energy	8/9	• Capacitating communities • Fallings costs of renewable energy	• Eskom • Emission status of the country • Unaffordable electricity • Air pollution
Restoration of Land	Sustainable Land Use	8/9	• Climate smart agriculture • Small scale agriculture • Leveraging the Nexus	• Overexploitation of resources • Resource extraction-based economy • Destruction of the environment • Dominance of large, commercial agriculture • No emphasis on sustainable practices/ biodiversity
Safe Water for All	Fairness in Water Use	7/9	• Behavioural change in water use • Rainwater harvesting • Wastewater and grey water reuse	• Water pollution • Water wastage
Restoration of Land	Densification of Cities	7/9	• Denser, sustainable cities	• Population growth • No emphasis on sustainable practices
Green Growth	Green Economy	7/9	• Falling renewable energy costs • Job creation • Developing new skills and new businesses • Relevant green-economy education	• Job losses • Resource-extraction based economy • Overexploitation of resources
Energy Transition	Affordable Electricity	6/9	• Falling costs of renewable energy	• Unaffordable energy • Air pollution
Energy Transition	More Competitive ESI	6/9	• Falling costs of renewable energy	• Eskom • Coal lock in

Restoration of Land	Land Rehabilitation	6/9	• Land rehabilitation • Leveraging the Nexus	• Abandoned mines • Job losses
Safe Water for All	Enforcing Water Laws	6/9	• Wastewater and grey water reuse • Behavioural change in water use	• Water supply shortages • Water pollution • Water wastage

The Energy Transition

Changing the current energy mix is the core of the Just Transition. The current ESI in South Africa is too dependent on the burning of coal for the generation of electricity, which has grave implications for climate change, the environment and people throughout the country. As the earlier situation analysis highlighted, the current state of energy generation in the country has led to a number of significant consequences for South Africa. Firstly, in its quest for a competitive advantage in cheap electricity, the country has created a deeply inefficient monopoly – Eskom – which consumes vast quantities of coal to meet the electricity needs of the country. Environmentally his has led to the destruction of land as a result of coal mining and as the largest single cause of GHG emissions in the country has led to the widespread pollution of air – having significant implications for climate change.

Thus, transitioning away from the centralised, coal-fired electricity generation is crucial in ensuring the country meets the NDC's that have been set to decrease GHG emissions in line with mitigating climate change.

The energy future of South Africa, as determined by stakeholders from around the country, was one where the country's electricity needs would be met by decentralised and diversely owned renewable energy – providing electricity which is affordable and accessible for all.

To achieve this future, however, would require an energy transition. This energy transition would be based on utilising renewable energy as the core source of electricity generation in the country. This dominance of renewable energy and it being a central pathway to achieve a Just Transition, according to stakeholders, was based on the opportunities renewable energy provides. With South Africa having good conditions for renewable energy and the global cost of renewable energy generation falling, as well as the low prices for renewable energy facilitated by REIPPPP, there is clear impetus and a good platform for it in South Africa. It also can capacitate and empower communities, as well as becoming a means of job creation – all of which are central to the Just Transition.

Also, according to stakeholders, key to the energy future would be an emphasis on SSEG and community owned renewable energy generation, which would allow rural communities and poorer households a means to cater to their own energy needs, improving the equality around energy in the country. Renewable energy and SSEG would provide the means of improving the affordability of electricity in the country, which will allow businesses to be more competitive and would decrease the energy poverty faced by the country. This also resolves a key challenge noted by stakeholders around

the country, that of electricity being unaffordable. Lastly, the decentralised nature of renewable energy along with the closing of coal-fired power plants would provide more competition into the ESI, reducing the market power of Eskom and improving the efficiency of power suppliers. This would resolve the energy challenges of Eskom's dominance and will assist in breaking the coal lock in the country currently is in, assisting in reducing the country's GHG emissions (another critical challenge faced by South Africa).

It will furthermore assist in alleviating the poor air quality which affects many thousands of people every year, will provide jobs for those who may lose jobs in the transition as well as providing an opportunity for additional job creation (particularly if linkages can be established and a renewable energy value chain can be created in the country). There would be less need for coal mining, allowing land to be restored and used more sustainably, which can have positive effects on water resources throughout the country.

Altogether, an Energy Transition is a key pathway to achieving a Just Transition in South Africa, based on stakeholder beliefs from around the country. Overall, it would provide benefits to people and the environment and would assist in the fight against climate change.

The Restoration of Land

As the population grows and the demand for food, space and housing all increase, how land is used in the country will be critical for climate change and for the South African population. The key message from stakeholders was that currently land is often not used sustainably or productively, having implications for the environment, water resources and people, as well as contributing to climate change. South Africa's historic dependence on minerals for growth and on coal for electricity has led to widespread mining efforts throughout the country, which in turn has damaged huge swathes of land. With a growing population and the consequences of climate change set to get worse, food security in the country is under increasing pressure.

The future South African's envisioned was for land to be rehabilitated and made productive, with an emphasis on conserving natural resources and biodiversity and using land efficiently and equitably. Stakeholders envisioned small scale agriculture and the utilisation of indigenous and water efficient crops as the cornerstone of the country's food security. The final piece of the vision for land use from stakeholders was the densification of cities and the greater utilisation of public transport within cities.

To achieve this vision, stakeholders believed that land needed to be used more sustainably. This would be based on a number of actions, such as maximising the current agricultural productivity using indigenous and water efficient agriculture based on agroecological principles in order to secure the country's food security going forward. This pathway also looked to leverage the small-scale agriculture opportunity, as small-scale farming can often lead to greater agricultural efficiency as well as being more water efficient and more equitable.

Next, they believed cities had to become more densified and they believed that currently damaged land needed to be restored. These three pathways together form the "Restoration of Land" – which together was seen as a critical pathway in facilitating the Just Transition.

Safe Water for All

Water is central to all life on the planet and thus vital for human development. Yet, water resources are under increasing pressure in a future facing the increasing impacts of climate change. As the supply of water is predicted to become increasingly constrained in the future, and demand for water is expected to rise as the population grows, the needs of all users need to be balanced fairly so that those most vulnerable to water shortages are protected.

To compensate for this, stakeholders acknowledged that the future of water in South Africa must be underpinned by a fair allocation of clean water for all water users. Water security at a household level was the vision of stakeholders to ensure equality.

There were three main pathways stakeholders identified which would assist in attaining a water secure and fair future of the country's water resources. Firstly, the inherent interdependencies which exist as a nexus between land, water and energy – the nexus – was seen as one of the dominant pathways around the county and would need to be planned for in development going forward. These interdependencies have the potential to create vast co-benefits if the resources are used sustainably and can help build climate resilience at a micro and macro level. At the same time, if one resource is abused and affected there may be downstream implications for the other resources throughout the nexus, which could have a detrimental effect on people's resilience and livelihoods. Specifically, integrating the Nexus into development planning would allow the abatement of the current challenge of water pollution, which have largely been caused due to unsustainable land use practices, such as mining.

It was brought up around the country in 80 percent of engagement workshops that the poorest communities are the most vulnerable to water scarcity. This inherent vulnerability makes it critical to ensure that water resources are allocated fairly, as those with the greatest vulnerability to water insecurity are the ones who have been least considered to date. Thus, another key pathway in ensuring water for all is ensuring that water resources are allocated fairly, so that everyone can access and use water that is clean. Clean, safe water in and of itself was also key in stakeholders vision, and stakeholders mentioned that it is crucial that water resources not only be allocated fairly, but that they are considered from source-to-sea, based on the understanding that there are multiple users of the same water, and that upstream polluters can have massive detrimental effects on downstream use. Ensuring a more equal use of water would also allow water pollution and water waste challenges to be lessened as overexploitation of water resources would be diminished.

Enforcing water laws and regulations was seen as the last critical pathway by stakeholders. It was highlighted that currently water bylaws are not enforced – resulting in heavy water pollution, as well as

water overuse. Greater enforcement of water laws would therefore curb the current overexploitation and pollution that water resources around the country face – as well as being a mechanism for changing how society use water. Stakeholders also mentioned that these water laws and regulations could facilitate a greater reuse of water.

Altogether, ensuring safe water for all by integrating resource planning based on the Land-Water-Energy Nexus, by creating a fairer use of water so that there is greater equality in accessing the critical resource, and enforcing current water laws to a greater degree to curb the current overexploitation and pollution water resources witness, would all contribute to South Africa's Just Transition.

Green Growth

Green growth has been touted as a new development pathway for the world, based on the increasing need for sustainable development and the growing market for renewable energy and a variety of green products, such as electric vehicles, to mitigate climate change.

At present in South Africa the country's economy is linked to the extraction of resources, with a dependence on coal for the country's electricity needs and a deeply entrenched mining sector. This status quo is under threat however as the transition to low-carbon and climate resilient economies is underway. This transition threatens the livelihoods of mineworkers, powerplant operators and a large segment of the transport industry.

Stakeholders envisioned that as the country transitions away from carbon-intense activities that the jobs lost would be absorbed into other sectors, particularly into the growing green economy.

This future for South Africa would be dependent on two crucial pathways, reskilling current fossil fuel workers and the establishment of a green economy. Stakeholders from every province mentioned that without the reskilling of current fossil fuel workers, the transition would not be just. Hence there were calls for these workers to be reskilled in the manufacturing of renewable energy, the rehabilitation of land, into agriculture, etc such that they could find work as the economy transitions away from resource extracting, GHG emitting activities.

At the same time, it was further highlighted that the establishment of a green economy would unlock green growth in the country, providing new jobs and assisting in the economic growth of the country. It was brought up that this green economy should develop the linkages for renewable energy so that a renewable energy value chain could be established, providing additional value and job creation.

Together, a growing green economy would provide new job opportunities, especially for fossil fuel workers. These together would contribute to green growth according to stakeholders and would facilitate the Just Transition.

6. Conclusion

The world is poised to heed the call of the greater scientific community and transition away from fossil-fuel intensive energy generation and transportation. This will have serious implications for the industries and sectors that support these activities, as well as the people who work in these industries. As a result, the global impetus of the Just Transition is growing.

In South Africa the Just Transition has particular relevance. The low-carbon transition will be especially painful for the country due to the significance of coal-fired power, historically and presently. Yet, the difficulty does not obfuscate the need for change as the country must reduce its contribution to climate change, not least because of the severe consequences it will have on South Africa.

The Just Transition has a pivotal role to play in lowering the country's current carbon footprint. With the large majority of GHG emissions resulting from energy generation, any transition will have benefits for the climate. Yet, the urgency and scale of change needed ensures that South Africa cannot stall over reducing its dependency on coal for electricity.

This thesis has provided a qualitative analysis of the Just Transition. Through numerous stakeholder engagements, a number of key findings have been uncovered about the Just Transition in South Africa. Stakeholders shared their vision for the future of the country, highlighting the various challenges which the Just Transition can and must solve, as well as a number of opportunities for the Just Transition to capitalise on. Lastly, a hypothetical roadmap was estimated from the commonalities in stakeholder perceptions regarding the pathways which the country can utilise to justly transition.

In recognition of the current situation the country is in, stakeholders around the country understood the crucial need for change. Understanding that the GHG emissions profile of the country must improve for the good of the planet and for the good of the people, and the knowledge that coal-fired electricity generation was one of the greatest contributors meant that stakeholders advocated for the decarbonisation of the energy system.

Together, the 2050 Vision for the future of South Africa has been pieced together as follows:

South Africa will have achieved a low-carbon economy by 2050, built on a foundation of decarbonised energy generation – providing decentralised and affordable electricity for all. The conservation of natural resources and the sustainable use of land resources is paramount, and everyone in the country has fair access to clean water. Prospering green growth has established the green economy in the country, providing employment, growth and deep linkages to the rest of the economy. All people in the country, particularly those most vulnerable to climate change, are protected against its ill effects (NPC, 2019).

To accomplish this future the country must experience a Just Transition, and this thesis has identified four clear pathways which will facilitate this Just Transition based on the views of stakeholders around South Africa.

1. The Energy Transition
2. The Restoration of Land
3. Safe Water for All
4. Green Growth

These pathways capitalise on opportunities such as the increasing affordability and potential of renewable energy, planning for resources in an integrated manner – thus prioritising the nexus, developing new skills, jobs and industries for a new, climate resilient and rehabilitative world, and ensuring the population is being made aware of, and taught about climate change.

These pathways also must solve a number of challenges which jeopardise the country's future. These include ensuring the government work in a more integrated manner, away from the silos they currently operate with. Additionally, the Just Transition must ensure that the people who will lose jobs as the current extractive and GHG-emissions intensive economy transitions to one that is low-carbon and restorative are protected and catered for in the new economy. The energy challenges the country faces, with the affordability of electricity a crucial challenge, as well as the GHG emissions profile of the country and the coal path dependency the country is locked in on will have to be addressed too, which will furthermore have a marked effect on the air quality of the country.

Climate change is a global challenge which must be solved locally. South Africa is at a critical juncture and the need for change is urgent. The Just Transition provides a lever which can allow the country to reduce the emphasis the economy places on extractive, unsustainable activities without harming people vulnerable to this change. The Just Transition also provides clear benefits for employment, for the environment and for the economy. This thesis has provided a platform to illustrate the beliefs of the country in terms of what the collective vision was for 2050 and how South Africa can get there. It is clear that there is an urgent need for action in the country, and the Just Transition is one lever which both provides opportunities for socioeconomic growth through job creation, as well as providing a response to climate change.

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Appendix A

Reference Number	Province	Opportunities
1	Western Cape	Resilience is the key to sustainability. Need to develop strategies to advance resilience.
2	Western Cape	Government must create a task team to support people whose jobs will be lost
3	Western Cape	There is an opportunity for the National Government to facilitate the creation of jobs by creating an enabling environment for business and investment and skills development in a green sector. Such a sector can provide a means for growth but needs the enabling environment to incentivise growth into such a sector, and needs new skills to feed it with labour.
4	Western Cape	Role in government for decentralising water
5	Western Cape	Government planning and operations need to be democratic and transparent so that corruption and mismanaged funds do not hamper successful implementation
6	Western Cape	Government should also support education and investment in research - which would lead to innovation and used to create new skills, create new industries and promote new types of jobs
7	Western Cape	Resilient and adaptable economy built on the creation of small business and a localised economy that creates jobs
8	Western Cape	Increased local investment from corporate South Africa through Corporate Social Investment
9	Western Cape	People should be made aware of and live within the available resources. We should be trying to build sustainability into the fabric of our nation.
10	Western Cape	Lock in (via policy) things that are very important for social and environmental wellbeing
11	Western Cape	Innovative education models should be developed and implemented
12	Western Cape	Mining reclamation can provide jobs, also will rehabilitate land for productive use
13	Western Cape	Municipal jobs can be created from retrofitting
14	Western Cape	Opportunity to create more than jobs, can improve livelihoods, co-operation, etc
15	Western Cape	Transport transformation.
16	Western Cape	Sustainable water future. Water is the key input into food security; thus, we should protect water resources to protect food resources.
17	Western Cape	Support active citizenry
18	Western Cape	Government should be facilitating the creation of jobs by creating an enabling environment for business and investment and skills development
19	Western Cape	Government can instigate the decentralising of water and energy
20	Western Cape	Green cities provide an opportunity for many benefits in the future over traditional, grey infrastructure based cities which aren't planned for people or the environment.
21	Western Cape	Government must support education and invest in research, which could lead to innovation and new skills development, which could create new industries and promote new jobs
22	Western Cape	Individuals and communities should take responsibility to identify models of effective service delivery and access to clean energy, water and education.
23	Western Cape	There should be a focus on developing entrepreneurs in climate change, not just job seekers. Small scale agriculture and renewable energy could be two avenues with which

		to achieve this as they have relatively low barriers to entry and are vital for the future of the country.
24	Western Cape	There's an opportunity to create a Just Transition task team to become experts. The task team should then direct municipalities and local government in order to synchronise policies across different spheres of government.
25	Western Cape	Citizens should be made aware of and live within the available resources
26	Gauteng	We need to link education / universities to the new and growing industries that are emerging to ensure that skills that are developed among the youth match the emerging needs of business. Also shift the education system so that school leavers are fit for the low-carbon economy and inclusive for youth
27	Gauteng	Innovation is required in the skills development and training in the country. We need to educate people to be entrepreneurs – to be job creators rather than job seekers
28	Gauteng	More emphasis should be put on women and how they integrate into the economy
29	Gauteng	South Africa can learn from China and Germany who have gone this route
30	Gauteng	Indicators should be developed that measure the well-being of society and not just GDP
31	Gauteng	Behavioural change will need to occur to reach any vision that includes the transition to a low-carbon economy.
32	Gauteng	Additional research is needed. We need to better understand what carbon neutral means, because that is a global issue, so we need to determine what that means for South Africa
33	Gauteng	Manufacturing jobs - New industries and products in the 'green' sector need to emerge to create jobs. We need to invest in building solar panels, wind farm components in this country.
34	Gauteng	Decarbonise the energy sector
35	Gauteng	We will still have coal power stations by 2050 but can explore retrofitting these existing plants to make them cleaner (albeit this comes at a high cost).
36	Gauteng	If South Africa can be economically sustainable then we have the power to make our own decisions
37	Gauteng	Need to grow energy supply as economy is energy constrained. With the cost of renewable energy decreasing, it provides a least cost solution which can solve the energy crisis.
38	Gauteng	Small scale farming provides opportunities for job creation as they will be more labour intensive as they will not have access to the capital of commercial farms.
39	Gauteng	Develop policies for a circular and sharing economy to reach the vision
40	Gauteng	Upskill and expand the education system, with a clear focus on early primary education in native languages that includes arts and crafts (to promote skills and talent in arts to promote those skills)
41	Gauteng	Simple measures such as providing basic insulation for low-income housing lead to far greater benefits than just providing extra warmth. Rather, added insulation reduces peoples use of electricity or other, dirtier forms of energy like fires for heat, which contributes to improving air quality
42	Gauteng	A regional biomass energy strategy to be created, that considers our water scarcity
43	Gauteng	Opportunity for greener transport which emits less carbon, which will decrease the overall emissions of the country.
44	Gauteng	Mitigate urban sprawl and make cities sustainable. Densification is important going forward.
45	Gauteng	Decarbonisation of the energy sector as a whole
46	Gauteng	Decentralised energy system- energy mix
47	Gauteng	A responsive economy to technology
48	Gauteng	Low-carbon, neutral economy

49	Gauteng	An inclusive society and economy will benefit everyone in South Africa.
50	Gauteng	If policy is harmonised across the country so that for certain key goals, such as climate change, departments are aligned and singing off the same hymn sheets then greater good opportunities can be reached.
51	Gauteng	The education system needs a vision to ensure a relevant and skilled workforce is developed that meets the needs of new industries and emerging green economy jobs. This requires increased investment, including a focus on primary education and ensuring talented teachers. A mother-tongue policy should be developed. Furthermore, young talent should be identified and empowered early. The classroom is also an ideal place to instil climate sensitive behaviour and teach about climate change, green solutions, etc.
52	Gauteng	Corporate rights should be adjusted for greater protection of access to information and decreased burden of proof
53	Gauteng	Integrated and cooperative government, engaging in the development of coherent policies needs to effectively facilitate the transition.
54	Gauteng	A clear Climate Change Bill, digitalisation and effective urban planning policy needs to be created. Furthermore, decentralisation is required.
55	Gauteng	Policies should include disincentive mechanisms to mitigate individual wealth enrichment.
56	Gauteng	Finally, there should be budget allocation to implement the NDP
57	Gauteng	A public consciousness about climate change needs to be developed.
58	Gauteng	A devolution of power and the use of indigenous knowledge should characterise the future.
59	Gauteng	Water saving should be instilled in people at a household level so that we create a country of water savers from the ground up. Also, part of this, is greater rainwater harvesting and reusing grey water – which is both a behavioural mechanism as well as a capital one.
60	Gauteng	Finally, a social compact should be developed that all South Africans share
61	Gauteng	Government must be assertive to promote investment
62	Gauteng	Business and government need to identify and fund effective solutions to the country's transport challenges.
63	Gauteng	Proper land use planning should be established and enforced, especially considering urban sprawl.
64	Gauteng	Take South African context into consideration. Inequalities need to be addressed to move forward (such as access to education)
65	Gauteng	Bottom up approach - develop solutions that put people at the centre, by engaging with the public and looking at successful solutions that they have developed. We need to start taking advantage of community resilience strategies, harnessing indigenous knowledge, and looking outside the norm in conjunction with civil society and vulnerable communities
66	Gauteng	The youth needs to be equipped with skills that are relevant for the future. At the moment there is a mismatch between what is being taught at school and in tertiary education facilities, and what is needed to drive an environmentally sustainable economy.
67	Gauteng	Environmental, minimalistic values should be instilled in children from an early age.
68	Gauteng	People also need to be empowered to make sustainable choices, and this comes with awareness-raising
69	Gauteng	South Africa should look at the skills and resources that we have and are good at and focus on these rather than diluting our efforts or trying to implement measures that are neither practical nor appropriate. For example, we could lead in the hydrogen economy due to our vast platinum resources. This should be used to define an economy / system that works for us rather than just trying to follow others. Current artisan skills should be leveraged to make efficient use of them in the low-carbon economy.
70	Gauteng	Land reform, if done correctly, can transform land use such that the land is utilised in a more sustainable way, with critical resources such as water being used in much more equitably.
71	Gauteng	Population growth needs to be curtailed and migration patterns incentivised i.e. develop human settlements in a much more controlled way by incentivising or disincentivising people away from areas that will suffer in a 2°C higher world

72	Gauteng	The transition to a low-carbon society needs to consider the impact to value chains, instead of isolated opportunities in the decision-making process. For instance, bioenergy opportunities tackle energy, job creation, agriculture and food security, rural development and community empowerment, however, the country is focused on large-scale renewable energy projects which mainly tackle the energy sector with very little co-benefits materialised
73	Gauteng	Government needs to work more closely with the private sector to unlock opportunities at a faster and bigger scale
74	Gauteng	Government needs to align its policies to provide the country with clear signals. Climate change needs to be mainstreamed into all sectors, all policies, and plans
75	Northern Cape	Solar in the Northern Cape is a huge opportunity for the local economy. Especially since much of the land is unfertile and there are a lot of sunny days per year.
76	Northern Cape	With the new technologies, there is an increased demand for R&D.
77	Northern Cape	Locals can be trained and become specialists in the renewable energy field
78	Northern Cape	The draft Climate Change Bill is an opportunity for development
79	Northern Cape	The utilisation of global fund grants can create greater financial flows for climate responses
80	Northern Cape	There's also an opportunity for greater national funding of climate change programs
81	Northern Cape	Renewable energy is an important opportunity for the province but needs to be optimised
82	Northern Cape	Making the links between enhanced eco systems and improved poverty and equality will increase economic outputs and improve social development
83	Northern Cape	Alternative energy can be used to capacitate communities
84	Northern Cape	Awareness around climate change, renewable energy, etc to capacitate society and incentivise a behavioural change.
85	Northern Cape	Advocacy and awareness around climate change
86	Northern Cape	Opportunity to understand what research is happening at a local level
87	Northern Cape	Also, research can identify better drought response strategies
88	Northern Cape	Climate smart agriculture should be focussed on so that our food security is not compromised as climate change worsens.
89	Northern Cape	Translate climate change messages into simpler messages
90	Northern Cape	Need to bring different sectors on board so as to maximise co-benefits
91	Mpumalanga	The numerous abandoned mines in the country should be rehabilitated. The rehabilitation of this land could be used for agriculture or renewable energy production and would stop their negative environmental impacts.
92	Mpumalanga	Land should be used for solar and wind farms as they provide cheaper power than coal and are cheaper to install
93	Mpumalanga	Renewable energy can create more jobs than coal and so should be focussed on.
94	Mpumalanga	Agriculture should be supported as it can absorb job losses and provide food security
95	Mpumalanga	Educate and empower the youth and provide training and skills that are relevant for future jobs
96	Mpumalanga	Empower youth to be job creators not seekers

97	Mpumalanga	Include sustainable human settlements and urban planning projects into IDPs so service delivery meets social and economic needs
98	Mpumalanga	Pilot projects which include renewable energy which will demonstrate sustainable habitats
99	Mpumalanga	Boosting the agricultural sector to absorb jobs. In particular, the use of small scale, locally owned and managed farms will provide much broader empowerment opportunities and employment opportunities, as well as providing a greater degree of food security as they will not necessarily target cash crops.
100	Mpumalanga	Climate smart agricultural methods are a necessary and reliable way of ensuring food security.
101	Mpumalanga	Strengthening the agroprocessing sector
102	Eastern Cape	Reskilling of current labour, especially for those at risk of losing their jobs
103	Eastern Cape	Transform the current transport system (reducing our biggest carbon footprint will be necessary for the JT. improved safe, secure, punctual public transport, electric public transport, this is easily achievable and very effective)
104	Eastern Cape	Move toward hybrid/ electric vehicles will all help.
105	Eastern Cape	Empower and enable local communities to become self-sufficient, localised "economies"
106	Eastern Cape	Education and the fostering of more climate sensitive habits.
107	Eastern Cape	Greater collaboration and sharing of success
108	Eastern Cape	Community microgrids
109	Eastern Cape	Green technology can create jobs and facilitate the creation of a green economy
110	Eastern Cape	Social entrepreneurship
111	Eastern Cape	Government beneficiaries like RDP houses should be built with an emphasis on green.
112	Eastern Cape	Community driven change is needed. Resilience is built from the ground up and thus communities must be utilised to implement actions which can foster climate resilience.
113	Eastern Cape	Make businesses out of pollution (recycling, etc)
114	Eastern Cape	Shift the mindset around jobs. People should be incentivised to be job creators rather than job seekers, as that is how to end unemployment.
115	Eastern Cape	Shifting the ownership of the means of production.
116	Eastern Cape	New, green technologies can unlock development, growth and job creation.
117	Eastern Cape	Underdeveloped economy leaves a lot of room for growth.
118	Eastern Cape	Government and business both aligned to a shared future state.
119	Eastern Cape	We need to solve our own problems. One way of doing this is to provide the goods and empowerment to communities for them to develop their own housing
120	Eastern Cape	Create an economy for business to create jobs, create wealth and stability within the economy.
121	Eastern Cape	Improved management of resources
122	Eastern Cape	Efficiency and sustainability are the cornerstones which should underpin the Just Transition and will provide a platform for sustainable, reliable and necessary growth.
123	Eastern Cape	Rural economy (local job creations)

124	Eastern Cape	Improved infrastructure and road networking
125	Eastern Cape	Local economy can lead be improved which will lead to further growth
126	Eastern Cape	Utilising the research and knowledge we have
127	Eastern Cape	Propose a South Africa city capable of going green: 1)Eco city using wind and solar power as an energy source 2)Improved transport which reduces the carbon footprint 3)Attract eco tourists 4)Lead by example, show that a green city is possible 5)Find ways of incentivising the movement towards green energy
128	Eastern Cape	Clean air will help health
129	Eastern Cape	Job creation closer to communities so people don't have to travel from city to city. Also, workers will not have to migrate to distant cities for employment
130	Eastern Cape	Less chronic illness (cancer, TB, eczema) from less air pollution as coal-fired power stations shut down
131	Eastern Cape	Focussing on the environment will allow the soil to be more fertile so that food can be cheaper
132	Eastern Cape	The commercialisation of marijuana can be sustainable for local communities and eco systems and thus aid the JT
133	Eastern Cape	Limit the number of departments
134	Eastern Cape	Implement awareness programmes to educate people on 1) the benefits of going green 2) help create employment within the green space 3) increase innovative solutions to counter climate change
135	Eastern Cape	Water behaviour needs to change so that people actively save water.
136	Eastern Cape	Windmill farms in the ocean
137	Eastern Cape	Solar panels at the household level
138	Eastern Cape	Government funding for farmers (and private households) to help them produce their own energy through solar panels and windmills in the area of Transkei
139	Eastern Cape	Green cities are an opportunity for overall betterment of people, starting with densification and nature based solutions for current cities.
140	Eastern Cape	By professionalising administration and services, the state of government can be resolved. People will have access to affordable and efficient public services and administration that works
141	Eastern Cape	Focus on tourism as it is an avenue to create jobs
142	Eastern Cape	South Africa should learn from other countries around how they have managed to resolve their own water crises
143	Eastern Cape	Reskilling of workers from e.g. Eskom to produce local alternatives rather than importing the alternatives from international producers of renewable energy
144	Eastern Cape	Technology should be created, owned and accessed by ordinary people
145	Eastern Cape	Decentralised community owned energy
146	Eastern Cape	Solar powered cars, electrical trains
147	Eastern Cape	Increase jobs

148	Eastern Cape	Create biogas and biofuel from commercial agricultural practices as a co-benefit which can be used locally
149	Eastern Cape	Regenerative building designs and agriculture
150	Eastern Cape	Agroecology
151	Eastern Cape	Water distribution
152	Eastern Cape	For households - get solar panels and rainwater tanks per household. This can aid in job production and allow households to become self-sustaining
154	Eastern Cape	Building housing more sustainably and RE ready
155	Eastern Cape	EIAs need to be done to improve the environment - feeds into the need for long term planning
156	Eastern Cape	Using sustainable technology for energy generation to ensure reliable energy security
157	Eastern Cape	Job creation, skills development to create employment in RE
158	Eastern Cape	Improve the air quality in cities by using RE transport technology
159	Eastern Cape	Move away from imported energy to using local technology including public transport
160	Eastern Cape	Cohesion and collaboration between different committees on energy and environmental issues
161	Eastern Cape	Awareness raising in a language people can understand so everyone can understand the threat of climate change.
162	Eastern Cape	Social entrepreneurship and creative thinking
163	Eastern Cape	Improved ways of doing thing through new technologies
164	Eastern Cape	Decentralised production
165	Eastern Cape	Involvement of civil society at grassroot level
166	Eastern Cape	Wind power
167	Eastern Cape	Building solar energy systems
168	Eastern Cape	Innovative farming
169	Eastern Cape	Paradigm shift
170	Eastern Cape	Nature resources (allowing development)
171	Eastern Cape	Green skills (youth using available resources)
172	Eastern Cape	Reversing climate change to address challenges in EC problems
173	Eastern Cape	University working together with industries to create jobs
174	Eastern Cape	Knowledge generation
175	Eastern Cape	Creating apps and utilising technology

176	Eastern Cape	Foreign investors want prototypes
177	Eastern Cape	Carbon incentives
178	Eastern Cape	Creating a circular flow of waste (waste to money).
179	Eastern Cape	The growth of waste can lead to innovation from universities
180	Eastern Cape	Skills transfers
181	Eastern Cape	Foreign organisations creating jobs even though it's a municipal opportunity
182	Eastern Cape	Education of people about the benefits of higher density living so we can transfer to a carbon free state
183	Eastern Cape	Funding is available, but people need to be taught how to access it
184	Eastern Cape	Making use of the YES initiative (youth development)
185	Eastern Cape	Passive solar design features developed by UFH inclusion in Breaking New Ground Human Settlement policies
186	Eastern Cape	Create jobs in the renewable energy sector which will help with pollution problems and rural development
187	Eastern Cape	Micro grids for communities e.g. Tsitsikamma wind farm
188	Eastern Cape	RE creates opportunities for upskilling jobs
189	Eastern Cape	Carbon reduced by energy transition to RE
190	North West	Renewable energy can allow job creation
191	North West	Clean production
192	North West	Attracting labour to manufacturing of renewable energy infrastructure using existing mining infrastructure.
193	North West	Projects for solar power generation
194	North West	Mines should employ, educate and train local communities
195	North West	Special Economic Zones for renewable and green manufacturing are a significant opportunity. They can provide the means for growth and jobs.
196	North West	Communities at the centre of the JT
197	North West	Relationship should be formed between mines and communities to make sure they make the right partnerships to make sure they are using the right water, people are being adequately skilled, etc
198	North West	Getting synergies between departments and policies
199	North West	Reverse the implications of mines being dirty by using cleaner tech in mining and energy use for mines
200	North West	Recycling and reuse. Making use of the circular green economy. For instance, instead of just throwing tyres away a company can make use of the tyre as an input, which firstly creates jobs but also minimises waste
201	North West	When they shut down a mine, they must give the communities the mine structures for training academies to transfer skills to communities as they aren't closing it properly anyway.
202	North West	Mines need to be closed properly. Currently they are not which means there is acid mine drainage, and kids die by playing in mine pits. There is opportunity to close properly so communities aren't harmed by closed mines
203	North West	Old shafts can be reused, such as museums

204	North West	Job creation – through the green economy e.g. recycling, renewable energy, mine rehabilitation, manufacturing of green technologies (solar PV panels).
205	North West	Repurposing mines for the other uses including using them as manufacturing hubs and museums.
206	North West	Renewable energy production – the country has high solar resources which could be utilised to produce electricity for the country. Mining companies can also invest in clean renewable energies and reduce their dependence on the grid.
207	North West	Upskilling - Mines can employ people in the surrounding communities, upskill them for other sectors that can benefit businesses and communities
208	North West	Manufacturing jobs – the Bojanala District has recently been declared a Special Economic Zone for manufacturing. People should be at the centre of this planning.
209	North West	Invest and protect the rich biodiversity for tourism and wildlife economy
210	North West	Integrated approach to decision making
211	North West	Mines should be using clean energy since they pollute so much themselves. They should also be made to develop clean energy in the area for their use
212	North West	Use a cleaner mining process - which will lessen the carbon footprint of mines - improving health of employees and improving the surrounding environment
213	North West	Intervention from government so that mine committees are formed around communities so that the people actually affected are the ones who help make decisions on what mines do.
214	North West	Mines should educate communities, around more than mining skills; take the youth to school and university and such. They then can develop the skills to come back and help the community with things like water purification and preservation, etc.
215	Limpopo	Opportunities for rural areas. Lack of skills development and a lack of leadership which can set up projects which can eradicate poverty. Short, formal courses/ workshops on climate change and resilience can train individuals and communities
216	Limpopo	Identify programmes and projects which are environmentally friendly and bring in innovation which can combat environmental degradation.
217	Limpopo	Create licenses in mining areas. This will create employment and opportunities. These licenses need to come with regulations to protect natural resource degradation. Mining must be well managed and strictly monitored / regulated. This includes rehabilitation efforts integrated into the mining.
218	Limpopo	Create awareness at household level about water re-use opportunities. This includes the use of grey water for toilets and gardens, rainwater harvesting for household use.
219	Limpopo	Environmental rehabilitation. Opportunity for replanting indigenous trees (like Marula planting projects). Opportunity for the youth to get involved too, use it as an indigenous knowledge system to teach the youth about indigenous knowledge and afro knowledge. Can lead to developing Afrocentric science. Utilisation of NR from an indigenous point of view.
220	Limpopo	Rainwater harvesting for households is an important opportunity.
221	Limpopo	Develop or create community projects to assist in alleviating poverty
222	Limpopo	Community beneficiation. A project could be developed on the re-use of waste materials, recycling. In addition, alien invasive plants can be harvested, and the wood can be used for economic benefit and allow indigenous vegetation to grow. Using indigenous knowledge system on the use of plants and academic programmes.
223	Limpopo	Teach the municipalities to apply for available grants within local, provincial and national treasury or international donors. This will allow the funding opportunities to be capitalised on.
224	Limpopo	Teach the community how to save energy. For example, we had a project promoting the use of wonderbags. We also had a project of donating solar lamps.
225	Limpopo	Proper planning in terms of land use can lead to sustainability and safety (so that people don't settle on unsafe ground)
226	Limpopo	Explore skills development to promote training and up-skilling

227	Limpopo	We should change our attitude around how we approach traditional leaders. If we approach them with respect, they will be a much larger part of the solution and will better enable projects in their local areas.
228	Limpopo	Implementation and enforcement of regulations
229	Limpopo	There are opportunities for rural areas to develop their skills as there is a current skills shortage.
230	Limpopo	An opportunity on unlicensed sand mining is to rehabilitate, quantify and license them, and this may help in reducing poverty and create job opportunities (direct benefits).
231	Limpopo	Solar energy is regarded as a solution to Limpopo's energy crisis
232	Kwa Zulu Natal	Bottom-up, community-led processes to address concerns, e.g. water
233	Kwa Zulu Natal	Public participation processes and some structures remain in place to promote inclusiveness and empower citizens
234	Kwa Zulu Natal	Development must come to develop my mind and my community. Activities need to be done sustainably- rather than somebody comes in then leaves and the solution then falls apart. Or the “solution” doesn’t present a real solution to a priority problem.
235	Kwa Zulu Natal	Dialogue to discuss real solutions with government to support community members to enable them to properly express their rights
236	Kwa Zulu Natal	Government needs training in the environmental issues
237	Kwa Zulu Natal	Durban can be a leader as a green city. Need to more properly make it sustainable as there are benefits for everyone.
238	Kwa Zulu Natal	Use experiences within eThekwini to assist secondary cities
239	Kwa Zulu Natal	Increase secondary engagements
240	Kwa Zulu Natal	All action needs to undergo climate change review and pass criteria
241	Kwa Zulu Natal	Opportunity to capture sun and many natural resources that can be used sustainably and ecologically
242	Kwa Zulu Natal	Food sovereignty to ensure that people raise organic food that is healthy and nutritious
243	Kwa Zulu Natal	Climate change protocol should be established within which all development must pass
244	Kwa Zulu Natal	We are a well-resourced province in terms of natural endowments. All action and developments need to have some sort of climate change review and full understanding of harmful effects
245	Kwa Zulu Natal	We are largely a water focused province- sea and rivers. We have an opportunity to ensure that all water actions are bottom-up in terms of their management and protection. Inherent in this is ensuring households save water where they can.
246	Kwa Zulu Natal	Planning around disaster management- one that aligns with climate science in terms of increased number and intensity of these disasters
247	Kwa Zulu Natal	Policies that are not profit-driven but also account the environment
248	Kwa Zulu Natal	Proper land audit to understand who owns the land, what land people want etc
249	Kwa Zulu Natal	Rectify poor farming and skill communities to grow nutritious food and do so ethically
250	Kwa Zulu Natal	Development of green economy, through tourism and land given back to communities who don’t know how to profit / gain from the land. Areas of sufficient land can be brought into the green economy for tourism. This includes providing education and training to people in the communities to ensure they gain from the green economy.

251	Free State	Partnerships between local authorities and businesses and communities to implement ecological solutions.
252	Free State	Tax benefits could be provided to socially / environmentally conscientious businesses coupled with fining systems for businesses that don't comply with environmental regulations.
253	Free State	Offer more government budgets to those ward councillors that are able to mobilise their communities and promote behaviour changes like recycling, use of public transport etc.
254	Free State	Government should invest in waste to energy projects; recycling and renewable energy projects.
255	Free State	Agriculture and renewable energy provide an opportunity for providing jobs in rural areas. Government needs to support small scale initiatives.
256	Free State	Climate-smart agriculture and zero tillage must be compulsory.
257	Free State	Climate change offers the opportunity for crop diversification from maize and wheat to more high-value products such as mangoes and bananas.
258	Free State	Studies show that the ecosystems will change, and this information needs to be factored in when planning and identifying suitable commodities to be produced.
259	Free State	Implement full cost accounting to ensure that environmental and societal externalities are included in the pricing. This should be initiated by National Treasury.
260	Free State	Green procurement must be mandatory in all sectors of the economy.
261	Free State	All buildings must be energy efficient, recycle and reuse materials as part of their planning and building requirements.
262	Free State	Integrate climate change mitigation with social and economic development priorities
263	Free State	Old mining towns can be revitalised by attracting industries involved in the green economy. These industries could capitalise on existing infrastructure. Towns in the Free State are also centrally positioned and can easily link to green economic opportunities in Gauteng and other neighbouring provinces. The Free State could become an innovation hub for the just transition through the reuse of mining towns in this way. Political buy-in from the Premier is required.
264	Free State	Mining towns such as Welkom could become renewable energy producers. Transmission lines are already established, and energy could easily be fed into the grid and used locally.
265	Free State	Redefine our culture and value systems - embrace a culture of one that is caring and peaceful and environmentally conscious.
266	Free State	Promoting eco-tourism through nature conservation and wildlife protection
267	Free State	Investing in locally produced goods stimulates the local industry, creating jobs and reducing the carbon footprint of products
268	Free State	Rainwater harvesting can be a useful tool in ensuring water saving.
269	Free State	Utilise existing higher education institutions to train people for skills required for the future and to identify potential economic areas of growth and innovation.
270	Free State	The adaptation sector for instance in the UK is worth a lot of money. South Africa can use this as an inspiration and jobs can be created in weather protection, disaster risk management, and adaptation solutions. There is an opportunity to develop skills base to serve climate adaptation sector needs.
271	Free State	NEDLAC should champion the Just Transition and bring it to the forefront. Climate change and the energy transition need to be integrated with social and economic development priorities.
272	Free State	Role in government for decentralising energy

Appendix B

Reference Number	Province	Challenge
1	Western Cape	Frustration about government excluding people from processes that impact them. Includes people impacted by energy decisions at a national level as well as workers in various industries whose jobs are in danger in the power, mining and manufacturing sectors.
2	Western Cape	A low carbon transition will inherently damage some businesses and industries and put people out of jobs. If this is not planned for at every level of society the effects of it will be dire on people's lives.
3	Western Cape	Government at all levels plays an important role in the Just Transition process, however, disjuncture's remain in terms of national guidance and well as national, provincial and municipal capacity. The current policy environment is a top-down approach, with very little to no consultation.
4	Western Cape	Future of our economy and social wellbeing is placed in the responsibility of struggling government institutions
5	Western Cape	Contradiction between what's said and what actually happens. "President has said he wants mining to grow, which is contrary to low-carbon, resource efficient development".
6	Western Cape	Inadequacies in regard to on the ground implementation have plagued South Africa's development attempts in the past. There are power dynamics and political forces in affect that impact implementation at various levels. Decision making is bogged down by short terminism, need to promote long term thinking and planning.
7	Western Cape	Many people lack information on climate change and various issues that impact them. Even if they have the information, they lack the capacity to address them.
8	Western Cape	The water we have feeding into our oceans is insanely dirty. People get sick using this water and its leading to degradation of the oceans. We need to clean this up.
9	Western Cape	We use land unsustainably. We don't focus on sustainable land practices and chase short term wins which lead to destruction of key ecosystems and biodiversity.
10	Western Cape	We recently experienced a huge drought. This was caused partly due to poor rainfall but also because of poor water infrastructure, poor planning and protection of water catchment areas, too much alien vegetation and people not using water responsibly.
11	Western Cape	Governance challenges need to be resolved.
12	Gauteng	There will be real sacrifices in the Just Transition. As a country we need to be realistic about the enormous challenges we will face, and that thousands of people will lose their jobs
13	Gauteng	Not fully aware of how the low carbon pathway will affect jobs - could create wealth but reduce employment.
14	Gauteng	Air pollution is rife in the country, perpetuated by mining and power generation, as well as by the high electricity prices which forces poorer settlements to resort to burning wood and paraffin for heat and light.
15	Gauteng	Better ways to measure economic growth need to be developed and adapted to South Africa because measuring Gross Domestic Product (GDP) is inadequate and does not reflect wealth distribution.
16	Gauteng	Some sacrifices will have to be made. The coal economy has brought economic development, but it undermines the health of communities. The short-term pursuit of resource exploitation is undermining sustainability, which is fed by licenses and laws being broken without consequence
17	Gauteng	Need to also understand where we are. Realistically we are sitting in the worst possible place in terms of moving toward re compared to other countries. There are challenges on the supply side and the demand side of coal. And Medupi and Kusile have just been finished and have been a massive drain on the economy, we can't now just turn them off – we need to recoup part of their value.
18	Gauteng	Lack of trust in the government due to corruption, which can be a barrier in forming the partnerships which are needed for widescale economic gain.

19	Gauteng	Government departments are working in silos undermines the collective vision for the future. The vision set by National Government is not implemented by provinces or municipalities, who in turn are not held accountable for not implementing the actions. There is no capacity, structures or political will to bring silos together.
20	Gauteng	Water is critical to all life in South Africa, yet we waste it in our homes and because of leaky pipes. This is a massive challenge as we cannot continue to survive as the population increases and water supply shrinks. We need to implement water solutions today.
21	Northern Cape	Political will is critical to a just transition happening. At the moment, there are conflicting attitudes on the subject as politicians tend to chase short term goals – the environment is not a priority for them.
22	Northern Cape	The political situation in the country is also marred by deep rooted corruption and thus is a huge impediment to the implementation of any plans developed.
23	Northern Cape	Poverty also leads to environmental destruction in its own way as the poor either do not have access to electricity or cannot afford it, resulting in them collecting firewood illegally. Therefore, the root cause of poverty needs to be addressed
24	Northern Cape	The Northern Cape is the largest province in the country but has little financial support because it is also the least dense, e.g. the equitable share grant is awarded per person. The economics are skewed towards big municipalities, and therefore service delivery in small towns is more challenging. The cost of the just transition will likely require additional funding, and municipalities feel that they are currently incapable of funding any further plans. A one size fits all should not apply
25	Northern Cape	The province has severe water challenges, and climate change is expected to amplify water shortages. The water that is available mainly comes from other provinces (Orange River etc), however, by the time it reaches the Northern Cape, the water is polluted and unsuitable for agriculture
26	Northern Cape	There is a disconnect between civil society and government. Civil society is not sufficiently engaged with to determine their needs the solutions that will work for them. Civil society is largely kept out of the decision-making process. On the other hand, government works very closely with big business, and yet they are responsible for the environmental challenges
27	Northern Cape	Globalisation allows for industries to shift to other countries if costs increase and regulations become stricter. The government policy on imports and localisation is not conducive to business competitiveness. Although localisation is meant to benefit and stimulate local businesses and SMEs, in reality, contracts go out to large businesses and there is very little tricking down of that economic wealth.
28	Northern Cape	There exists a skills shortage in the renewable energy sector, and thus we are having to use technicians from Europe to install solar PV. We need to upskill local technicians to be able to grow the local economy and provide jobs
29	Northern Cape	Large businesses are capable of transitioning to sustainable solutions, even if they are slightly more expensive, but there exists concern around small business survival, and whether they will be able to afford the potentially more expensive, greener solutions.
30	Northern Cape	There is a lack of knowledge around the impacts of fossil fuel impacts, and thus citizens aren't all that motivated to make the change.
31	Northern Cape	There are large communities of poor people, and their primary goal is to exit poverty, whether in a sustainable manner or not. Thus, poverty encourages a short-term view, so it seems alleviating poverty would be a first step to a just transition.
32	Northern Cape	Concern around the affordability of the just transition, and how it would be funded: public vs private funding.
33	Northern Cape	We let short term exploitation of land cloud of vision of the long term benefits from land resources. This goes onto affect water resources too, which is not taken into account in the cost-benefit weigh up.
34	Northern Cape	Wealthy can afford a transition but the poor cant
35	Northern Cape	Communication between government and the people around policy and regulations is inadequate
36	Northern Cape	There is misalignment around the implementation of policy between the three spheres of government.

37	Northern Cape	There is a lack of budget for climate change in government operations
38	Northern Cape	Decision makers don't necessarily understand climate change, and it is thus not important to them – there is a need for greater awareness
39	Northern Cape	There is inadequate research and thus a lack of understanding of what is happening locally. Perhaps due to a lack of communication of research. Need to translate research into better understanding
40	Northern Cape	The average South African is not concerned about climate change as they feel there are much more pressing socio-economic challenges like poverty and inequality
41	Mpumalanga	Air quality in the country is a severe challenge as it makes people sick and degrades the farm land.
42	Mpumalanga	Multiple abandoned mines which contribute to air and water pollution.
43	Mpumalanga	High concentration of coal mines and coal-fired power stations which lead to the destruction of large belts of land at a time. Also the dust settles in the region nearby which decreases agricultural productivity and affects lives.
44	Mpumalanga	Local economy is not diversified. As such, when there is a threat of job losses for mining a huge percentage of the employed population are at risk
45	Mpumalanga	Mpumalanga has the majority of mines and power stations – yet they don't necessarily have the best conditions for renewable energy (solar is better in the Northern Cape, wind better along the coast). How can coal workers from Mpumalanga then get these jobs without having to migrate?
46	Mpumalanga	Competition for land use
47	Mpumalanga	Acid mine drainage has ruined water resources. Water is also used for power stations. Whatever is left is poisoned and we cannot use it for our own farms.
48	Mpumalanga	No plan for the phasing out of coal – just finished new power stations (Medupi and Kusile).
49	Mpumalanga	Coal mining continues to grow despite international commitments
50	Mpumalanga	Misalignment of policies for water, minerals, mining and the environment. Currently mining dominates and minerals are sought after at the expense of water resources and the environment.
51	Mpumalanga	No community consultation
52	Mpumalanga	No transparency in decision making
53	Mpumalanga	Energy poverty not prioritised. Many poor people cannot afford electricity even if they have access
54	Mpumalanga	Lack of education and training to reskill coal workers
55	Mpumalanga	Lack of education and training for school children with regard to future jobs
56	Mpumalanga	Enforcement of rehabilitation is poor
57	Eastern Cape	Energy tariffs are very high, making electricity unaffordable for many communities and eroding competitiveness of business
58	Eastern Cape	The majority of the Eastern Cape population is uneducated, particularly in terms of climate change
59	Eastern Cape	Uncertain IDPs, especially with regard to IDPs
60	Eastern Cape	No clear coal transition plan.
61	Eastern Cape	Bankruptcy of the state.
62	Eastern Cape	No interaction with communities.
63	Eastern Cape	Lack of information, education and empowerment around the Just Transition.
64	Eastern Cape	Scarcity of residential land, causing urban sprawl.
65	Eastern Cape	Air pollution from traffic is causing health challenges across the city.

66	Eastern Cape	People's living mentalities for wanting a plot of land are inefficient.
67	Eastern Cape	Scarcity of agricultural land means whatever land is available goes to the richer commercial farms which then means locals cannot farm for subsistence.
68	Eastern Cape	The lack of water for other activities due to agriculture's allocation is severely challenging, especially when the large farm concentrates on unsustainable practices.
69	Eastern Cape	Air and water pollution contribute to making people sick.
70	Eastern Cape	Highly centralised economy, thus when one sector experiences difficulties then many people lose jobs. Also not enough entrepreneurship.
71	Eastern Cape	We are still planning on using coal for the future – which is breaking our current NDCs.
72	Eastern Cape	Not enough business generation/ creation.
73	Eastern Cape	Not enough support for SMEs.
74	Eastern Cape	Alignment of strategy within government (too much government).
75	Eastern Cape	Living with the consequences of previous decisions (Kusile, Medupi, etc)
76	Eastern Cape	The country is bankrupt.
77	Eastern Cape	Shrinking of economy/ GDP
78	Eastern Cape	Outflow of skill
79	Eastern Cape	GDP growth at 0.9%
80	Eastern Cape	NDP not aligned because of short term political views
81	Eastern Cape	Government is measuring success on the wrong things i.e. job creation
82	Eastern Cape	Large percentage of budget spent on social services instead of the economy
83	Eastern Cape	To many departments - and the alignment of these departments
84	Eastern Cape	Too much waste
85	Eastern Cape	There are new technologies available, but they are not being used
86	Eastern Cape	Money is getting lost/ state capture/ corruption
87	Eastern Cape	No accountability. If the number of departments is minimised, then an individual can be held to account
88	Eastern Cape	Uneducated majority of the population
89	Eastern Cape	The current use of coal has many effects on humans and the environment
90	Eastern Cape	High tariffs and multiple tariff hikes make electricity unaffordable
91	Eastern Cape	High density of pollution.
92	Eastern Cape	Political will (many opinions, too much discussion and no actions will be taken)
93	Eastern Cape	Land use issue (infrastructure backlog)
94	Eastern Cape	The state of government

95	Eastern Cape	Lack of coordinated planning
96	Eastern Cape	Soil quality, water quality is bad and affects the production of food
97	Eastern Cape	Fear of job losses from the transport sector
98	Eastern Cape	There is limited access to land. Deepening this is that there is no assistance from municipalities and there is a constant change of leadership which erodes accountability and the will to implement projects.
99	Eastern Cape	Not everyone will benefit from the JT
100	Eastern Cape	IPPs are currently still big corporates
101	Eastern Cape	The availability of jobs.
102	Eastern Cape	Waste pollution
103	Eastern Cape	Land availability and housing and how it contributes to social and domestic problems
104	Eastern Cape	Environmental problems in relation to geographical landscape and the purpose of land use
105	Eastern Cape	Access to energy and linking how households can link up to the grid
106	Eastern Cape	Localised skills development, education on JT
107	Eastern Cape	Air quality issues from fossil fuel usage in vehicles
108	Eastern Cape	Getting different communities to link and understand energy and environmental issues in a cohesive manner around the JT
109	Eastern Cape	Awareness raising
110	Eastern Cape	Lack of social compact driving force at community level
111	Eastern Cape	Lack of information, education and empowerment on JT
112	Eastern Cape	Lack of integrated approach and synergy in the roll out of government programmes
113	Eastern Cape	Lack of sustainable measures to ensure on going implementation
114	Eastern Cape	Fear of job loss
115	Eastern Cape	Lack of funding
116	Eastern Cape	lack of available land for agriculture graduates
117	Eastern Cape	Lack of management of available land
118	Eastern Cape	Lack of water and drought
119	Eastern Cape	Floods negatively affect the economy
120	Eastern Cape	Lack of knowledge and skills
121	Eastern Cape	Poverty and unemployment
122	Eastern Cape	Construction degrades environment

123	Eastern Cape	Climate change
124	Eastern Cape	Resource care and use
125	Eastern Cape	Loss of jobs from the JT
126	Eastern Cape	Transitioning the energy sector currently the progress is very slow
127	Eastern Cape	Not a lot of land ownership
128	Eastern Cape	Slow pace of mitigating the drought problem
129	Eastern Cape	Space is a challenge
130	Eastern Cape	There are different levels of energy requirements, each area in the Eastern Cape has different energy requirements that cannot be compared
131	Eastern Cape	Fertile lands are being converted into residential land
132	Eastern Cape	Earmark certain jobs for coal workers
133	Eastern Cape	Lack of information being given to small businesses that are willing at act as a result key stakeholder are not present
134	Eastern Cape	Skills transfer (there is a lack of it) and a lack of implementing action
135	Eastern Cape	Cultural objections to higher density housing technologies despite land scarcity and environmental imperatives
136	Eastern Cape	Energy efficiency in existing positions
137	Eastern Cape	There needs to be a change in the development or construction of RDP houses
138	Eastern Cape	Lack of partnerships in the Eastern Cape
139	Eastern Cape	Not empowering South African citizens as workers
140	Eastern Cape	Density issues - cultural issues in the transition to higher density
141	Eastern Cape	A lack of a clear transition plan on energy
142	Eastern Cape	Awareness on options and activities
143	Eastern Cape	Jobs for one vs jobs for all (need to concentrate on the whole, politicize and personalise, ignore health impacts)
144	Eastern Cape	Managing Algoa Bay as a whole authority, currently: - NEMA excludes sea/ oceans - multiple authorities such as the ports and SAMSA so many vested interests - River ecosystems need to be managed too
145	Eastern Cape	Allocation and sustainable use of common resources
146	Eastern Cape	Land use - a decision needs to be made in terms of energy and food security
147	Eastern Cape	Impact of labour exodus on villages (increased pressure on services)
148	Eastern Cape	Disconnect to land, farmworkers to towns
149	Eastern Cape	Skills and capacity in all different sectors

150	Eastern Cape	Coordination of planning (no integrated planning, no planning of resources and support which leads to wastage)
151	Eastern Cape	No community buy in and mutual benefit
152	Eastern Cape	Lack of leadership and accountability
153	Eastern Cape	Poor regulatory framework and governance
154	Eastern Cape	Implementing systems that are not conducive for our environment
155	North West	Socioeconomic challenges exacerbate climate change.
156	North West	Policy uncertainty ensures that no action is taken from local municipalities which is a challenge since urgent action is needed.
157	North West	Air pollution
158	North West	Invariant rainfall – leading to water shortages. Also water pollution from mining and people is bad for people's health. Whatever water is left is polluted and unusable, meaning we cant grow our own food.
159	North West	Electricity is unaffordable for many people in the country
160	North West	The green economy is neglected as big business dominates decision making
161	North West	Lack of integrated decision-making impacts on activities and communities
162	North West	Deforestation and the burning of wood
163	North West	Unprofessional, disoriented, demoralised public service
164	North West	Health issues due to bad air and water quality
165	North West	Corruption. Government officials make decisions which aid them, not us.
166	North West	Rustenburg is the fastest growing town in NW. Mines are attracting foreigners and non-locals and don't aid the neighbouring and local communities.
167	North West	Mines hire liaison officers from foreign places who then recruit workers from their hometowns and not from the local stock of labour
168	North West	Local communities are left destitute and unemployed as mines bring in employment from non-local sources and from migrant labour
169	North West	Mines don't reinvest in local communities and only teach them the skills that are specific to mining, so when the mine leaves it leaves the workers without hope of a new job elsewhere.
170	North West	When foreign nationals and non-locals come in for mining jobs, they bring their families who then use local and community resources and services which reduces the available public services for all locals.
171	North West	Service delivery is really bad in local communities - partly because the communities are so big due to foreign nationals and partly due to bad service delivery.
172	North West	Mining strategies/ practices are not acceptable in terms of environmental regulations like indigenous plant life, land and water. No one monitors that these regulations are enforced properly.
173	North West	Department of minerals issuing out licenses and they decide what will happen to the environment.
174	North West	Decision making process may impede the Just Transition as there is no synergy currently between policy or departments. One department says one thing, and another says another, with policies that then clash. For instance, the Department of Agriculture doesn't protect and prioritise agricultural land which has been afflicted by a natural event like a drought. In many situations the Department of Mining then comes in and because there's no one protecting the land they demarcate the area for mining.
175	North West	Just Transition needs to consult the people
176	North West	More mining in the province than manufacturing but mines use more energy which leads to energy poverty

177	North West	Mines mine all the minerals out the ground and leave white elephants in the area when they leave. They also leave behind air pollution and harmful gasses, particularly when they leave as they don't close up properly and don't rehabilitate the mine or the surrounding land
178	North West	Government ministers are shareholders in mines, there should be committees which make the decisions and monitor the mining operations and make sure its meeting standards (enforcement, accountability), even after it's closed.
179	North West	No institutional mechanism of the Just Transition.
180	North West	Mines are empowering themselves, but don't empower the communities
181	Limpopo	Development happens in silos - there is no interaction with policies between policies. For instance, communities will be relocated into various areas - but people will be settled on land that could be used for farming or is dangerous to the community. Moreover, resettling communities often leads to environmental degradation (such as debushing) which is obviously against for instance the DEA.
182	Limpopo	Population growth leads to environmental degradation as different departments and tribal leaders don't take into account the feasibility of service delivery when settling communities. As there is this lack of communication, traditional leaders allocate sites to people which then cannot be easily serviced as it falls out of the municipalities IDP. The allocation of land from traditional leaders must align with municipal alignment.
183	Limpopo	This allocation issue between different parties is a governance issue not a working in silo issue. Difficult to differentiate the roles and responsibilities or various roles of traditional offices, and whose authority holds true. Sometimes traditional leader authority may lead them to make a decision which is in contrast to local IDPs. Needs to be an enhanced understanding of how they fit and where their authority lies.
184	Limpopo	As population grows the demand on resources grows. If governance is not addressed properly then you end up with issues such as overexploitation of NR, misallocation of properties.
185	Limpopo	Dealing with traditional leaders is difficult. They are not aware of their roles and as such they don't do things necessarily in line with what the municipality puts down/ says. Needed to teach them the rules which they have to follow and the way they make decisions.
186	Limpopo	Traditional leaders are the custodians of areas over which they have jurisdiction, yet they were left out of certain legislature with regards to land rights.
187	Limpopo	Lack of awareness of climate change issues at community level, lack of campaigns and marketing initiatives focusing on environmental sustainability. These all mean people don't know about climate change and then don't want to do anything about it.
188	Limpopo	Lack of buy in from management to enact climate change solutions. There is an incentive to keep on plundering the country's minerals at the cost of all other life until someone forces them to stop. This stems from high up, as the decisions to build Medupi and Kusile will now haunt us for the next 50 years.
189	Limpopo	Lack of implementation in terms of funds. Even if a plan is in place there may be no funds to do it
190	Limpopo	No strategy for dolomite conditions around Limpopo. People are settled in old mine shafts which destroys housing and harms people.
191	Limpopo	Issue of population growth (natural growth, not in migration), as population grows the demand for NRs grows which leads to environmental degradation as when you don't utilise resources wisely it impacts on the environment. So, as pop grows, we need to also start thinking about taking into account utilisation. There is also a challenge of no alternatives, when you have no alternatives you utilise what you can
192	Limpopo	Planning for settlements. Settlements, some formal and some informal are settled upon floodplains and rain lines, which leads to big issues when it rains
193	Limpopo	Poverty and unemployment shackle development
194	Limpopo	Political will is non-existent on issues like the environment and climate change as decisions there's no will to implement long term goals, especially at a municipal or provincial level.
195	Limpopo	Load shedding is a particular problem, caused by Eskom

196	Limpopo	No regulation of mining which they take advantage of by destroying the environment without consequence and then leaving the area, not even rehabilitating the damages.
197	Limpopo	Sustainable capital projects not identified in the Integrated Development Plans (IDPs) aiming at dealing with climate change and environmental issues
198	KwaZulu Natal	Lack of democracy, government has a role to do what the public needs. However, they are not listening to better ideas of how certain things should be done (for instance they spend R160 000 a day on one water truck rather than underground tanks based on "engineers" plans, which don't necessarily work. They need to start listening and starting solutions which come from a more informed/ intelligent place).
199	KwaZulu Natal	Community planning is not currently community- based and it should be as communities know their needs best
200	KwaZulu Natal	Our water resources are central to our economy as well as being central to our health, yet we pollute them and do not maintain any infrastructure which leads to massive water wastage.
201	KwaZulu Natal	Government/ municipalities haven't maintained water infrastructure. The massive floods we experienced recently were exacerbated as stormwater drains were blocked, leading to lost lives, livelihoods, houses and thousands of displaced people. If anything flooding will get worse, we need to start maintaining water infrastructure.
202	KwaZulu Natal	The lack of coordination between different departments within government is a challenge. Causes policies which conflict with each other.
203	KwaZulu Natal	Environmental issues occur as decision makers act against the environment.
204	KwaZulu Natal	High unemployment and inequality
205	KwaZulu Natal	Serious spatial divides and legacy of poor education and poor public services
206	KwaZulu Natal	Investment and focus perpetuate existing differences in the development by focusing on urban areas only
207	KwaZulu Natal	Red tape to get permits takes too long
208	KwaZulu Natal	An audit should be undertaken to understand how land is being used, spatial inequities creating health problems etc, included
209	KwaZulu Natal	The current system is influenced by corruption, corporate capture and we need a new direction that looks at system change that puts people at the centre
210	KwaZulu Natal	Stop seeing mining as an important industry and see mining as a detriment to the society and should be replaced by other means of generating energy.
211	KwaZulu Natal	Lack of engagement with other areas of KZN to inform this process. The focus is always on eThekwini and there is a lack of focus on new ways of addressing issues that include other portions of the province
212	KwaZulu Natal	Balance between taking action, civil response, correction.
213	KwaZulu Natal	Fossil fuel investment in the country will have long term implications for the environment and for people and only provide finite benefits, which is misguided and unsustainable
214	KwaZulu Natal	Top-down approach that ignores communities' needs, based on what is best for the government or in some situations what is best for the decision maker. Also because there is no interaction with communities the Government implement what they think is best for the community, which may not actually be the case.
215	KwaZulu Natal	Lack of sustainable food and agriculture that jeopardises access to nutritious, affordable food and exposes people to potential food borne disease. We have to turn to importing basic grain and produce which aren't desirable for commercial farms to grow, which makes it more expensive and less sustainable, as well as causing an unnecessary addition to climate change via transport emissions.
216	KwaZulu Natal	Government does not listen to people and not promoting people centred economy. Developments that come through are not uplifting communities. There is no participatory government.

217	KwaZulu Natal	Communities dependent upon fishing as a primary economic activity are being jeopardised because areas have been protected and are no longer are communities allowed to fish there for their livelihoods. There is a rumour that mines are coming to the area and people are scared they will go hungry because their livelihoods are fishing. Furthermore, very poor consultation occurred, and we were unable to discuss our concerns properly.
218	KwaZulu Natal	The people who are causing the problem- government and business- are not around the table. It makes it difficult to discuss as they are key to implementing and if they aren't part of the decision-making about establishing those targets, they won't respect them.
219	Free State	There is still little acceptance by social partners (business, government, and civil society and labour) for a transition that is just.
220	Free State	There is no evidence of political will - policies are contradictory and low carbon development is not being broadly implemented.
221	Free State	Social institutions are not sufficiently profiling the just transition. The concept of a just transition requires awareness on a societal level and our social institutions should be providing education and awareness to promote inclusion and participation
222	Free State	The Free State's economy is based on mining and agriculture, which are both emission intensive. These emissions not only destroy the air quality, but also contribute to climate change. The province is suffering the impacts of climate change which include natural disasters such as droughts and floods and other extreme weather which have and will continue to affect the agricultural sector negatively.
223	Free State	The Province's position within the broader national economy is a challenge because the economic benefits that take place within its boundaries are largely distributed elsewhere. Specifically, the province often functions as a broker to other provincial economies, providing water, and minerals. Furthermore, it is a thoroughfare for freight.
224	Free State	The decline of mining, for example in Welkom, have had significant and negative impacts on the economy and high unemployment. Experiences from Welkom could have been shared with other mining dependent towns by assisting in their planning for closure, but this has not happened.
225	Free State	There is a lack of maintenance in infrastructure which will exacerbate the impacts of climate change.
226	Free State	Low skill base in the province leads to poor investment in the province, high levels of unemployment and low levels of entrepreneurship and innovation.
227	Free State	Lack of municipal capacity in terms of decision-making around rural and urban planning.
228	Free State	Lack of understanding of flood lines and dam capacities have resulted in inadequate spatial planning which has put communities at risk
229	Free State	Existing strategies and platforms that promote black business and previously disadvantaged development are not adequately preparing individuals and small businesses to be successful in the emerging global economy particularly in the light of climate change and the promotion of a low carbon economy. They are being set up for failure. The climate risks need to be factored in when helping them set up their businesses.
230	Free State	South Africa is still coal dependent and has lock-ins with coal power stations (Medupi and Kusile).
231	Free State	Communication challenges both vertically (including top-down vs bottom-up) and horizontally impacts social development.
232	Free State	Implementation of plans - e.g. public transport plan has not been adopted.

Appendix C

Bilateral, Community and Expert Discussions	Discussion Point
Bilateral Engagements	
1- Energy Intensive Users Group (EIUG)	A concern is that often the vision focuses too much on ideological rhetoric rather than a pragmatic and practical way forward. There is a structural mismatch in our economy; we have a very high Gini coefficient. We have a poverty crisis, which is a result of the unemployment crisis. The unemployment problem is a significant challenge. Those with lower skills available aren't getting absorbed (manufacturing, mining) as these industries lack growth and any growth as all is in areas that are semi-permanent and skilled. We need to tradable sectors growing in order to absorb employment or the result will be continued poverty and social upheaval.
2- EIUG	Electricity prices have gone up 530% in the last several years resulting in decreased energy use as a country.
3- EIUG	This exacerbates many underlying challenges the country faces, eroding business competitiveness – leading to job losses – as well as preventing people from accessing electricity.
4– EIUG	South Africa historically had a competitive advantage because of our cheap power. With the electricity prices going up like they are, we're becoming less affordable than in other developing nations. This is driving away foreign investment and foreign companies, who are instead taking business elsewhere and establishing industries and industrial complexes in other similar countries with lower energy prices. This also is detrimental to South Africa's overall employment, as each foreign investor or company that leaves people unemployed in its wake.
5– EIUG	The biggest risk we take is the fundamental problems about the principle agency problem. There is no recourse to force out poor management and inadequate executives. ESKOM usurped the capacity of government to effectively manage it. Competition drives innovation drives smart decision making. In the absence of competition, innovation and smart decision-making is thwarted. Hence, the rolling blackouts have no recourse, no one is held to account and as there is no alternative it continues to occur, which drives away FDI which has economic implications.
6- EIUG	South Africa is twenty years behind and wasted opportunities for the private sector to play a bigger role in energy provision, which would likely be lower carbon. Government also has a role to play in terms of co-championing the way forward. Although there are successes, we haven't seen movement on the discussion forward.
7- EIUG	We need trust-based partnership to drive a positive agenda. The state owns 42% of the fixed capital stock but the amount of investment is incredibly low. We are not growing because of lack of enabling environment for investment. We are asking the wrong questions and having the wrong conversation.
8– EIUG	It is important to avoid taking one issue in a silo. ESKOM unbundling is just one issue of many. Unbundling Eskom alone will not fix the structural issues that the country faces, such as poverty, unemployment and inequality. These challenges require much further reaching policy interventions. Instead, the unbundling of Eskom can assist in the easing of challenges such as Eskom's relationships with municipalities, IPPs and labour unions
10-EIUG	We know the future will not look like the past. We must think how we can latch into opportunity where an energy mix is inevitable. We look at company costs and identify where to make significant changes to become more efficient. But various factors are so interlinked.
11-EIUG	For example, if the IRP is implemented, there will job losses in mines. But there will be opportunities to create job markets around other sectors, even in the same areas where the mines are closing down. It really isn't that bad in terms of job losses. The coal in Mpumalanga is still there. We are selling so much coal to Eskom. What needs to be understood is the relationship of demand based and related job losses / trade-offs. There is a similar situation with agriculture. There are huge potentials for job creation when viewed in unison.
12 – EIUG	Eskom is a barrier to allowing the market to develop naturally. This power needs to be broken up to some regard.
13- EIUG	Coal is in crisis- a major midlife crisis in terms of maintenance. There is a management and financial crisis. There is also a human resource issue where they've lost a lot of their technical

	people. In addition, the water problem is influencing closing of mines, returning of land to Agriculture- all of which are key to solving the problem.
14- EIUG	We are being hindered by archaic regulatory processes. Unbunding can remove the red tape to an extent which can allow business to function and do what it does best – generate growth.
1- Sasol	Sasol want to see a unified approach to climate change. Climate Change tends to be address in pockets of excellence, resulting in isolated initiatives
2- Sasol	Policy can play a big role in assisting businesses like Sasol. Jobs are at stake if plants are closed and so they want everybody to understand what is at stake from all perspectives.
3- Sasol	In terms of natural gas, it was only in 2004 when Sasol began bringing in gas from Mozambique. The problem is that it is finite. Furthermore, it has proven challenging to find more gas. Gas is a more medium to long term prospect- and we need to acknowledge that.
4- Sasol	Sasol's interest is to make the bridge between us and government and labour stronger. SASOL would like to play a role and to facilitate a constructive dialogue with everybody around the table
5- Sasol	A big challenge for Sasol is that they can't mitigate emissions immediately. SASOL has invested in increasing energy efficiency since 2005, resulting in a 13% reduction. The mitigation analysis we undertook was put in place to identify where is the low hanging fruit. The barrier that we came across was what are we going to do about electricity. Understanding the electricity side is fundamental to the discussion
6- Sasol	But there is a lack of vision (for instance, how long do we use coal, what do we transition to?). If we understand about the grid, then we can make a plan. It is hard for us to take a decision on this alone. We've tried to have a dialogue with EIUG. But it is been difficult to resolve these conflicts regarding electricity.
7- Sasol	We decided not to go after Coal to Liquid (CTL). While we have limited access to gas we have to rely on coal. There are 29,000 direct jobs and 30% of country fuel supply is dependent upon this. It isn't our own decision because of the sincere implications. We continue to pursue gas, but several challenges remain in order for us to access the natural gas required. Renewable Energy isn't a growth opportunity, but it is a mitigation strategy we are looking at. But at this time coal remains primary feed stock at this stage.
8- Sasol	Labour is an important partner, but we struggle to get labour to see that nobody is trying to shed tens of thousands of jobs. Labour as a difficult partner. SASOL has worked well with some labour units. But there are particular ones that are difficult for many stakeholders to work with. There are some that will come to the table and others we just won't get. We need to get labour on board. This transition needs to include labour to assist in unpacking the whole situation. 10 job losses in a plant may result in 100 job losses downstream in the economy, therefore this requires understanding from a holistic perspective.
9- Sasol	The challenge will be to undertake a Just Transition without riots and social upheaval from various constituents that undermine a rational debate on the way forward. There are solutions (re-skilling, localising jobs), but we don't get the opportunity to talk about the table. From electricity we have an idea of what we want it to be, but how do we get there. There needs to be reasonable time provided to do proper research to move forward informed and manage the transition. The NPC can potentially dovetail on existing discussions or workshops so we can get the key people who want to be part of the discussion. What has worked are closed room dialogues around a specific topic. Something that has worked is having discussions with groups based on specific challenges. These have allowed opportunities to build trust. We need to put mandates aside and have a serious conversation on what needs to be done next. And we need others to come along with us.
10- Sasol	Climate Change is a priority risk from SASOL operations as well as our carbon footprint. There is also downstream investment which is becoming an increasing risk. SASOL has a huge impact on the economy. SASOL has a huge chemical portfolio. SASOL has said no more GTLs etc, and our chemical component is a growing component as a strategic decision.
1- Youth	They have nothing and they are not a constituency – at best they are voters. But we need to care because the youth are the leaders of tomorrow and today, we are destroying our planet. There

	has to be a youth voice and the youth need to organise particularly as most of our population are young – 62%.
2- Youth	There is land available, but it is not always used well. In addition, we need to consider transport when talking about land – how accessible people are to the city for instance.
3- Youth	Even though the country is now 64% urbanised the problems differ between cities and towns and urban and rural areas. We need to manage urbanisation properly and in particular how we manage our cities in the face of climate change.
4- Youth	Decentralising energy and technology is critical.
5- Youth	Transport in the city ids a big issue
6- Youth	We should be looking at solutions for farming such as incentivising farmers, using land more efficiently and providing farmland exchange. We need to find innovative solutions.
7- Youth	We need to transform agricultural land use. 70% of land is used by commercial agriculture that does not benefit the people.
8- Youth	Issue of education and information sharing was raised. The group felt that information and awareness sessions are required and critical
9- Youth	A concern about the low priority of climate change by politicians was voiced. The general focus is on poverty, unemployment and inequality.
10- Youth	As a citizenry we need to learn to save water. Problem is not water per sec but awareness. How do we create awareness? Maybe have ambassadors, going house to house to talk about leakages and how to conserve water. This has to some extent been implemented in Johannesburg. Perhaps the answer is training and holding community meetings.
11- Youth	Need to have awareness of the entire water cycle e.g. river systems. We should be using grey water for flushing toilets and irrigation.
12- Youth	We need better quality drinking water and we should have access to pristine water without chemicals and water that is not polluted.
13- Youth	Piping processes should be healthy, and infrastructure maintained. Currently the infrastructure is old. Often water pipes are placed next to sewerage pipes and there may be leaks which results in health hazards
14- Youth	participants felt that awareness relates only to those households living in rural communities and informal settlements as they have been rationing water use for a long time and have been using rainwater
15- Youth	A culture of entitlement has emerged where people expect not to pay for water and protest when they are asked to pay. There was a sense that those who are advantaged and have access to water misuse the system and then refuse to pay. Thus, we need to look at issues of entitlement and responsibility.
16- Youth	Need to ensure that the wealthy are not simply able to opt out and continue to waste.
17- Youth	Need to trace the source of pollution and make sure that the most vulnerable are protected. Ownership must be by people and by government who must enforce laws to protect the environment for the people.
18- Youth	The polluter has to pay, and this principle must be enforced by government.
19- Youth	We need to address the inequality in the allocation of water. There has historically been a bias to agriculture – need to introduce smart agriculture. Need to get industry to toe the line.
20- Youth	Need to look at ways of balancing old ways with technology. Difficulty with changing culture. Borehole water depends on area where the water is being sourced. In Gauteng, water collects impurities on its way to the Vaal. Need to promote the use of storm and rainwater in Gauteng.
Community Meetings	
1- Mpumalanga Community	Mining leads to really bad air quality, due to dust from the blasting, disposal (coal dumps) and the transportation of coal, and due to smoke from spontaneous combustion in mines This really poor air quality makes people really sick. Also growing crops and subsistence agriculture is also affected by mines with regard to the dust they rain down on the surrounding community.
2- Mpumalanga Community	Mines affect the water quality and use a lot of water. This makes people sick and people don't have access to municipal water. People rely on dirty, polluted streams and boreholes.

	Water gets dirty because mines use chemicals which get into water which causes sickness and disease.
3- Mpumalanga Community	The families who live in areas where there is mining cannot themselves get jobs in the mines. The air localised around mines and power stations is so bad for people's health that they do not pass the health tests required to work in the mines. Ironically, it's the very people who should be benefitting from jobs due to their proximity to mines who are precluded
4- Mpumalanga Community	Coal industry has destroyed the Highveld. The big push for investment in the SA economy biases toward big businesses and away from people. Migrant workers come in, get a local address and a job at local mines which disadvantages locals.
5- Mpumalanga Community	Electricity prices were too expensive, so that even if they had access, they could not afford electricity
6- Mpumalanga Community	With the current price of electricity, the poor resort to cheaper alternatives such as firewood, paraffin and coal, as one Mpumalanga community member told: *"People then use dirty coal to supplement their energy needs*."
7- Mpumalanga community	Mines don't consult people around their projects or potential projects. There is also no information out there from mines around their activities so communities cant even try research issues. Also no one from mines will see community representatives to hear their issues.
8- Mpumalanga community	The healthcare available for communities is really bad and so people find it difficult to be treated. No emergency services for communities, people need to make it to a clinic before an ambulance picks them up for a hospital. Many communities are a long way from clinics and have to walk long distances for healthcare.
9- Mpumalanga community	Decisions weren't made taking into account communities and they were left out of decision making process (ie weren't consulted). There is a lack of info from mines but people also don't have access to their rights, and people don't know who to turn to if their rights are broke.
10- Mpumalanga community	Mpumalanga has been ravaged by mining. The mines destroy land that can be productive for a thousand years for the sake of ten good years.
11- Mpumalanga community	Agricultural employment may be one way to fix the current problem of jobs. Lots of abandoned mines which can be rehabilitated and then farmed on
12- Mpumalanga Community	Most of the land in Mpumalanga is under mining prospecting, which means communities are forced to concentrate as there is no space for people and no space for subsistence agriculture. People are then also pushed off prospecting land and have no one to turn to for assistance.
13- Mpumalanga Community	There is no access to information or leaders (governmental, municipal nor mining) so communities cannot take their gripes further. Also, indifference from leaders with community engagement
14- Mpumalanga community	The community are the ones who suffer when mines open, as well as when mines close. when mines close down PnP may as well close down too as money leaves the economy so no one goes to Pick n' Pay anymore.
15- Mpumalanga community	Active empowerment and involvement which may generate greater entrepreneurship for communities. Can be built into a curriculum which teaches the youth entrepreneurial skills and highlights the opportunities that are around them (eg recycling businesses utilising all the waste)
1- Eastern Cape community	Jobs are a big problem in the province. No one has jobs and the places which promise jobs like Coega end up giving the jobs to foreigners and not local people.
2- Eastern Cape community	Crime and SAPS. We have the challenge in the area where there are not police resources. People have to travel long distance to travel to the police station. We need community (Zwide) police station. We have many vulnerable areas because there aren't facilities for policing. Some community police areas there are no vans available and people are getting killed.
3- Eastern Cape community	Service delivery and municipalities. Communities struggle to go to the municipality offices. We are scared of going there and asking for help. We have lost this feeling where we put our civil servants there and they are there to serve us. There is a lot of poverty in Port Elizabeth, driving people to crime and drugs and young girls are getting pregnant. Solutions aren't easy because are hungry and there are no jobs. Government won't support our idea to promote renewable energy projects they want you to go to the councillor's office.
4- Eastern Cape community	Housing and settlement crisis. People don't have houses. Everybody in PE is waiting for a house but there is no land.

5- Eastern Cape community	We have a poor primary health care system and service. We had hoped we would be clear about the National Health insurance, but it is silent. In terms of service health care providers don't want to do their jobs. There is a movement to limit liability to medical negligence. Furthermore, we have facilities available to offer extended service to ensure that health services are available when needed.
6- Eastern Cape community	We spend sometimes R50 a day getting to and from work, and we only earn R150-R200.
7- Eastern Cape community	Education is inadequate. This 30% passing mark is killing our children. Our government poured money into schools, but they wanted the School Governing Bodies to control the money. Yet the SGBs don't have the training and knowledge required to manage the money properly. The advancement of students who fail twice regardless of if they earn it.
8- Eastern Cape Community	Electricity is too expensive for us to afford. Some suburbs even have meters and plug points but cannot buy electricity that lasts the whole month.
9- Eastern Cape Community	Government can create jobs building houses that use materials that don't use water, for example. And densify housing by building up. And sustainable housing.
10- Eastern Cape Community	Utilising solar panels for energy production and selling back to the grid, generating income and substituting energy use for the houses directly. And use rainwater for collection for rainwater harvesting.
1- North West Community	The vision is for an alternative economy in the NW that is socially beneficial, inclusive and environmentally friendly.
2- North West Community	There is agreement that the coal-fired power stations are destructive to communities and the environment and, cleaner energies are needed. There is room for government to assist communities' benefit from energy projects – like community owned renewable energy.
3- North West Community	Mines use all the electricity in the region. We can see the power lines but cannot access the power there.
4- North West Community	people feel that the government values the corporates more than people – there are tariff subsidies and tax rebates for large mines, but communities do not have access to electricity. The communities pay the cost of damage to the environment in terms of health, agriculture, cattle and fishing and property. When workers are retrenched, they cannot go back to agriculture as the natural capital is destroyed. Mines are not held accountable for the damage.
5- North West Community	The local municipalities need to play a bigger role in the transition – municipalities do not have a say in land-use as DMR issues the mining licences however municipalities have to deal with the in- migration/urbanisation challenges.
6- North West Community	People with disabilities and women are often overlooked. A suggestion was made that, the NPC should integrate the disabled people when implementing the National Development Programme and reviewing the NDP.
7- North West Community	Land is available for the construction of solar farms; however, chiefs are excluding communities in decision-making processes and from ownership.
8- North West Community	Air pollution as a result of dust from mining operation is a huge problem. Dust rehabilitation programmes and projects were proposed. There is a lack of community awareness about the impacts of dust and safety of water on their health were raised as major problems.
9- North West Community	Skills centres need to be established in poor communities in enabling community empowerment in the renewable energy space.
10- North West Community	Government has vested interests – they own shares in mining companies so there is a conflict of interest.
11- North West Community	The current economic system is deeply concerning. We need to ensure that the energy transition is not a repeat of the current capitalistic system where only foreign companies and the rich benefit.
Expert Views	
1- Energy Expert: Harald Winkler	Eskom faces debt of nearly R500 billion, which is so large that if it is not handled urgently will sink the ESI and quite possibly the country
2- Energy Expert	Zero carbon is ambitious, but possible. Rapid decarbonisation of electricity, combined with a shift to electric vehicles, can assume there will be breakthroughs in some of the process emissions by heavy industry (iron ore, chemicals, etc) 1. Industry and transports are tough. Some parts of industry, sure, but for heavy industry

	(e.g. iron and steel), it may take longer to take zero-emissions substitutes. Transport is difficult for different reason, so many players, from Transnet rail to taxi drivers in Khayelitsha. 2. Consider framing the challenge as a shift in economic structure, i.e. that more well-being is generated by less carbon-intensive sectors. That would mean less from primary sectors like mining (but still some in agriculture, due to employment multipliers) and more in tertiary sectors, mostly services. 3. Buildings probably possible – public, commercial and residential buildings Net zero is less ambitious, and relies on SA have a net sink. We probably due, recent studies, suggest about -20 Mt CO2-eq. We should aspire to zero carbon.
3- Energy Expert	ERC modelling shows that the "power sector contributes the largest mitigation effort, as discussed above – with fewer coal units operating overall and those that do run operating with lower load factors and result in an electricity carbon intensity of just 8g CO2eq/kWh by 2040 and zero by 2050". If storage technologies become affordable, SA can be net zero coal for electricity by 2040 (McCall, Burton, Marquard, Hartley, Ahjum, Ireland & Merven 2019).
4- Energy Expert	The NPC should engage with the Eskom task team regarding the use for blended finance, including climate finance, to support the unbundling of Eskom, in exchange for more ambitious mitigation targets (so would have to be zero carbon by 2050, and certainly for coal-fired power)
5- Energy Expert	Very important. Should establish a Jobs and Competitiveness Programme (JCP), funded by Treasury (on budget, can happen to be part of carbon tax revenue). An enabling provision to establish the JCP must be included in the Climate Change Bill to provide for recycling of revenues. It should through the JCP ensure a) assistance to poor households and b) transitional assistance for mitigation by energy-intensive firms, against agreed plans. Performance in implementing such plans should be subject to monitoring and evaluation (M&E), with future claw-backs depending on effective implementation of the agreed plans.
6- Energy Expert	In a carbon constrained world, there can be no new Coal-To-Liquid (CTL) plants in South Africa. My understanding is that Sasol has no plans to invest in new CTL in South Afrcia. So, the decision becomes about the future of Secunda, phasing out existing CTL and changing Sasol's business model. That is a special case and should be treated as such.
1- Sustainable Land Expert: Simon Nicks	Land productivity is measured by the difference between outputs and inputs. Production systems with low capital investments can be more productive than land productivity in situations of high capital investments. Small scale farmers are frequently much more productive per tonne produced than large commercial farms.

Pathway	Province	Discussion Point
Community owned electricity generation	Western Cape	1- Government should look into supporting worker cooperatives through policy, funding and capacity development so that communities can pull together to establish small scale renewable energy projects.
	Northern Cape	2- Energy is decentralised and community owned composed of an array of clean renewable energy technologies (solar, wind, hydro and waste biogas). Gas is used as a transitionary fuel away from coal. Alternative energy can be used to capacitate communities. 3- Communities need support to enable community-owned power generation. Skills need to be built and funding/access to finance is required. 4- Financial support of power generation - especially financial support for community owned power. Communities could then be empowered and mobilise themselves in order to manage renewable energy ownership. This will assist in alleviating the country's supply challenges, households would consume less as well as providing a means to add to supply.
	Mpumalanga	5- To adopt a renewable energy future that addresses poverty, unemployment and equality through the development of community-owned systems that are inclusive and support improved employment, mobility and health. 6- Community owned electrification projects using different funding models should be explored and piloted. Mechanisms to access money for capital and operational expenditure should be established. This could be done through stokvels, corporate sponsorship, etc.
	Eastern Cape	7- Decentralisation, circular energy economy – the decentralisation of the current industry can see South Africa transition away from one electricity supplier (Eskom) towards a more diverse, privatised energy industry with benefits accruing to local communities. This energy decentralisation could also facilitate a localised circular economy which is focussed on meeting the needs of people. 8- Community microgrids should be utilised throughout the country, built close to communities and run by communities. They can provide affordable electricity and allow many to escape energy poverty. 9- Community renewables – the creation of community owned renewable energy operations and enterprises in rural areas would allow these communities a means of power and possibly a means of income. 10- Solar panels at the household level. 11- There was an overarching vision for a decentralised, renewable intensive energy sector which would not only provide a healthier environment but also act as a potential source of income for small scale energy producers in communities. This vision was underpinned by a changed energy legislation which allowed Independent Power Producers (IPPs) to feed power to the grid. 12- Micro grids for communities eg Tsitsikamma wind farm. 13- For households - get solar panels and rainwater tanks per household, build households with ferrocement. This can aid in job production and allow households to become self-sustaining.
	North West	14- Households can benefit from generating their own energy. In particular, decentralised circular energy systems at a household level can decrease our waste and produce a source of energy at the same time. For example, in India almost every household is using their own biogas as fuel which is a game changer. 15- Energy decentralisation to local and community decentralisation 16- Priority stakeholders - Communities need to be empowered to implement community-owned renewable energy systems. Therefore, the financing of energy plans must be inclusive of communities. People need to be prioritised over businesses.
	Limpopo	17- Democratisation of energy would allow households to have the ability to generate their own energy needs and potentially feed energy back into the grid for income. This will free up supply from the larger electricity suppliers, as well as providing additional supply back into the grid. 18- Build capacity and resilience to ensure everyone is treated equally. Could be in terms of skills and resource provisioning. Government may need to come in and ensure solar is installed in each household for their energy needs, making sure everyone has energy availability, which would also then contribute to the breaking down of Eskom.
	Kwa-Zulu Natal	19- We should build energy systems based on socially owned renewables. They are the best option to provide sustainable, clean, useful energy which can help millions. These decentralised solutions also, once installation costs have been taken into account, provide essentially free power for these households.
	Free State	20- Decentralised energy should be part of generation portfolio, and these plants should be socially owned and create local jobs. 21- Agriculture and renewable energy provide an opportunity for providing jobs in rural areas. Government needs to support small scale initiatives.
Reskilling fossil fuel workers, building up SA's Renewable Energy capacity	Western Cape	22- It is important that we make workers aware of their realities in terms of the term expectancy of their work (coal workers), and what alternative options are available/possible. In this way, we empower them to make decisions about their own employment and how to upskill and improve their position. We need to push for skills transfer in mining concentrated areas such as Mpumalanga before they lose their jobs/while there is still time. 23- Government needs to create an enabling environment for RE to be manufactured locally by South Africans. The example of the proposed Atlantis Greentech SEZ was given. Unfortunately, SEZs are far away from where the jobs lost are. An important question was raised on whether, in a country with such a high unemployment rate and a carbon intensive economy, we should be concerned with protecting existing jobs of people or prioritising the creation of new jobs in a cleaner greener economy. 24- The South African government should conduct a skills audit, to understand where and how the opportunities exist for coal workers based on their current skills. After which there should be a large reskilling initiative to transfer coal jobs to climate jobs. 25- The country needs more technical colleges teaching technical renewable energy skills as renewable energy in particular can provide a sink for lost labour.

	Gauteng	26- We need to link education / universities to the new and growing industries that are emerging to ensure that skills that are developed among the youth match the emerging needs of business. Also shift the education system so that school leavers are fit for the low-carbon economy and inclusive for youth Manufacturing jobs - New industries and products in the 'green' sector need to emerge to create jobs. 27- We need to invest in building solar panels, wind farm components in this country.
	Northern Cape	28- Renewable energy technologies are locally manufactured 29- Skills development or re-skilling is required during the transition. This needs to take place along the entire value chain of the current energy sector. All sectors need to plan for job losses and plan how they can absorb those jobs in addition to creating jobs. This is critical and urgent – at the moment the country does not have a plan and we cannot repeat what happened to Welkom.
	Mpumalanga	30- Communities need to be empowered so that they can pursue entrepreneurial opportunities in the renewable energy sector. Training needs to be provided and SMEs need to be encouraged and supported.
	Eastern Cape	31- Reskilling of current labour, especially for those at risk of losing their jobs 32- Renewable energy creates opportunities for upskilling workers for new, clean jobs as well as providing additional job creation. 33- Create jobs in the renewable energy sector which will help with pollution problems and rural development 34- Up skilling and reskilling – people should be skilled and reskilled to work in renewable energy. For instance, the labour union members who work in fossil fuel-based industry could be retrained in renewable energy, helping protect their jobs.
	North West	35- Renewable energy can provide a means of job creation throughout the country. Particularly if the linkages and value chains are developed throughout the renewable space which can foster growth and wealth creation.
	Limpopo	36- Explore skills development to promote training and up-skilling. Also, miners can be reskilled and taught how to rehabilitate the environment, starting with abandoned mines.
	Kwa-Zulu Natal	37- Upscaling of jobs- creating an enabling environment so that those in fossil fuel industry can work in Renewable Energy or other sectors.
	Free State	38- Skilling and reskilling - The reskilling of workers in energy-intensive industries needs to start now, so that they can obtain employment in jobs that rely on renewable energy and energy efficiency.
Affordability of Electricity	Western Cape	39- Energy poverty, which is the lack of access to affordable energy is on the rise throughout the country. Middle- and high-income households install off the grid options to become more energy efficient, which has a negative effect on municipalities who distribute energy as their ability to cross-subsidise electricity dwindles, leading to decreasing revenue. Eskom's monopolistic hold on the ESI allows them to charge the prices they decide and even when they don't provide the power people cannot easily turn to an alternative.
	Northern Cape	40- Our vision is for energy to be affordable in the country.
	Mpumalanga	41- Universal energy access - The province needs to firstly provide sufficient energy to meet basic household energy needs. One way of doing this is by using cheap gas from North (Mozambique). Once universal access has been achieved then the province can look at exporting energy to the rest of the country. Sufficient amounts of Free Basic Electricity (FBE) should also be accessible to indigent households.
	North West	42- Financing of energy plants must be inclusive of the communities so they can benefit.
	Limpopo	43- Affordable energy – currently many people do not qualify for indigent electricity, but then cannot afford the electricity prices themselves and thus are stuck without power. These criteria needs to be reviewed, but also if there was affordable energy then it wouldn't be a problem. There is also an opportunity here for the buy in of traditional leaders.
	Free State	44- Energy must be affordable and accessible, and the free basic electricity allocation should reach all indigent households. 45- We need a competitive and open market, that at the same time ensures that energy costs are affordable and there is universal access.
Renewable Energy	Western Cape	46- Renewable energy is a definite must in the Just Transition. The country firstly has high levels of solar radiation (compared to say Europe) as well as constant wind thanks to an extensive coastline. We don't need coal power anymore, the technology now exists to capture the natural energy of resources, which have so may upsides and much fewer downsides than coal power.
	Gauteng	47- There should be an emphasis to decarbonise the energy sector using solar and wind power. This should not include nuclear, as although it may be clean energy it is too costly for the country to invest in, particularly when renewables are cheaper. 48- A decentralised energy system- energy mix is crucial for the country going forward to decrease GHG emissions and increase sustainability, as well as providing a means for equality. 49- A regional biomass energy strategy to be created, that considers our water scarcity
	Northern Cape	50- Smart technologies, Renewable Energy and waste conversion into biogas. 51- There is an opportunity for South Africa to be a pioneer in renewable energy given the vast untapped natural resources. 52- Solar in the Northern Cape is a huge opportunity for the local economy. 53- Locals can be trained and become specialists in the renewable energy field. 54- Municipalities should also be able to generate their own clean energy.

		55- Renewable energy is an important opportunity for the province but needs to be optimised.
	Mpumalanga	56- To adopt a renewable energy future that addresses poverty, unemployment and equality through the development of community-owned systems that are inclusive and support improved employment, mobility and health. 57- Infrastructure ready -Mpumalanga should make use of solar energy through large and small-scale distributed energy systems. Solar radiation in Mpumalanga is approximately 10% less than other areas of the country such as the Northern Cape, but it is still high. Further the transmission infrastructure is already in place, so less funding is needed to connect solar farms. 58- Land should be used for solar and wind farms as they provide cheaper power than coal and are cheaper to install.
	Eastern Cape	59- that the country has been blessed with great mineral wealth and that ignoring that would hinder our potential development. 60- Development of renewable energy – renewable energy is becoming cheaper than coal-fired energy which can enable South Africa to be a carbon neutral country – potentially even carbon negative as it transitions away from fossil fuels. So, it also makes no sense to strive for extremely expensive nuclear power. This shift toward the cheaper renewable energy could also provide the opportunity for energy prices in South Africa to fall, which would convince people of the low carbon transition.
	North West	61- South Africa could be an energy superpower on the continent. If we focus on our advantages in renewable energy, we have the potential to become a powerhouse on the African continent. 62- We should still make us of coal fired power stations, especially the latest ones else they are just a waste. 63- Renewable energy production – the province has high solar resources which could be utilised to produce electricity for the country. Mining companies can also invest in clean renewable energies and reduce their dependence on the grid.
	Limpopo	64- Although renewable energy is the end solution, we should not turn our backs on coal as then the millions spent on coal power stations would be wasted. We should use coal till all coal power stations are decommissioned naturally. 65- Solar energy is regarded as a solution to Limpopo's energy crisis
	Kwa-Zulu Natal	66- The Vision is that municipalities are no longer dependent on Eskom and they are free to produce own energy that is free from emissions. 67- Increase the Renewable Energy percentage currently utilised to achieve zero / no pollution from energy generation. 68- Enhancing policy environment to promote RE and reduce dependence on fossil fuels. This will help grow the investment in renewable energy, specifically wind and solar, and stop the investment in coal for power. There is huge scope for increased rollout of renewable energy based on South Africa's natural conditions which must be taken advantage of and energy can be nearly constant.
	Free State	69- Energy must be sustainable. Zero emissions by 2050 using zero carbon technologies. This technology is getting cheaper and the possibilities of scaling up investment are increasing, meaning South Africa can develop a strong renewable energy sector which then can create strong horizontal linkages, perhaps even throughout SADC, as we can then teach other countries how to grow their own renewable energy investments/ sectors.
Densification for cities	Western Cape	70- Urban sprawl is a great challenge for many cities in the country. It forces people outwards, away from where the majority of jobs are as well as increasing their travel times to work. If a proper densification plan was implemented the space around cities for housing would not need to be so extensive, allowing more people to move closer to cities.
	Gauteng	71- Mitigate urban sprawl using densification to cut down on congestion from outlying settlements. Also, the air pollution from outlying settlements is a huge issue for peoples health, particularly in winter, which is driven by a lack of electrification in these settlements. Denser living can provide greater access to electricity, or at least better insulation to prevent this problem.
	Northern Cape	72- Cities in the future should be sustainable, self-reliant and densified.
	Mpumalanga	73- Alternate housing – High rise densification is an option for housing as it allows greater concentration of people on a smaller amount of land, leaving more land available for utilisation such as agriculture. Also, this housing requires construction, which provides a means of job creation.
	Eastern Cape	74- South Africa suffers from massive urban sprawl problems. People are pushed to the peripheries of cities which perpetuates many issues around inequality in the country. For instance they have to travel further and pay more for transport, their homes are smaller, they have to deal with more pollution and less services. These are the people who can least afford these hardships. 75- Affordable housing close to economic centres – People live far away from work which means that they incur high travel costs but also have to use transport to get to their work, bringing people closer to jobs limits both these things. 76- Education of people about the benefits of higher density living so we can transfer to a carbon free state. People aren't educated or aware around this kind of living, wanting to live on a plot of land with a garden, etc. We need to change this behaviour and mentality as vertical living must be the future.
	North West	77- Urbanisation. Deviated from the IDP model, people are exploiting land and developing on land horizontally rather than vertically. In studies it's said that the higher concentration of people per square km ie high densification the easier it is to provide public services. Should focus on vertical and horizontal.

		Business/developers should be convinced to invest in vertical urban planning which is much more efficient for society and the delivery of services, but less profitable for the developers. 78- There is no sustainability if you don't apply the principle of vertical integration. Worldwide tendency (especially South African) to grow out, but it's much more efficient to develop vertically. The flatter you go the more money there needs to be, ie more sewage, more roads, more pipes, more electricity. Thus businesses have sunken interests in flattening the production. Need to preserve environment and specific functions and not flatten everything out. 79- Not just developed countries like Germany have done this, countries like China and such are developing this way. It provides more space for activities that land can be used for, such as wildlife, energy, agri, etc. 80- Densifying living settlements is key. At the moment many people lack access to services as hospitals, fire stations etc cant cover the area effectively. Getting more people onto fewer square kilometres will mean more people are served by hospitals, etc.
	Kwa-Zulu Natal	81- We should implement planned densification to mitigate urban sprawl, with planned conservation areas and planned rural development. 82- The densification of our cities must be green, but it can offer a means of employment for workers.
Rehabilitate Land	Western Cape	83- Mining reclamation and the rehabilitation of damaged land can provide jobs, also will rehabilitate land for productive use. 84- There are 8000 derelict mines, of which only 1 is rehabilitated. They should be rehabilitated, by law. Also, mining companies should have to pay money into a rehabilitation fund at the beginning of the mining operations, which is then added to proportionally based on sales so that even if the mine is not successful the land can be rehabilitated.
	Northern Cape	85- Invest in land rehabilitation programmes is needed. The costs of rehabilitating land is very expensive and only companies with a lot of capital will go about it (which rules out small scale use of that land). Hence investment from government or big business is needed to get land fixed.
	Mpumalanga	86- Opportunities for rehabilitating land – Polluted land can be rejuvenated and rehabilitated which would allow it to be reusable – allowing unproductive land to become productive. For instance, turning an abandoned mine into a solar farm or livestock farm.
	North West	87- Density, ownership, better define the issue of sustainability with regard to mines, land rehabilitation for land use Water affairs. Compliance is the issue not the licensing. Vigorously rehabilitation of already destroyed land. Land needs to be remediated using the documentation that already exists, enforce and rigidly punish the detractors. 88- The mining sector needs to take responsibility – mines do not adhere to environmental regulations leading to environmental destruction. Mines need to act responsibility and rehabilitate mines upon closure. 89- Implementing rehabilitation and conservation of our land. Lots of the land we have is destroyed and can be reused if it is rehabilitated.
	KwaZulu-Natal	90- Rehabilitative and restorative measures should be monitored and enforced for all exploration, mining etc. Mines need to clean up areas they polluted.
	Free State	91- Resilience in mining is needed together with proper social facilitation, rehabilitation strategies and implementation plans. Additionally, licences and approvals should require that a fund be established at the outset (development stage) of the development to ensure that rehabilitation can occur. Often mining companies claim bankruptcy at the end of mine lifespans so most mines are not rehabilitated. 92- Mining rehabilitation can address the problem of acid mine drainage.
Small scale/ Dencentralsed Agriculture	Western Cape	93- Small scale agriculture should be the way forward for the country's food production. 94- Promote small scale agriculture through a ministry of small farmers who can then bring together all of the issues from policy, supply chain, training and other needs. Also the promotion of urban agriculture in cities should be pushed up the agenda.
	Northern Cape	95- We are a food secured society but still embrace and support small scale farmers. Increase household & urban farming.
	Eastern Cape	96- Regenerative agriculture – go back to small settlements where we had control over everything – eat from our gardens, own water, etc. provided what we need. Wealth distribution, community action, collective partnership/ community voice.
	Limpopo	97- Agricultural sectors being implemented in the rural areas. 98- Each family has their own garden and can produce their own food for their family 99- Rural areas need a plan to implement projects to farm to reduce poverty. So DOA and other stakeholders can approach communities and local leaders to implement projects to promote income generation.
	Free Stats	100- Agriculture and renewable energy provide an opportunity for providing jobs in rural areas. Government needs to support small scale initiatives.
Sustainable use of land	Western Cape	101- We must focus on growing, consuming and using local food. Currently we export out best produce and also focus on growing cash crops which often need extreme amounts of water. Rather we should ensure we grow local, indigenous food which will be better for the land and better for local growth. 102- Promote local food options as a means of low carbon development. Local food is fresher and healthier, and less transport of food means a reduction in South Africa's carbon footprint

	Gauteng	103- Fertile land should be prioritised over destructive and harmful practises for short term gain. 104-
	Northern Cape	105- Farmers should grow appropriate crop/livestock for that area i.e. does not place a heavy burden on the environment. 106– (vision) Future farms are well managed and overgrazing is a thing of the past. Farmers shift to a low-carbon and water-wise production. Alien plant species which put pressure on the environment are eradicated. 107- There should be an emphasis on incentivising good land use practices. The incentives exist for destructive practices so incentives for sustainable land use are needed to balance out the destructive incentives. 108- Support climate smart agriculture.
	Mpumalanga	109- 110- Prioritising the preservation of soil – Soil needs to be preserved. Much of the land in Mpumalanga is under prospecting and mining rights – but mining destroys topsoil which cannot be remade.
	Eastern Cape	111- New agricultural technology and foods – opportunity to develop new agricultural technologies and foods which are more efficient and allow us to feed more people per square kilometre of land. Also to realise certain foods are not efficient in our agricultural mix in terms of water or land required to grow and so should not be focussed on. 112- Resilient crops – what are the crops we want to grow. We need resilient crops, not crops like macadamia nuts which require so much water. We need to decide on what crops we want to produce and they should be the most efficient crops.
	Limpopo	113- The use of pesticides is bad for the environment. So, we see organic farming as key to the future to move forward. 114- Balance between planting and harvesting. This includes ensuring local use of culturally significant plants and resources. 115- Sustainable integrated models that is Afrocentric approach to land use rather than a Eurocentric approach. 116- Indigenous trees and plants should be utilised and grown throughout the country, for instance on rehabilitated land, to increase carbon sequestration
	KwaZulu-Natal	117- Rectify poor farming and skill communities to grow nutritious food and do so ethically. Also teach them about the ecosystems to allow eco-tourism businesses to flourish. 118- Reduce meat consumption as cattle farming is a large contributor to GHG emissions and responsible for land destruction.
Responsible resource consumption	Western Cape	119- Urban use of land is problematic as people are living or moving onto wetlands and other areas that damage ecosystems and promote people living in unhealthy places as there is the prospect of living and working in the city. 120- Citizens should be made aware of and live within the available resources. This will allow consumption patterns to shift and behaviours to align with sustainable practices.
	Northern Cape	121- We are all responsible citizens who practice responsible resource consumption. In this, citizens create zero waste 122- The conservation of biodiversity and an economy which supports biodiversity. This will have benefits for the environment and can in turn aid the economy. Also biodiversity products can be used for medicine which can aid humans.
	Mpumalanga	123- Efficiency in land use - Whatever opportunities there are for land, it should be done so properly so that land is used efficiently. For instance, land more suitable for forestry should not be allocated to residential developers. Clarity also needs to be given around who has particular roles for land – political spheres confuse the system as confusion arises between landowners and the promises given by government 124- Land should be used sustainably – Land use for short term gains may lead to long term challenges – clear example is mining. Rather, land can be used sustainably which has much greater long-term payoffs, although the immediate value may be lower.
	Eastern Cape	125- Prioritise ecosystems – there is an opportunity to enforce and increase accountability in terms of South Africa's existing legislation. This would allow ecosystems to be prioritised economically. At the same time there is an opportunity to prioritise ecosystems mentally with the population, albeit with a caveat: many people are desperate in South Africa and they cannot prioritise the environment as they are trying to survive. 126- We should update our diets. Less meat, less cash crops. We need to realise that although we can enjoy food, we cannot always have everything that we want – we need to consume food responsibly.
	North West	127- Mining is destructive in nature. The amendments made to the NDPRDA are unethical. Many mines operate without water licenses, partly due to the government failure to enforce and regulate and the backlog in getting through the red tape. Also huge in terms of energy use and air pollution. Should be empowering the local communities rather in terms of business alternatives. They should start to respect human rights and the constitution rather than just trying to line their pockets. Maybe shut them down until they can be ethical/ until the Government have put a policy in place as they perpetuate and propagate human and environmental rights violations. 128- Invest and protect the rich biodiversity for tourism and wildlife economy

		129- The natural environment and available agricultural land should take precedence over human development. 130- Land use and zoning - New mining licences should not be granted until there is clarity on climate policies and plans. There should be a focus on vertically designed and densified cities to allow more space for agriculture and nature preservation.
	Limpopo	131- We have limited land fill sites and if we don't initiate zero waste, we won't have the land available. Initiate zero waste to reduce number of land fill sights. 132- Government needs to provide legislative guidance to ensure milestones towards 100 per cent organic farming. Policy alignment in terms of environmental management, including waste and preservation and conservation. 133- Ethical and sustainable implementation stick by the book.
	Kwa-Zulu Natal	134- Protect land from big corporation who want to conduct development in areas that protect not only humans but also animals in nature. 135- Forests and ecosystems must generally be protected in terms of holistic natural resource management 136- Take an integrated approach to understanding climate response: land, water, cultural resources, animals are all integrated and need to be seen holistically. 137- Ensure agriculture is being ecologically sound (perma-culture) 138- Divert organic waste away from landfill 139- Our wellbeing is dependent on healthy flourishing ecosystems 140- Detoxify the damaged land to create a healthy eco system
Climate centred education	Gauteng	141- We need to link education / universities to the new and growing industries that are emerging to ensure that skills that are developed among the youth match the emerging needs of business. Also shift the education system so that school leavers are fit for the low-carbon economy and inclusive for youth The education system needs a vision to ensure a relevant and skilled workforce is developed that meets the needs of new industries and emerging green economy jobs. This requires increased investment, including a focus on primary education and ensuring talented teachers. A mother-tongue policy should be developed. Furthermore, young talent should be identified and empowered early Upskill and expand the education system, with a clear focus on early primary education in native languages that includes arts and crafts (to promote skills and talent in arts to promote those skills).
	Northern Cape	142- Communities are well informed around the environmental impacts of everyday activities Education on sustainability and the environment should start at school level, and an environmental consciousness needs to be fostered. 143- Include climate awareness in school curriculums, implemented by schools, government, civil society.
	Mpumalanga	144- Educate and empower the youth and provide training and skills that are relevant for future jobs 145- Education – communities need to be educated and brought into the climate change discussion. Also, communities and in particular the youth need to be educated about how to use land effectively and learn how to grow food for themselves and for the economy. There could be an introduction of agriculture into the schools as either a subject or extra mural so that interest can be built up in land preservation and agriculture which may help grow the youth.
	Eastern Cape	146- Education and the fostering of more climate sensitive habits 147- Adult education – there is a need for adults in communities to be educated about climate change and how it can affect them. Also, room for them to be taught about small scale energy production and other opportunities which can arise from the just transition.
	North West	148- Education and awareness – government needs to educate rural communities on sustainable land management practices 149- Rural development is not doing its job in educating people about land use and things people can do with their land. For instance, people don't know that they can stop land development with intravenous documents/ data. The people are not taught about it and so cannot use it, which keeps them disempowered.
	Limpopo	150- Have a strong education and awareness campaign around land use and climate change, alongside a capable state.
	Kwa-Zulu Natal	151- Agriculture is taught to youth and valued. 152- Increase community awareness and education so that they better understand climate change, the threat of climate change and what the future holds. 153- Improve climate communications- promote accessibility of climate science.
	Free State	154- Utilise existing higher education institutions to train people for skills required for the future and to identify potential economic areas of growth and innovation. 155- Capacity building and training should be a continuous process in municipalities, COGTA and other bodies at provincial and national level. 156- We need to start skilling and reskilling people now. Our education system needs to adapt to train people to become problem solvers rather than equip them with a specific skill. This will enable workers to easily migrate to other sectors. It is difficult to train learners with skills if we don't know what skills will be needed in the future.
Community involvement	Gauteng	157- Greater cooperation between civil society and government.
	Northern Cape	158- There is a disconnect between civil society and government. Civil society is not sufficiently engaged with to determine their needs the solutions that will work for them. Civil society is largely kept out of the

		decision-making process. On the other hand, government works very closely with big business, and yet they are responsible for the environmental challenges 159- There is misalignment around the implementation of policy between the three spheres of government.
	Mpumalanga	160- Community engagement - Involve communities that are most affected by closing power stations to participate and co-create plans for new energy. This will mitigate fear and pessimism associated with plant closure.
	Eastern Cape	161- Fund sufficiently driven community programmes – there needs to be a series of difficult dialogues at community level to spark changes in the current way of thinking. This requires sufficient funding and political will to help facilitate an understanding in communities about what climate change is, what it means, how they can become resilient, etc. 162- Empower through conversation – It is difficult to motivate and mobilise communities and people to change their bad habits or correct misinformation they believe. The enabling conditions for the empowerment of people's land use can be created through conversation though. Citizens are the most important stakeholders – they must be at the centre 163- Community action is needed.
	North West	164- Equitable land ownership. The same people who own land are not involved in the planning process, especially the development planning process. 165- Dep of rural development have done the study of land that is owned by government and land owned by private interests. Need to rethink about who owns the land in terms of JT 166- If there's not real ownership then there is no responsibility. If a company owns it land it doesn't really care about what happens. If an individual owns it though then they will care about the land and prevent its destruction. Underpinned in this is that South African's should own the land, not international companies. 167- Rezoning. Much of the agri land in SA is being rezoned for mining. This means we lose arable land. In the vision we need to indicate that the rezoning of land needs to stop so that we protect our current land spaces. 168- However rezoning is not necessarily bad. It's the re-zoners who need to be checked too – as they get swayed by the money of developers to develop on particular land. 169- A Just Transition needs to consult the people, else who is it trying to help? 170- Land ownership – land needs to be given back to communities and communities need to be empowered to manage that land and included in decision making processes. Land reform should not affect climate change negatively 171- The community representatives do not necessarily have the community's best interests at heart. There is thus a greater need for community consultation and need to be part of all the decisions which are made so that they can be made fairly for the communities. Proper engagement with actual community members – not with people who have vested interests. Also don't want a top down engagement once, want a constant collaboration process with information flowing both ways. Inclusive planning – Government should create platforms for improved stakeholder and community participation. Communities need to be empowered to take on big business on a levelled playing field. 172- All affected parties including community are key. Consultation is currently the problem, so need greater engagement and stuff between all players which makes everyone key. 173- All stakeholders from executive management to local level, including traditional leaders 174- Collaborative planning is key in the Just Transition process.
	Limpopo	175- Ensure integrated planning, including government, traditional authorities and private sector, and stakeholder engagements 176- Traditional leaders must be incorporated into the service delivery process. Currently the municipalities do not consult traditional leaders with regard to public service delivery, which means that they are not hearing the voices from the ground and as such often do not provide adequate services. If there was consultation, then there could be better service delivery as municipalities would know where to allocate resources. 177- Relate well with traditional authorities 178- Engage fully with all stakeholders. Present evidence and obtain feedback and identify negotiations which need to occur. 179- Promote indigenous knowledge on water management and learn from it.
	Kwa-Zulu Natal	180- Bottom-up, community-led processes to address concerns, e.g. water 181- Dialogue to discuss real solutions with government to support community members to enable them to properly express their rights 182- Community involvement and community-based planning is crucial for the Just Transition.
	Free State	183- The process must include proper consultation with communities. Consultations need to focus on understanding their priorities and allowing communities to propose solutions to their own problems. 184- There should be a social compact between government, business and labour on a just transition to ensure that mechanisms are put in place to for the vulnerable.
Political Issues	Western Cape	185- Current institutional arrangements were not adequately managing the complex and central issue of land use in the country 186- There is a need to have holistic focus when dealing with the complex issues and that institutions need to work collaboratively. There are currently fragmentations of the work happening between and within the various levels of government. 187- Silos, need for working together.

	Northern Cape	188- Review, implement and amend existing policies and develop new policies for good and sustainable land use policies.
	Mpumalanga	189- Sectors work in silos 190- Disconnect between policy and plans – Address the current disconnect between policy and plans. For instance we have international policies based on reducing carbon emissions and yet locally we have more plans for coal mining – this is a clear disconnect. 191- Disconnect between policies – Policies also currently clash between themselves. For instance DMR has policies for extra coal mining but then the environmental department has policies for less mining, this need to be sorted out as soon as possible so departments "sing off the same sheet". Conflicting mandates in government – The Department of Mineral Resources (DMR) has a mandate to promote mineral extraction but it is also responsible for preserving the environment which is a clear conflict. Should the mandate for the protection of the environment be given to another department such as DEA or DWA? Government departments need to also hold each other accountable and work together.
	Eastern Cape	192- Alignment of government in planning – the Municipal Planning Act facilitates the consideration of all levels of government, which feeds the IDP. Yet there is no integration or alignment in the IDP of these plans which leads to an unbalanced budget set out by the IDP. This could be fixed by integrating and aligning the spheres of government in this planning process. It will furthermore mean that national plans are reflected at an IDP level.
	North West	193- Need government to be on board. Government members are shareholders of the mines and so their decisions will be biased toward mining. Need to prevent government entities taking embedded positions in mines so that they can be influenced by the mining owners. No consultation with the communities in terms of EIA's. need the people who are benefitting into the room so that we can hold them to account to their face, they currently make the decisions far from locals and the locals have to live with the decisions they make with no way of letting them know their decisions are affecting them badly. 194- Need to stop working in silos and in isolation. Need to integrate our planning processes. 195- Political support for climate change and energy transition from government (political will) 196- Government is divided on mining vs land protection. Government needs to have a unified vision for land-use and the economy. 197- Government (at the highest level), the laws and the justice system and education around people's rights and the avenues they can turn to 198- The shift needs to happen urgently. Government should thus start acting immediately to create an enabling space for society at large to transition to cleaner energies and live in a sustainable manner. The transition is already happening but we are not prepared for it resulting in short term negative impacts - mines and coal powered stations are closing down; municipalities are facing revenue losses; the transmission and distribution grids are not ready for decentralised energy. 199- Political buy-in – there is poor political buy-in to support climate change and the energy transition in a just way. There are many good plans that lay unimplemented due to changes in ministers etc. 200- Make sure the things we are saying are acted upon. The collaboration is right and the engagement is taken seriously and continuously.
	Limpopo	201- Political buy in, the country relies on politicians to make things happen, so if there is no political buy in then projects will never succeed. 202- Development happens in silos - there is no interaction with policies between policies. For instance communities will be relocated into various areas - but people will be settled on land that could be used for farming or is dangerous to the community. Moreover resettling communities often leads to environmental degradation (such as debushing) which is obviously against for instance the DEA 203- There's also a need to get political buy in, which is difficult when people in positions for the short term and thus don't focus on long term goals.
	Free State	204- The three spheres of government need to improve their coordination. 205- The NDP needs to be institutionalised throughout all three levels of government. 206- National, provincial and local government – need synergies and alignment and coordination 207- NDP targets must be aligned with the 5-year plans of government and targets need to form part of the agreements with the new ministers. 208- Political heads and respective stakeholders. 209- Building capacity within government – government officials are not sufficiently skilled to manage policy and infrastructure relating to water adequately.
Decentralised water resource management	Western Cape	210- Communal water supply options. Eg. A water supply scheme whereby the community cleans out the water source for their own use 211- Improved water rights for small scale farmers who are currently crowded out of water resources by large commercial farms.
	Northern Cape	212- Decentralised water ownership.
	Mpumalanga	213- Devolution of water management to local government – small municipalities in the province need to be capacitated and empowered to manage water resources, water supply as well as demand side management to better control water in their areas. Coordination between national, provincial and local government is imperative for successful implementation.

		214- Community protection of water assets – communities should be made aware of the important part of water preservation such that they also play a strong role in protecting streams, wetlands etc. Each community should become custodians of local water assets and can participate in an 'adopt a stream' programme.
	Eastern Cape	215- Strategic implementation of policy – South Africa has decent water laws and policies, but they are not used strategically. In order to strategically manage these policies there needs to be integration between national, provincial and municipal government. On top of this, current water allocation must be managed so that water resources are allowed to regenerate. Catchment Management Agencies can be decentralised and linked into municipalities such that catchment strategies are incorporated into the IDP. 216- Community based natural resources based management—we need the people themselves to enforce this
	KwaZulu-Natal	217- Develop and implement training to those on the ground e.g. TOT of community members who are then responsible for training other members of their community. 218- In ground water tanks, JoJo tanks provided where appropriate 219- Community ownership of water and water sustainability solutions 220- Community involvement and community based planning 221- Communities are in control of their own water consumption.
Behavioural/ Societal Change	Western Cape	222- People should be made aware of and live within the available resources 223- Need to change mentality around water use. Many people act like water is unlimited and need to realise that it is not.
	Gauteng	224- A public consciousness about climate change needs to be developed.
	Northern Cape	225- Changed human behaviour so that we consume water responsibly and water conservation becomes a way of life 226- Only grey water is flushed down toilets. 227- Changed behaviour, responsible water consumption, conservation mentality. 228- Dissemination of information / campaigns / education.
	Mpumalanga	229- Mind shift – Currently agriculture is not thought well of in comparison to mining. In essence people, especially youth in communities see miners and they all have more money and flashy clothes whilst farmers are seen as poor. There needs to be a mind shift so that people realise that agriculture is also a good working profession. Agriculture doesn't only have to be seen of only in terms of being a farm worker on a large farm – there are many successful small farmers who feed into the economy.
	Eastern Cape	230- Shifting mindsets – there are opportunities for land but they require people to start thinking differently about land, waste and diet. For instance compostable toilets for waste can be used for small scale agriculture or gardening. Also people can be taught that small scale farming in their garden is viable. There is also an opportunity to decolonising the South African diet, which is currently unsustainable and putting a great burden on agricultural infrastructure. 231- Education and the fostering of more climate sensitive habits 232- Education on water scarcity – people need to be made aware about water scarcity and the challenges it poses. This will help society to become more sensitive to their water wastage. 233- Implement awareness programs to educate people on 1) the benefits of going green 2) help create employment within the green space
	Limpopo	234- Create awareness at household level about water re-use opportunities. This includes the use of grey water for toilets and gardens, rainwater harvesting for household use. 235- Water re-use strategies should be employed. Change the mentality of just throwing away water when its been used. 236- Increase education about water use and management 237- Individuals need to be responsible citizens, not overuse water, not use illegal connections and pay if they can afford it
	Kwa-Zulu Natal	238- Water is everybody's responsibility to conserve 239- Education on water conservation, change mindsets 240- Education and public campaign on water conservation, particularly the youth **education of people on how to appropriately build capacity for people to be subsistence farmers as well as learn to trade through agroecology
	Free State	241- There is insufficient water use awareness. Redefine our culture and value systems - embrace a culture of one that is caring and peaceful and environmentally conscious.
Waste Water Harvesting	Western Cape	242- Wastewater treatments plants in SA do not have the capability of removing numerous chemicals that are endocrine disrupting, thus causing havoc on fish populations.
	Northern Cape	243- Circular economy approach to managing water 244- Reclaiming & decontaminating water 245- Waste water management
	Eastern Cape	246- Water treatment and transmission infrastructure – there is currently inadequate water treatment infrastructure, which needs significant investment to be able to cope with the demands placed on it. Also, over forty percent of treated water is wasted throughout the province due to leakages. This is unacceptably high and existing water transmissions need upgrading and investment so that less water is needlessly wasted.

		247- Upgrading water management – climate change has implications for water resources. Higher overall temperatures will result in decreased water quality and increased evaporation from dams and rivers. Also, there is likely to be more erratic rainfall and drought. As such there needs to be an upgrading in how the country and the Eastern Cape view and operate water management. There is currently no water reuse in the Eastern Cape which is an opportunity for saving water. Also, there is an opportunity for the regulation of daily water use to limit demand. Additionally, there is an opportunity for rainwater harvesting to become part of the Eastern Cape's water plan. 248- We as humans are the ones responsible. We are surrounded by water. It is a must that we recycle the water. If we are responsibility water will not be a scarce resource. 249- Biggest polluters are municipalities- inadequate wastewater treatment is the biggest problem.
	North West	250- Polluters need to be held accountable.
	Limpopo	251- Water re-use strategies should be employed. A roll out plan which impacts on how people think about water and create an awareness that water can be reused. 252- Invest in wastewater treatment facilitated to ensure we don't pollute the water we do have.
	KwaZulu-Natal	253- Re-use water and Utilise grey water, non-potable water when appropriate 254- Sewage and waste treatment is an important priority 255- Use non-potable water for agriculture; separate drinking water processes from other uses to conserve water.
Nexus approach to water	Western Cape	256- Land use and land rights have significant impact on the access and distribution of water. Land use also impacts the surrounding ecosystem, including water, agriculture and livelihoods. There is no regulation to protect water from the abuse of land use, which needs to change. 257- Housing must be built in water efficient ways in the same way that energy efficiency was integrated into house building in the past. There is currently no regulation to ensure this happens
	Gauteng	258- Land-water nexus. South Africa is a water-scarce country. Water allocation can make any piece of land useless, so you must look at land-use and water together. Currently governance structures for land and water don't work together 259- A regional biomass energy strategy to be created, that considers our water scarcity
	Northern Cape	260- Decontamination of water especially in the mining sector who are currently not managing acid mine drainage properly.
	Mpumalanga	261- Holistic approaches are required - water cannot be looked at in isolation but should be integrated with land-use, energy in an equitable way that drives social change. Therefore, government departments need to align their goals, collaborate and coordinate in a much stronger way. 262- Technological solutions offer solutions to the water crisis– There are several opportunities to use sustainable technologies e.g. industrial effluents should be treated and recycled on-site using renewable energy powered technologies. Wastewater treatment plants should utilise biogas digesters to treat water while producing clean biogas for use within its own operations. Agriculture can irrigate through smart climate friendly methods.
	Eastern Cape	263- Projects need to be co-created and co-implemented between departments which both have impacts on water. For instance awarding mining licenses should be overseen by the DMR as well as the DWS – so that the sake of water is taken into account in all planning. Further, departments should not work in isolation as far as resources are concerned due to the impacts resources have on each other. 264- Better monitoring of agriculture – much of the available water in the Eastern Cape is allocated to agriculture. However, the allocation is very poorly monitored and over users are not punished.
	North West	265- The private sector (mines and agriculture) use a significant quantity of water. A lot of the outputs are for export.
	Limpopo	266- Decrease de-forestation (lead to reforestation), which will lessen soil erosion 267- Farmers – use water within their quotas.
	KwaZulu-Natal	268- Transition to agroecology to reduce the amount of water by agriculture sector.
	Free State	269- There needs to an acknowledgement of the nexus between water, land use and energy.
Fairness in water use	Western Cape	270 The government needs an integrated plan which considers the human impact on the environment, and the long-term effects of this damage on economic sectors, and human lives (For instance, water pollution has severely impacted the fisheries sector resulting in unprofitable and unsustainable operations, and health of consumers). The current approach is to act symptomatically rather than systematically.
	Mpumalanga	271- Good governance and accountability – Government needs to enforce the numerous water acts and bylaws. For instance, there is no enforcement of water treatment and disposal. Closure plans need to include rehabilitation. Public wastewater treatment facilities should also adhere to blue drop green drop standards to prevent biological contamination of rivers. The Catchment Management Act and company Social and Labour Plans need to be clear, transparent and be enforced. Civil society needs to hold government accountable.
	Eastern Cape	272- Pro-poor policies – the poorest communities are the most vulnerable to water scarcity. These communities should be cared for the most in terms of policy so that their interests are looked after. 273- Focus on fairness – everyone has a right to water access. At the moment though, water is polluted upstream which affects downstream usage. Many local communities also don't have access to municipal water and thus rely on natural water resources, which is unfair in and of itself, but none of the upstream

		polluters care for the water which affects these users. If downstream users were considered and catered for there would be less upstream pollution. 274-
	North West	275- Need to prioritise the rural communities and areas 276- Prioritise water such that it is used sustainably, economically and fairly.
	Limpopo	277- Sufficient potable water for all households. 278- Government needs to enforce strict use of water so that there is more water for those who need it the most and cannot fight for it.
	KwaZulu-Natal	279- Clean water available to all 280- Inclusive platform, includes rural areas 281- Ensure there is enough infrastructure to provide water for everybody (e.g. dams), in a way that is not detrimental to the environment and eco-systems 282- Just policies in terms of local versus international allowances for fishing need to be established and enforced
	Free State	283- Vulnerable people need to have access to clean water to enable people to live productive and healthy lives. 284- Water needs to be distributed equitably. Commercial farms get the favourable allocations, leaving little or no usable water for smaller farms.
Source-to-Sea	Northern Cape	285- All source water is protected, and we have vibrant ecosystems.
	Eastern Cape	286- We must look after the ocean – the ocean is the Eastern Cape's largest water resource but is not managed or looked after. The five different authorities who rely on the sea (transport, fishing, wildlife, tourism and technology) yet don't work together – which affects the resource as a whole.
	North West	287- Healthy water resources (rivers and dams) 288- Human demands should not take priority over the needs of the natural environment. Wetlands need to be conserved and protected 289- Begin protecting wetlands and water ecosystems 290- Put the function of providing water in the hands of province and not the municipality
	Limpopo	291- Natural water catchment areas need to be rehabilitated, protected and managed 292- Establish catchment management agencies
	Kwa-Zulu Natal	293- Water is required for food and for human consumption 294- Ensure sustainability of wetlands to promote healthy ecosystem 295- We need to think about the sea / oceans when we are thinking about water because it has major impacts, particularly big business exploration should not be allowed as it contributes to climate change and then has further
	Free State	296- The provision of water needs to be looked at in a holistic way. A systems approach to water needs to be adopted, looking at water from all sources and matching it for different purposes (potable vs non-potable water).
Enforcement of water laws	Western Cape	297- There is inadequate enforcement of water treatment or of waste water disposal. This has resulted in the rivers becoming so polluted that they cannot filter out all the waste, which ends up in oceans. There are no consequences for this for polluters but big ones for people. 298- Improved and enforced water legislation at local government level. Also a greater and stricter use of water meters to penalise the abuse of water.
	Eastern Cape	299- Start enforcing international water standards – There are international standards that protect the environment and water resources. There is an opportunity to make these standards a prerequisite for any sector utilising water resources so that there is a focus on sustainability with the natural resources. Along with this would be to enforce these standards adequately and monitor and issue corrective penalties as needed.
	North West	300- Verification and validation (proper issuing and enforcement of water licenses, proper billing) 301- Enforcement of laws and regulations
	Limpopo	302- Regulations and their enforcement with regards to compliance of ground water. Also intensify the regulation around water use. 303- Law enforcement around water management and use, political and administrative leadership must ensure control and compliance
	KwaZulu-Natal	304- Increased monitoring and enforcing existing policies as without them water is abused. Our wetlands and coasts are bearing the brunt of human pollution which affects fish which we rely on, as well as impacting on nutrient levels in dams and such which have major impacts on humans.
	Free State	305- Apply pre-paid metres and fully enforce water conservation regulations, which may include water shut-offs for extremely high-water users.
Green economy	Western Cape	306- Government needs to create an enabling environment for Renewable energy to be manufactured locally by South Africans. The example of the proposed Atlantis Greentech SEZ was given. Unfortunately, SEZs are far away from where the jobs lost are. An important question was raised on whether, in a country with such a high unemployment rate and a carbon intensive economy, we should be concerned with protecting existing jobs of people or prioritising the creation of new jobs in a cleaner greener economy. 307- It is important that we make workers aware of their realities in terms of the term expectancy of their work (coal workers), and what alternative options are available/possible. In this way, we empower them to

		make decisions about their own employment and how to upskill and improve their position. We need to push for skills transfer in mining concentrated areas such as Mpumalanga before they lose their jobs/while there is still time. 308- The potential exists for South Africa to have a future competitive advantage in renewable energy development (installation, manufacturing and maintenance) as the country could export renewable energy parts, at least into the rest of Africa.
	Gauteng	309- Manufacturing jobs - New industries and products in the 'green' sector need to emerge to create jobs. We need to invest in building solar panels, wind farm components in this country.
	Northern Cape	310- Solar in the Northern Cape is a huge opportunity for the local economy as locals can be trained in and become specialists in the renewable energy field.
	Eastern Cape	311- Renewable Energy creates opportunities for upskilling jobs 312- Create jobs in the renewable energy sector which will help with pollution problems and rural development
	North West	313- Attracting labour to manufacturing of renewable energy infrastructure using existing mining infrastructure. 314- Recycling and reuse. Making use of the circular green economy. For instance, instead of just throwing tyres away a company can make use of the tyre as an input, which firstly creates jobs but also minimises waste
	KwaZulu-Natal	315- Development of green economy, through tourism and land given back to communities who don't know how to profit / gain from the land. Areas of sufficient land can be brought into the green economy for tourism. This includes providing education and training to people in the communities to ensure they gain from the green economy.
	Free State	316- Agriculture and renewable energy provide an opportunity for providing jobs in rural areas. Government needs to support small scale initiatives. 317- Old mining towns can be revitalised by attracting industries involved in the green economy. These industries could capitalise on existing infrastructure. Towns in the Free State are also centrally positioned and can easily link to green economic opportunities in Gauteng and other neighbouring provinces. The Free State could become an innovation hub for the just transition through the reuse of mining towns in this way.
Unbundling/ Creation of a more competitive energy market	Gauteng	318- One vested interest has all the power and thus the system has become unbalanced
	Northern Cape	319- The energy sector needs unbundling. Eskom should manage transmission only and the country should make space for private energy generation and wheeling
	Mpumalanga	320- Eskom's role in the Just Transition should be defined. The unbundling of Eskom may open up opportunities for smaller businesses to enter the generation space, however it is not clear how these changes will impact access to energy and energy prices. Further, Eskom should be involved in the renewable energy sector working in partnership with the local government and communities.
	Eastern Cape	321- The unbundling of Eskom – this could allow the energy production system to be democratised and allow privatisation in generation and distribution, creating power bidding which could facilitate a decrease in the price of energy. 322- Change the current energy legislation – the current legislation does not allow the implementation of any sort of energy market. Thus, the government and municipalities will have to liberalise and change current legislation and energy policies to create an enabling policy framework. This is needed to allow smaller generators into the market. For instance, a change in Independent Power Producer (IPP) legislation – such as a feed in tariff – could allow small scale energy producers (especially renewable energy) to find a foot in the market.
	North West	323- Meaningful public participation – public engagement needs to be strengthened. All stakeholders need to be part of making big decisions. This applies to the process of unbundling of Eskom which impacts the entire country not just the entity.
	Limpopo	324- Allow IPPs to enter the energy space, immediately 325- Breakdown monopolies, e.g. ESKOM, immediately