

SNAPFI STUDY

*Policy approaches
to guide finance flows
for more effective
climate action
in South Africa*

South Africa

JULY 2021



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Johannesburg city centre
by Jacques Nel



CHAPTER ONE —————>

Introduction

Finance is essential in order to implement effective climate action. The climate crisis requires urgent action from all countries, in both mitigation and adaptation. With the global average temperature having already increased to 1.2 °C above pre-industrial levels in 2020,¹ some impacts of climate change are already being felt, and more impacts will become unavoidable. In parts of South Africa, the average temperature has been increasing at more than twice the global rate over the past fifty years (Wolski 2019; Engelbrecht et al. 2015). Mitigation in the country is a major challenge, given the high dependence on coal for electricity and liquid fuel supply. Phasing out coal more rapidly must address social justice for adversely affected workers and communities – as part of a just transition to net zero.

A just transition requires transition finance as a component of finance for climate action – to protect the adequacy of energy supply and to mitigate negative economic, employment and social impacts during transition – supporting both an accelerated phasing-out of coal and development that sustains livelihoods in affected regions like Mpumalanga (Winkler et al. 2020a; Meridian Economics 2020a) (see section 3.3.3).

International climate finance under Article 9 of the Paris Agreement can play a critical role in support of just transitions. The Paris Agreement includes in its global aims ‘making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development’ (UNFCCC 2015: Article 2.1c). Article 2 presents the purpose of the Agreement, including finance flows, whereas Article 9 is the operational provision on how finance is to be provided and mobilised to assist developing countries to access financial markets in order to make just transitions, and not focus exclusively on domestic flows but include international climate finance.

Yet the policy is crucial context to funding climate action. Human and institutional capacity is vital for guiding finance flows towards desired outcomes – both development objectives and climate goals.

In this context, this paper aims to contribute to a better understanding of ways to increase the quantity of international and domestic finance for climate action and shift the direction of investment in South Africa. In pursuing this aim, it reviews government approaches to public funding and the little that is known about private sector flows. The work is located in the literature, specifically building on previous studies of the climate finance landscape. The primary audience for this paper is decision-makers in South Africa, notably the finance community and government policy-makers. The paper might also be of interest to the international development and climate finance communities.

The aim of the paper can be rephrased as a question: How can policy increase the scale and influence the direction of finance flows?

1 World Meteorological Organisation – <https://public.wmo.int/en/media/press-release/2020-track-be-one-of-three-warmest-years-record>

In order to achieve the aim and address this broader question, the following research questions are identified:

- › What are the finance needs in South Africa for climate action? In other words, what is to be financed for adaptation and mitigation?
- › What instruments in a public policy 'tool-kit' can increase the scale and shift finance to enable more effective climate action?
- › How can broader policy interventions enable this shift? (By policies is meant public sector interventions, institutions, governance and other enabling conditions; not only formal government policy). What is the role of building human and institutional capacity to guide finance flows for climate action?
- › How could South Africa track progress in finance for climate action, both international finance received and domestic investments?

The scope of the paper has South Africa as its geographical focus, examining finance flows at the national scale and considering international dimensions only where relevant to the country. We consider public and private finance, though it will be observed that more information is available on the former than the latter. Our scope in relation to policy is broad, as signalled in a question above; we consider broad government policy instruments across national departments and local government, a finance and fiscal 'tool-kit', the governance and institutional landscape that enable and direct finance flows, and policies that can guide investments in development of human and institutional capacity to be within our scope. Information is important, though we examine tracking progress relatively briefly.

We use mixed methods (Tashakkori 2007), both qualitative and quantitative. The paper presents a case study (Noor 2008) of finance flows in South Africa, with much qualitative analysis. It builds on existing literature and policy analysis (see section 2). A narrative literature review is undertaken,² appropriate to exploring multiple complex and emerging issues, to inform sections 4 and 5. A literature search was conducted for 'climate finance' and 'South Africa' on Scopus, the comprehensive research abstract database, which yielded 13 articles, the earliest from 2011. This was complemented by our own knowledge of largely non-peer-reviewed literature by South African authors (only three of the Scopus results were not international). This information was supplemented by targeted interviews, in some instances, which are referred to in the paper. In relation to quantitative analysis, no financial or other modelling was undertaken for this paper, but it includes quantitative data in mapping flows and presenting information on financial needs (drawing on existing modelling).

² This review is narrative, rather than a systematic literature review or meta-analysis, as explained by Sovacool et al. (2018), who suggest that a narrative literature review is appropriate for exploratory research with multiple dimensions and research questions, and in situations where resources are more limited than those required for systematic literature reviews, as is the case here.

The research design seeks to achieve the paper's aim through these methods. Section 2 looks at context and background, and section 3 turns to estimates of finance needs for mitigation and adaptation, and mapping of existing finance flows. Section 4 examines broader policies, actors and governance, and financial instruments. Section 5 explores policy coherence and coordination, and section 6 draws conclusions.



CHAPTER TWO —————>

Context and background: finance flows to SA

South Africa's development pathway has in the past supported high-emissions growth, notably through investment in fossil fuels, and now, despite attempt to green the Covid-19 recovery, investments in fossil fuels exceed those in clean energy (SEI et al. 2020a). Patterns of investment in industry, power generation, mining, and urbanisation have negatively affected water quality and social resilience (Ashton et al. 2008). Shifting to a low-carbon and climate-resilient pathway as part of a just transition requires understanding of the socio-economic context. This section briefly outlines the socio-economic context of development and climate action in South Africa, before turning to government's approach to financing a sustainable economy, including climate finance. It then considers private finance for climate action, and information gaps in that regard. A narrative review of the literature on the climate finance landscape in South Africa concludes this section.

2.1 The South African context

More than a quarter of a century after the formal end of apartheid in 1994, South Africa continues to struggle with the 'triple challenge' of unemployment, poverty and inequality. At the same time, the development pathway has continued to be emissions-intensive, primarily due to an energy economy dominated by coal.

Covid-19 has exacerbated stresses on the country. The official unemployment rate was 29% prior to the pandemic, and had increased to 32.5% by the fourth quarter of 2020 (that is, after the impacts of the first wave of the pandemic and some initial recovery), though it was 42.6% by an expanded definition that includes discouraged work-seekers (StatsSA 2021). While employment rebounded as some who lost employment due to COVID returned to work in late 2020, unemployment still increased by 28 000 in the fourth quarter – and by year-end, the number of unemployed people in South Africa is 7.2 million (ibid). This is a challenging context in which to undertake ambitious climate policy. South Africa faces development-climate challenges. And government has been considering how to finance a sustainable economy.

2.2 What is 'Paris-compatible' finance?

Since the adoption of the Paris Agreement in 2015, many things have been called 'Paris-compatible'. Often the term is narrowed to the temperature goal. The relevant question for this case study is: What is 'Paris-compatible' finance? There are proposed answers and no agreed definition (Rydge 2020; UK 2019; OECD 2019), but it is argued here that the term should include the aim relating to finance flows, the provision of finance by developed countries under existing obligations under the Convention (UNFCCC 2015a: Art 9.1), scaling up from the floor set by the long-term goal on finance, and transparent reporting on finance – mandatory for developed and voluntarily by developing countries, as well as indicating potential provision of climate finance in Article 9.5.

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The Paris Agreement reaffirms the continued obligations of developed countries to provide finance to developing countries for both mitigation and adaptation (Art 9.1), while encouraging other Parties to provide support voluntarily (Art 9.2). However, the Convention obligations were not quantified to specific amounts, though in the Copenhagen Accord developed countries came to a political agreement to jointly mobilise USD 100 billion per year starting in 2020. A long-term goal on finance (LTG-F) is established in Article 9.3 of the Paris Agreement, with the specific value of USD 100 billion per year as the 'floor' to be mobilised by developed countries specified in the Paris decision, paragraph 53 (UNFCCC 2015b). A new, higher number for the LTG-F is currently under negotiation and to be set prior to 2025.

What level of international climate finance should be contributed by individual developed countries to be 'Paris-compatible'? Presumably this would mean a fair share of the goal for developed countries collectively, set in the LTG-F. Research related to Article 2.1(c) of the Paris Agreement should consider international and domestic flows of finance. Mitigation and adaptation are reflected in relation to low emissions and climate-resilient development. And since the language of 'mobilising' is used, this implies that not all finance is 'provided' by developed countries as grants, but may be leveraged from other sources, including from the private sector. Unlike the Convention, the Paris Agreement contains no list of countries in an Annex; the term 'developed countries' is used extensively but is not defined. Nor are the 'other Parties' encouraged to provide finance in Article 9.2 identified in a list. Some authors have argued that Paris allows for 'self-differentiation' (Mbeva and Pauw 2016). However, for Article 9, Article 9.1 qualifies 'developed countries' as continuing 'their existing obligations under the Convention', which effectively provides a link back to the Convention's Annex II, for 'developed countries' and others.

Transparent reporting on finance for climate action is important. Opinions as to whether the USD 100 billion per year has been achieved or not differ among studies and their assumptions about what finance counts, so that 'indeterminacy and questionable claims make it impossible to know if developed nations have delivered' (Roberts et al. 2021). At the individual country level, reporting on the provision and mobilisation of finance is mandatory for developed countries (Article 9.7), voluntary for 'others', and voluntary for finance needed and received by developing countries (see section 4.2.4).

Last but not least, finance relates to equity. There is no basis in the Paris Agreement for allocating individual shares of the collective goal to countries, and in addition, if there were, whether or not a developed country has contributed a fair share is difficult to know if the total amounts are indeterminate. However, there are established means for assessed contributions to funds, and for equitable burden-sharing and transfers of finance within the European Union (Egli and Stünzi 2019), and the general principles of the Paris Agreement ‘implemented to reflect equity’ are supportive of the concept of an equitable contribution. It is thus doubly difficult to hold developed countries to account, due to both the lack of comparability of information provided on support and the lack of a quantified goal for each country.

Additionally, the collective goal of USD 100 billion, initial proposed in Copenhagen in 2009, is not set to increase until 2025. By contrast, the temperature goal of the Paris Agreement went significantly beyond previous goals, and the pressure since the UNFCCC Secretariat’s NDC synthesis paper, and the release of the IPCC’s Special Report for all countries to increase mitigation ambition, and to aspire to reach net zero emissions by 2050, has not been accompanied by any increase in the collective goal. Considering developing countries, and being mindful of the South African context, is it fair to expect developing countries to increase ambition in mitigation targets in NDC without additional financial support? (at the time of writing – June 2021 – the update of the first NDC was in draft form, with government undertaking public consultations³). In the same vein, the country has committed to ‘ultimately moving towards a goal of net zero carbon emissions by 2050’ in its low-emissions development strategy (LEDS) (RSA 2020), and implementation of just transition pathways towards this goal will require support, including transition finance (Meridian Economics 2020b; Winkler et al. 2020a).

Since this case study focuses on South Africa, we elaborate a little further on the question of how the country could track progress in finance for climate action, without attempting a definitive answer. From research and interviews conducted for this case study, it appears there is relatively more information available on public than private finance. There is significant pressure for companies to disclose their climate-related risk to returns (TCFD 2017). The assumption is that disclosing risks leads to clearer identification and inclusion of risk in the valuation of assets and decision-making, which may in turn make less attractive those investments that drive emissions or increase climate vulnerability. The hypothesis that more disclosure leads to more climate action is as yet unproven and should be tested empirically.

3 https://www.environment.gov.za/event/deptactivity/cop26indc_stakeholderconsultations

2.3 Transition finance needed to support an accelerated phasing out of coal, and improve social justice

In the South African context, the implications for financing just transitions should be considered, including cases of companies or state-owned enterprises whose balance sheets are dominated by fossil fuel assets. The national electricity utility, Eskom, is a case in point, with a fleet of ageing coal-fired power stations and at the same time a high level of debt (Winkler et al. 2020a: see also sections 4.2.2 and 4.2.3). The inherent debt levels and credit ratings of South African public and private players are a primary inhibitor of investment. Yet Eskom has established a just transition office and made public its commitment: the 2021 State of the Nation address stated that 'Eskom, our largest greenhouse gas emitter, has committed in principle to net zero emission by 2050 and to increase its renewable capacity' (Ramaphosa 2021). The Integrated Resource Plan has a schedule for decommissioning coal, and Eskom is planning the shut-down, repurposing and repowering of coal-fired power plants (DMRE 2019).

What is transition finance? There is an emerging literature on transition finance in the context of climate change and low-carbon transitions (Caldecott 2020; Bodnar et al. 2020; Kessler et al. 2019; Semieniuk et al. 2020; Naidoo 2019). Systemically, a literature review found mainly literature from the global North (Carley and Konisky 2020). The focus is more on private sectors actors, with less attention given to state-owned enterprises (such as Eskom in South Africa and public sector undertakings in India (Chandra 2018)). It seems that the literature engages insufficiently with the core issues of sustainable development in the global South, and that more attention is needed to address extreme unemployment, abject poverty, and high levels of inequality. South Africa's triple challenge is unemployment, poverty and inequality. In such contexts, transition finance must support social justice (Hall et al. 2018). The present report seeks to add to that focus, though its contribution also remains limited, and more research is needed. Questions deserving further attention including understanding the cost of social finance (or finance for specific social plans, e.g. by Eskom), the sources of funding in the context of limited fiscal space faced by the sovereign, and important finance-architectural details.

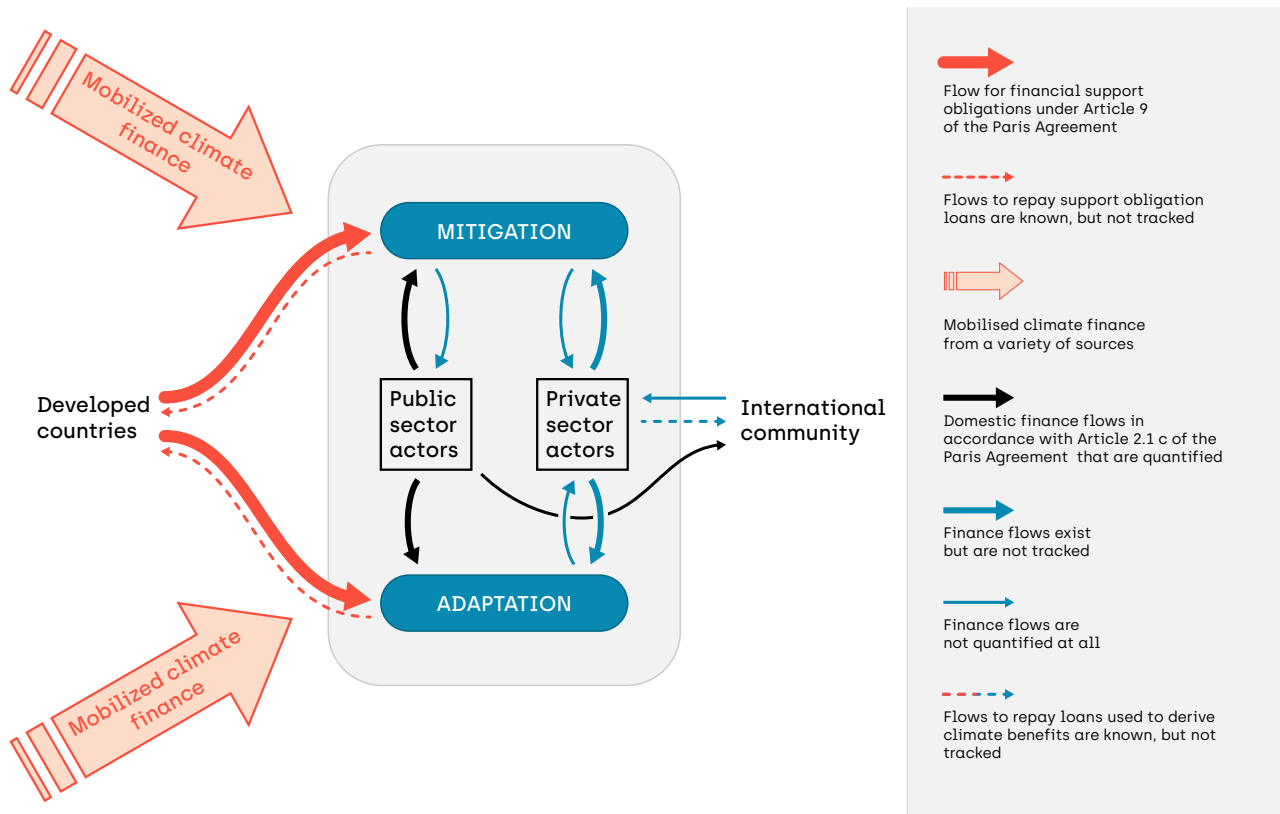
The position taken here is that transition finance should support companies, not exclude them from capital markets, if they accelerate the phasing-out of coal and support a just transition practically. Given Eskom's high debt, climate finance could enable access to such markets. Dealing with debt and cost of capital is a fundamental challenge for international climate finance, as is forex risk hedging. Even if a 1% interest rate can be secured, when hedged this might result in a total cost of capital in the region of 6–7%, which local finance institutions can raise through their retail funds.

A low emission energy development pathway for Eskom, which contributes to the mitigation targets in the NDC and the LEDS, is 'Paris-compatible' and consistent with our interpretation of Article 2.1(c) – 'making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.' (UNFCCC 2015: Article 2.1(c)). It requires finance to be provided, consistent with Article 9.3 – taking the lead in mobilising climate finances from a variety of sources, taking into consideration the needs and priorities of developing countries – and it represents a progression beyond previous efforts by developed countries.

Figure 1 illustrates how various elements are related, in this conceptualisation. Financial support provided by developed countries under their financial obligations under Article 9.1 is part of international climate finance. Developed countries also should take the lead in mobilising international climate finance from a variety of sources (Article 9.3). Some of the finance flows from developed countries flow through multilateral institutions, so through part of the international community (not shown as an arrow in Figure 1). There are also other international flows, shown distinctly. The right-hand side shows domestic flows of finance, again both public and private. All of these flows are to be consistent with climate-resilient and low-emission development, under Article 2.1(c).

FIGURE 1

Conceptual overview of international climate finance as support provided and mobilised by developed countries, and other finance flows, including domestic public and private investment, and levels of data certainty



The systems for accounting for multilateral financial obligations, and how countries report on domestic flows, are very different. Under the enhanced transparency framework, reporting on finance provided by developed countries is mandatory and subject to technical expert review; reporting on finance needed and received by developing countries is voluntary and not reviewed. The assumption is that transparency will drive progressive ambition, although this relationship is yet to be empirically tested (Weikmans et al. 2020). Developed countries have consistently indicated they will report ex post, whereas reporting on finance ex ante (under Article 9.5) is highly contested. From this case study, it has also emerged that much more is known in South Africa about public funds, whereas systems to gather information on private finance flows are much less mature.

2.4 Government approach to financing sustainable economy

The government departments in charge of finance (National Treasury) and climate change (Department of Environment, Forestry and Fisheries) published a technical paper that aims to define sustainable finance (adopted here as framing our working definition), take stock of global and national finance sectors, identify barriers and risks, and fill gaps in the regulatory framework (Treasury and DEFF 2020). Government's approach indicates that significant shifts in finance are necessary, and the paper frames the challenge as a development and climate one: 'Addressing both climate change and South Africa's development agenda will require the reallocation of capital, the mobilisation of new financial resources and the strategic realignment of existing resources (public and private) over the short, medium and long term.' On the scale of value at risk, it notes that the 'Climate Policy Initiative estimated the South African economic transition risks at an aggregated R2tn (of which 60% has already been incurred). A further R362bn (USD25bn) may result from infrastructure investments currently being contemplated that may not be economically viable in a low-carbon transition.' (See also the CPI report, Buchner et al. (2017)). The technical paper is structured in a manner to address all financial institutions, proposing risk disclosure and a regulatory framework for good practice. (See section 4.2.1 for more detail).

2.4.1 Key financing areas or decision points that are relevant to fostering a resilient, inclusive, low-carbon economy path

In a presentation on LEDS for South Africa, Gcobisa Magazi, chairperson of a climate change working group in National Treasury, framed the challenge as ‘reorientation and restructuring of the economy towards a more sustainable development path using a combination of mechanisms’. She placed the analysis of key financing areas and decision points in the context of introducing regulatory drivers and fiscal instruments. The instrument might be changed in ‘intelligently applied fiscal reform through a mix of tax, expenditure, pricing and procurement policies, [to] facilitate a shift towards a new economic paradigm and improve accounting in economic activity for undervalued ecological goods and services’, and moving away from ‘over-reliance on finite, subsidised fossil fuels’ (Magazi 2019).

To bridge the financing gap, Magazi identifies the following: specifically tailored environmentally-related taxes that internalise externalities; financial support for provision of public goods; localisation of green technologies through public sector procurement, and alignment of spending on infrastructure and services with environment performance indicators; tax incentives and subsidies to encourage R&D in low carbon technologies; environmental financing policies to de-risk project finance; public private partnerships (especially for piloting); carbon market finance; international climate finance (for example, from the Green Climate Fund (GEF) or Global Climate Fund (GCF), bilateral and multilateral funding) and, conditionalities on some of the on-budget financial mechanisms (intergovernmental grants) to facilitate investment in the green economy: ‘municipal infrastructure grant, urban settlement development grant, electricity demand side management programme, regional bulk infrastructure grant, public transport infrastructure and systems grant, provincial and municipal disaster grant, municipal drought relief grant and manufacturing competitiveness enhancement programme, are but few examples.’ (Magazi 2019). Magazi proceeds to tabulate programmes focused on climate change and environment more generally (termed ‘complementary’), for major sectors and activities as shown in Table 1.

TABLE 1

Complementary climate change and environmentally related programmes, by sector

Sector	Initiative
Energy	<ul style="list-style-type: none"> › Renewable Energy Independent Power Producers Programme › Integrated national electrification programme › Energy Efficiency and Demand Side Management Programme - mainly solar water geysers › Designated national authority – Clean development mechanism › Manufacturing Competitiveness Enhancement Programme – grant for upgrading projects to encourage energy efficiency and cleaner production practices
Transport	<ul style="list-style-type: none"> › Public transport infrastructure and systems grant – bus rapid transit systems
Environment – natural resource management	<ul style="list-style-type: none"> › Working for Water – clearing alien invasive species › Working for Coasts – Promotes clean-up, rehabilitation and security of coastal environments and ecosystems › LandCare – community-based programme focusing on conservation and rehabilitation of soil, water and vegetation › Working on Fire – focuses on integrated fire management of veld and wildfires › Green Fund – grants funding to support green economy programmes › Air quality programmes
Biodiversity	<ul style="list-style-type: none"> › Biodiversity conservation and management (South African National Parks, South African National Biodiversity Institute and Isimangaliso Wetland Park Authority)
Disaster management	<ul style="list-style-type: none"> › Municipal disaster grant › Provincial disaster grant (Includes allocations from Departments of Transport, Human Settlements › Cooperative Governance and Traditional Affairs

Source: Presentation by Gcobisa Magazi (2019)

Most of the programmes listed in Table 1 are presented by sector, indicating a primarily sectoral logic. In addition, there is a focus on disaster management, which is an interesting activity in two senses. Firstly, it relates to adaptation, as disaster management would deal with adverse impacts of climate change. Secondly, the focus here is on local and provincial tiers of government, rather than sectoral. Further work might consider the integration of policy – across sectors and tiers of government.

A system for public sector climate budget tagging (see section 4.2.3) and a national green finance taxonomy (see section 4.2.1) are being developed (Treasury and DEFF 2020). Work on the taxonomy references the EU taxonomy, which has been developed since 2018 and is a tool to help investors determine whether an economic activity is environmentally sustainable. The EU Taxonomy Regulation identifies six environmental objectives: mitigation, adaptation, sustainable use of water and marine resources, transition to a circular economy, waste prevention and recycling, pollution prevention and control, and protection of healthy ecosystems (EU Parliament and Council 2020).

2.4.2 Working definition of climate finance

There is no generally agreed definition of climate finance. However, National Treasury and the Department of Forestry, Fisheries and the Environment (DFFE), previously the Department of Environment, Forestry and Fisheries (DEFF),⁴ in the above-mentioned technical paper adopted the following definition of sustainable finance in South Africa:

Sustainable finance encompasses financial models, products, markets and ethical practices to deliver resilience and long-term value in each of the economic, environmental and social aspects and thereby contributing to the delivery of the Sustainable Development Goals and climate resilience.

This is achieved when the financial sector: Evaluates portfolio as well as transaction-level environmental and social risk exposure and opportunities, using science based methodologies and best practice norms; links these to products, activities and capital allocations; maximises opportunities to mitigate risk and achieve benefits in each of the social and environmental and economic aspects; and contributes to the delivery of the Sustainable Development Goals.

(Treasury and DEFF, 2020: 16)

This broader concept of sustainable finance includes climate change, in that the Sustainable Development Goals (SDGs) include SDG 13 on climate action, including both adaptation and mitigation. Climate resilience is explicitly mentioned in the definition and is understood as an adaptation response. For the purposes of this paper, financial resources that support mitigation and adaptation are considered to be part of climate finance, without offering a formal definition. What needs to be financed is explored in sections 3.1 and 3.2 below. The working definition in this sub-section is that international climate finance under Article 9 would support transitioning to low-carbon and climate-resilient development. This includes finance provided by developed countries under Article 9.1 and mobilised under 9.3, which should support country-driven strategies and meet finance needs signaled by developing countries. International climate finance and other finance flows, domestic and international, public and private, should be consistent with low greenhouse gas emissions and climate-resilient development (Article 2.1(c)).

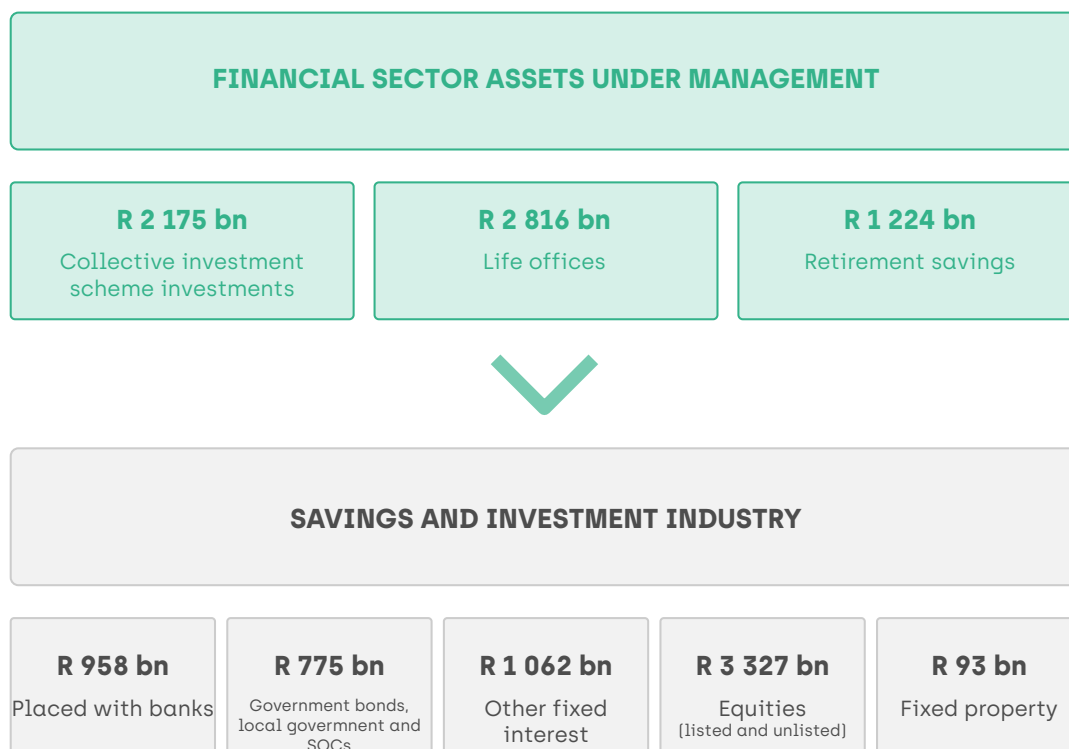
⁴ The Department changed its name to DFFE with effect from 1 April 2021; changing the sequence from DEFF. In 2019, there had been a merger of the Department of Environmental Affairs (DEA) with the forestry and fisheries components of the Department of Agriculture, Forestry and Fisheries. Up until ca 2009, tourism had been combined with environment, then Department of Environmental Affairs and Tourism (DEAT).

2.5 Private finance in South Africa

Public and development finance can serve as leverage to mobilise private finance (Naidoo 2011). However, there are also difficulties in accounting for private finance (Stadelmann et al. 2013), and the claims to leverage may lead to the same funds being counted multiple times. Partly this is due to political dimensions of accounting for the share of finance mobilised by developed countries (ibid). In the South African context, the literature suggests that there are significant gaps in knowledge about private finance for climate action. Early studies identified a key role for the domestic financial sector, recommending that government collaborate with local financial institutions to increase the scale of funding: ‘South Africa has to develop a strong, agile and resilient domestic financial sector that is increasingly aware of climate change and able to support investment in South Africa’s climate change response through financial innovation’ (Naidoo 2011). A self-description of the financial sector, its sources of financial assets and where investments are placed, is illustrated in Figure 2, which provides an overall context, and a sense of the scale of total value of assets within South Africa. The following discussion on private climate finance can thus be understood in the overall context.

FIGURE 2

Sources of financial assets and placement of investments



Source: ASISA drawing on SARB quarterly reports 31 December 2018, shown in Treasury and DEFF (2020)

2.5.1 Public policy guiding private finance

A case study analysis of publicly-mobilised private finance for climate action in South Africa between 2010 and 2015 investigated the mobilisation effect of public climate finance on private finance through an analysis and attribution of project-level co-finance data (McNicoll et al. 2017). A pilot methodology (the investor perspective) then expanded the analysis to also incorporate the mobilisation effect of financial support provided by South African policies in two sectors: renewable energy and energy efficiency. The study found that 64% of the USD 10.1 billion (ZAR 95.4 billion) that had been mobilised was motivated by domestic policy, suggesting that, in the South African context, domestic public actors can play the major mobilisation role by providing support through targeted policies, and – at least in the very context of the REI4P - to a lesser extent by committing project-level co-finance. While the results are context-specific, they nonetheless suggest that, within the earlier stages of a renewable energy technology maturity spectrum, public sector policy plays a role in building confidence for the private sector to move to de-risk finance in the energy sector.

2.5.2 Green Bonds

Green bonds, as an instrument to raise private finance for development and infrastructure that is low-carbon and climate-resilient, have entered public discussion and initial issuance. Ngwenya and Simatele have recently published papers on the emergence and unbundling of green bonds (Ngwenya and Simatele 2020a,b). The authors present case study experiences of green bonds in Kenya, Nigeria and South Africa, and conclude that the green bond market has the potential to increase on the continent. The first green bonds were offered by large municipalities: in 2014 the City of Johannesburg issued bonds to a value of ZAR 1.5 billion, with proceeds allocated to projects such as low-carbon transport and solar water heating for local residents (City of Johannesburg 2014 in Ngwenya and Simatele 2020a). In 2017, the City of Cape Town issued bonds valued at ZAR 1 billion, with proceeds allocated to water management, coastal structures and other projects in line with the city's climate change strategy (Climate Bonds Initiative 2017 in Ngwenya and Simatele 2020a).

The private sector also played a significant role; bond listings in South Africa rely exclusively on the privately-owned Johannesburg Stock Exchange (JSE), which in 2017 established its Green Bond segment with its own listing requirements (Nedbank 2019). The listing requirements have been subject to rounds of public comment and iterative development, but concerns have been aired about bias in favour of issuers and against investors (Constantatos 2020). The JSE reported a total of 11 green bond listings by the end of 2020 (JSE Limited 2021). Private sector green bond issuances have targeted mitigation benefits, for example the GrowthPoint Properties' 2018 ZAR 1 billion issuance allocated proceeds to energy efficiency and green office buildings (Growthpoint Properties 2018), and Nedbank's 2019 issuances worth ZAR 2.7 billion allocated proceeds to wind and solar energy projects (Nedbank 2019).

Regulation of green bonds could build credibility and support maturation of the market. Learning from their experience, Nedbank suggests that investor caution might be addressed by educating prospective investors about the product and investor mandates, and by appointing credible authorities for independent external party review and verification on the offering (Nedbank 2019). Independent external review is recommended by the International Capital Market Association to confirm the alignment of their green bonds with the 'green bond principles' (Dorfleitner et al. 2021). This mitigates risk of greenwashing or being used to finance non-green projects. External review could address concerns about refinancing. If green bonds were to be issued to refinance existing green bonds that had previously been financed by bonds, then the refinancing would not generate additional capital for climate action (Bongaerts and Schoenmaker 2019). In the case of Nedbank, it had to demonstrate additionality over a period of 1–2 years, for the reason that Nedbank was already active in renewable energy investment in South Africa (Carbon Trust 2020).

As yet, the primary function of green bonds is to raise funds for new initiatives. Arguably, there could be a market for private sector players packaging cash flows from de-risked green assets into stable cash flows for pension funds. This step in the evolution and maturity of the market would rely on sufficient project cash flows to enable the packaging, and governance in the finance sector – starting with the green finance taxonomy.

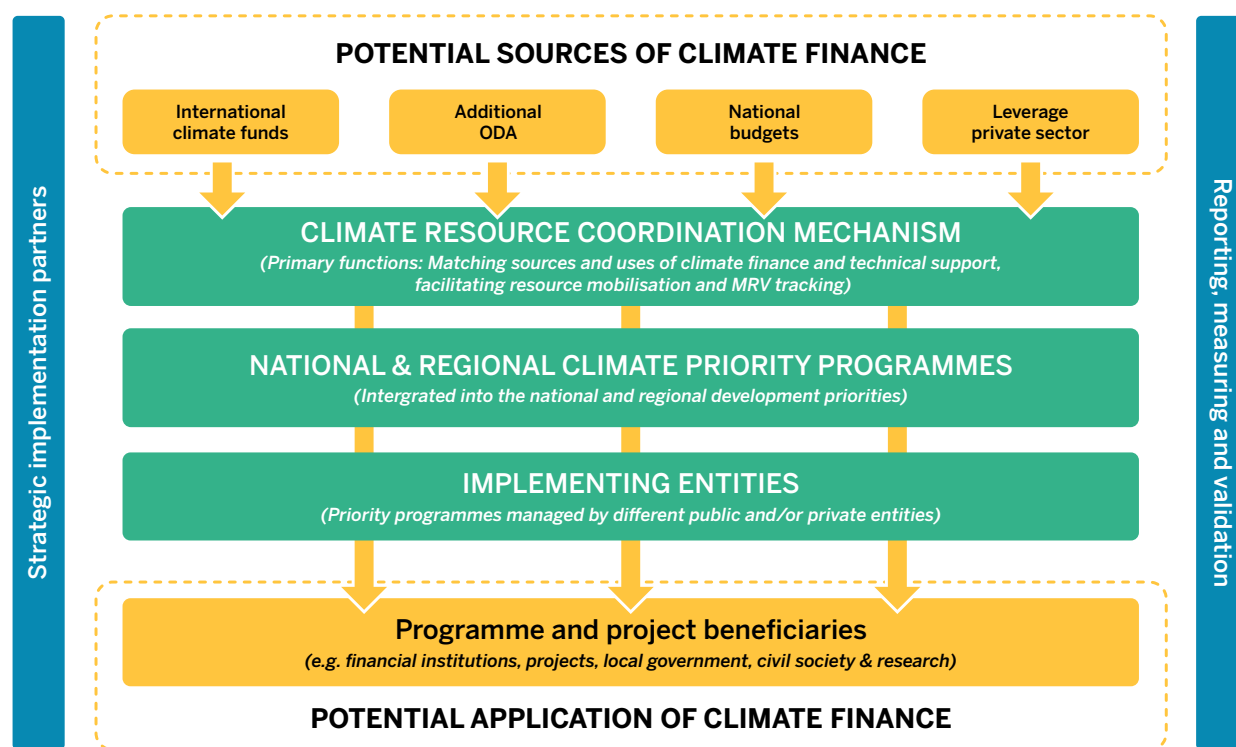
The Development Bank of Southern Africa (DBSA) launched its first green bond in January 2021, through a private placement with the French development institution, the Agence Française de Développement (AFD) (DBSA 2021a). In other words, the AFD is the sole investor in the DBSA's first issuance. The choice to make a private placement rather than a public listing is reportedly for benefits of certainty in the final pricing and in the size of the issue, with proceeds intended to refinance select renewable projects under the REI4P (Bisseker 2021). (Section 4.2.3 below provides information about the DBSA Green Bonds Framework).

2.6 Earlier studies on the climate finance landscape and how to influence it

South African researchers started analysis of the climate finance landscape a decade ago. Based on a narrative literature review (its methods explained in the Introduction), it was found that earlier studies focused on the 'climate finance landscape' – which has evolved significantly over the last 10 years – and how to influence flows of finance. In 2011, Naidoo found that 'significant resources are needed for scaled up action' on climate change, both mitigation and adaptation. The study also pointed to 'strong yet uncoordinated institutional frameworks' for climate finance flows. It aimed to 'perfect the diagnosis' on hurdles to climate finance, identify solutions to unlock investment in climate and green economy, and 'identify an appropriate institutional model' for climate finance flows. Naidoo's conceptualisation of flows from sources of climate finance to reach potential application in projects and programmes is shown in Figure 3 (Naidoo 2011). Each stakeholder within the climate finance system has a distinct role to play in supporting a cohesive climate finance framework. The figure also foregrounds the need for a coordination mechanism – in 2020, a Presidential Climate Commission was established (Presidency 2020). The two vertical bars emphasise the importance of partnerships (including with private finance, see section 2.5) and that measuring, reporting and verification can ensure quality of financial information, which in turn 'supports investment and risk decision making'.

FIGURE 3

Climate finance coordination prototypes as conceived earlier



Source: Naidoo (2011)

Montmasson-Clair (2013) built on the work by Naidoo, with a focus on tracking finance inflows to South Africa. He found that 'the fundamental challenges for robust tracking of climate finance lie at the nexus of political and technical issues. The articulation and cooperation between funders and receiving entities, to ensure that funding meets South Africa's requirements and priorities remain problematic and must be addressed'.

Petrie et al. (2018) focused on climate change governance and how funds flow from national and international sources to municipal governments in South Africa in relation to low-emission development and climate change mitigation and adaptation. They identified key climate finance mechanisms available to provincial and municipal governments, obstacles to accessing these funds, and institutional entry points that enable climate-specific investments and/or long-term infrastructure projects with climate co-benefits. They pointed out that the lack of a formal tracking system prevents keeping tally of climate finance investments and prevents systematic evaluation of climate finance impact, and reported that National Treasury's initial steps to establish a monitoring system stalled because of a lack of human resources.

GreenCape and the Bertha Institute have published a 'South African climate finance landscape 2020' (Cassim et al. 2021), applying a methodology developed by the Climate Policy Initiative for a global finance landscape (Buchner et al. 2017). Cassim and colleagues re-emphasised the need for finance to support an 'ambitious vision for 2030 ... towards a low-carbon, resilient economy', pointing out that this means a reduced dependency on high-carbon energy sources and non-renewable natural resources and social justice – the 'developmental imperatives of employment creation and reduction of poverty and inequality. They pointed to five sectors that need to grow – 'clean energy, low-carbon transport, smart water (supply and demand), circular economy and smart agriculture'. They suggested that financing and investments required 'to achieve South Africa's NDCs is R8.9 trillion over a 15-year timeframe (from 2015 to 2030)', which means an annual investment of R596 billion. This seems a high estimate, the 15-year total being larger than any of the figures in Figure 2 above. Further research is needed on costing just transitions to net zero CO₂. Initial work is being undertaken by the National Business Initiative, and energy-economic-environment modelling by a team at the University of Cape Town. Detailed financial analysis and costing deserves further research and attention in the public debate.



CHAPTER THREE —————>

Broad estimates of finance needs and finance support given

While the main focus of this case study is on policy interventions to shift finance flows, this needs to be understood in the context of the finance needs and the scale of international climate finance flowing into South Africa. Section 4.1 explores the enabling conditions to shift finance, while the present one first looks at broad estimates of finance needs for implementing the NDC, what the map of finance flows into the country looks like, and the status of tracking finance.

3.1 Estimates in first NDC

South Africa's first NDC⁵ provided some estimates of the incremental costs of achieving immediate climate-related objectives over the longer term, in a distinct support component or S-NDC (RSA 2016). A table listing the indicative cost estimates can be found in the longer input to this case study (Atteridge 2021). Drafted before Paris (as the INDC), it was assumed that the Agreement would deliver 'ambitious mitigation and adaptation commitments, enabled and supported by significant climate finance and investment, accessible and affordable technology and substantial capacity building commitments'. The 'Support component of the NDC' (S-NDC) outlined finance as a key challenge, and in that context stated that 'South Africa's S-INDC comprises indicative scales of finance and investment required for both adaptation and mitigation, based on analyses of specific sectors and initiatives' (RSA 2016). In this sense, South Africa assumed that finance would be provided; it did not, however, quantify a portion to be financed from domestic sources and another from international climate finance. In other words, the NDC does not quantify condition and unconditional components, and there is no obligation in the Paris Agreement to make such a distinction. Although these estimates may not be highly robust, they are useful indicators of the scale of finance likely to be needed over the coming decade and beyond.

South Africa's first NDC included a section on support, for both adaptation and mitigation. On mitigation, it included estimates of incremental costs required, based on energy-economic modelling:

Analysis of the incremental costs of mitigation actions indicates that significant finance and investment will be required in the long-term. The following estimates are of total incremental costs required:

- 1. Estimated incremental cost to expand REI4P in next ten years: US\$3 billion per year.*
- 2. Decarbonised electricity by 2050 - estimated total of US\$349 billion from 2010.*
- 3. CCS: 23 Mt CO₂ from the coal-to-liquid plant - US\$0.45 billion.*
- 4. Electric vehicles - US\$513 billion from 2010 till 2050.*

5 South Africa's intended nationally determined contribution (INDC) was submitted on 25 September 2015 prior to COP 21 in Paris (RSA 2015), and became its first nationally determined contribution (NDC) on 1 November 2016 (RSA 2016), following ratification of the Paris Agreement. The INDC and first NDC are identical. An update to the first NDC is being prepared and is expected to be communicated in 2021 (delayed due to the Covid pandemic).

5. Hybrid electric vehicles: 20% by 2030 - US\$488 billion

These costs are derived from energy systems and economic modelling. Further work is needed to prepare detailed business plans for finance and investment in mitigation. These numbers are presented for information to clarify the order of magnitude of mitigation finance and investment requirements.

(RSA 2016)

The NDC makes clear that these are not financial numbers, but order of magnitude indications based on energy-environment-economic modelling. While it is tempting to add up these numbers and present them as financial needs, that would not be the intended use or consistent with the underlying methodology of modelling. As the NDC states, further work is needed. It is beyond the scope of the present case study to undertake detailed bottom-up financial analysis of mitigation actions. In the following, the finance needs for the draft updated NDC are indicated, with changed target ranges and by sector.

3.2 Estimates of finance needs

3.2.1 Finance needs for mitigation in draft updated NDC

Since South Africa submitted its last NDC in 2015 (as its INDC, which became its NDC on ratification in 2016), a number of key factors have changed in South Africa's mitigation landscape. The first key shift has been lower economic growth than projected – in 2011, the South African National Development Plan proposed a GDP growth rate of 5.4% as being necessary to meet the development goals laid out in the Plan for 2030. This has not been realised, with very low economic growth levels to 2020, followed by a Covid-related contraction of the economy of more than 7% in 2020. The second key shift has been in the prices of renewable energy technologies (wind and solar PV) in the electricity sector, which became significantly cheaper than new coal power on a levelised cost basis towards the end of the 2010s in South Africa (McCall et al. 2019; Wright et al. 2019; Meridian Economics 2020a). In addition to this, the Paris Agreement contains more stringent global temperature goals than under the UNFCCC previously, and the IPCC's 2018 Special Report on 1.5 degrees established new international benchmarks for global mitigation ambition, including the goal of reaching net zero CO₂ emissions by 2050. The proposed NDC targets for 2025 and 2030 in the draft updated NDC are therefore considerably reduced compared to the previous target ranges, as summarised in Table 2. The lower range of the NDC target has not changed, and so is reflected for both 2015 and 2021 in a single row of the table.

TABLE 2

Range of mitigation targets in first and draft updated NDC

	2025	2030
Lower range	398	398
2015 upper range	614	614
2021 upper range	510	440
% reduction in upper range	17%	28%

Source: Department of Forestry, Fisheries and the Environment website⁶

The change in the NDC's upper target range was based on an assessment of South Africa's GHG emissions pathway to 2030, given current policies. These include the IRP 2019, South Africa's most recent electricity plan, the Green Transport Strategy, the draft post-2015 National Energy Efficiency Strategy (NEES), and the carbon tax. The NDC is, therefore, based on policies which have (with the exception of the draft NEES), been approved by the South African government for implementation. It thus represents a degree of political consensus which was present at the time (in 2019). In context, we understand the implementation requirements of the NDC to be synonymous with the implementation of these policies and measures. The mitigation impact of these policies and measures were quantified for the DFFE by the University of Cape Town as part of the technical process to update the NDC, using SATIMGE, an energy-economy-environment modelling framework. That analysis has been drawn on here to explore how the NDC will be implemented. The correlation between the proposed mitigation target range and the implementation of these policies is approximate, given uncertainties regarding growth rates, GHG inventory estimation, and other forms of uncertainty, as well as the fact that the NDC target range has been set conservatively to allow for some of these uncertainties; but the connection will be assumed here.

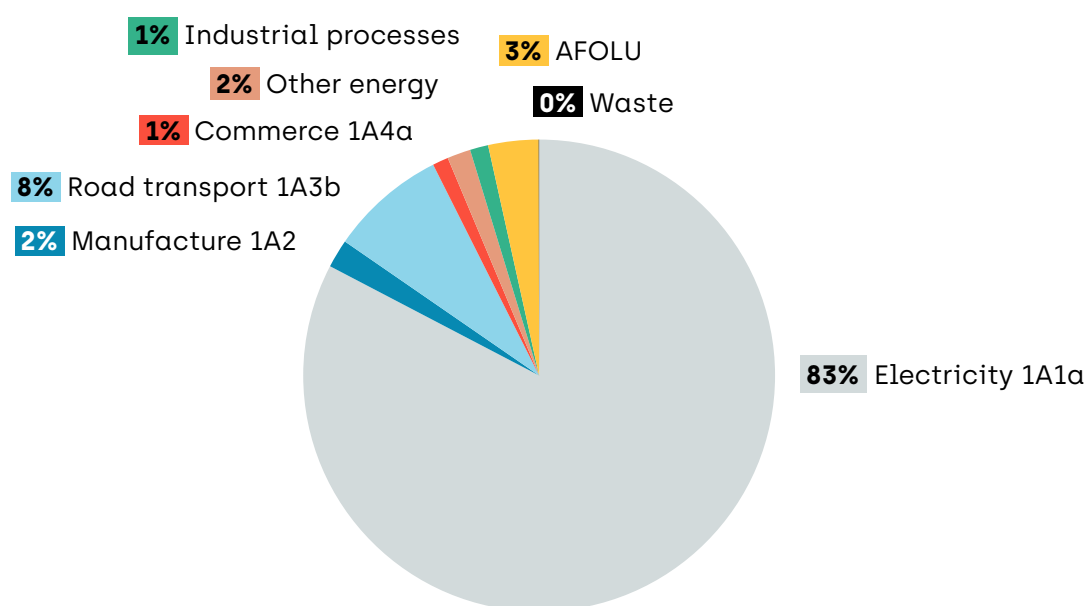
The analysis assessed GHG emissions levels with and without the implementation of these policies and measures. Even without implementation, a 'with existing measures' GHG emissions pathway peaks before 2030 as a result of two energy transitions unfolding in different timeframes in South Africa and globally, as well as low economic growth rates. The first is the transition from coal power to renewable energy, and the second is in the transport sector, from internal combustion engines to other transport technologies. The energy transition in the transport sector only begins to have a significant impact in South Africa in the latter half of the 2020s, whereas the energy transition in the electricity is already underway, and the IRP 2019 envisages very large-scale investment in renewable energy. As a result, most of the mitigation work in the NDC to 2030 is done by the electricity sector. The contributions by various IPCC sectors and sub-sectors are illustrated in Figure 4.

⁶ Released for public comment in April 2021 by the South African national Department of Fisheries, Forestry and the Environment. The NDC is expected to be finalised by July 2021. The target range specified may still undergo some revision before being submitted to the UNFCCC in July.

Reductions as a result of the IRP constitute 83% of the total, followed by a very significantly smaller contribution from the transport sector, and very much smaller contributions in other sectors. The assumed contribution of energy efficiency to this is contained mostly in the electricity sector. Other sectors have more limited reductions, which also obscures the importance of developing future mitigation opportunities in these sectors in the post-2030 period. Here we will concentrate on three areas of investment which will comprise the bulk of effort in implementing the 2030 NDC target – electricity supply, energy efficiency programmes and the transport sector.

FIGURE 4

Contributions from various IPCC sectors to mitigation target for 2030 in the draft updated NDC



Source: Authors' analysis, based on UCT (2021)

The electricity supply sector's investment plan is currently set by the IRP 2019, which envisages capacity expansion as shown in Table 3. IRP 2019 capacity expansion has been adjusted for the modelling analysis based on an assessment of the feasibility of meeting the original timelines of the IRP. It should be noted that the IRP includes 1500 MW of additional coal capacity, and 3000 MW of gas capacity, but the bulk of the new capacity is new wind power and solar PV. This will require investment not only in new generation capacity but also in associated transmission capacity – whereas the existing coal fleet is concentrated in the province of Mpumalanga, where the bulk of the country's coalfields are. Renewable resources are widely distributed, and many of the best solar and wind resources are located in areas which are remote and not well served by transmission infrastructure.

TABLE 3

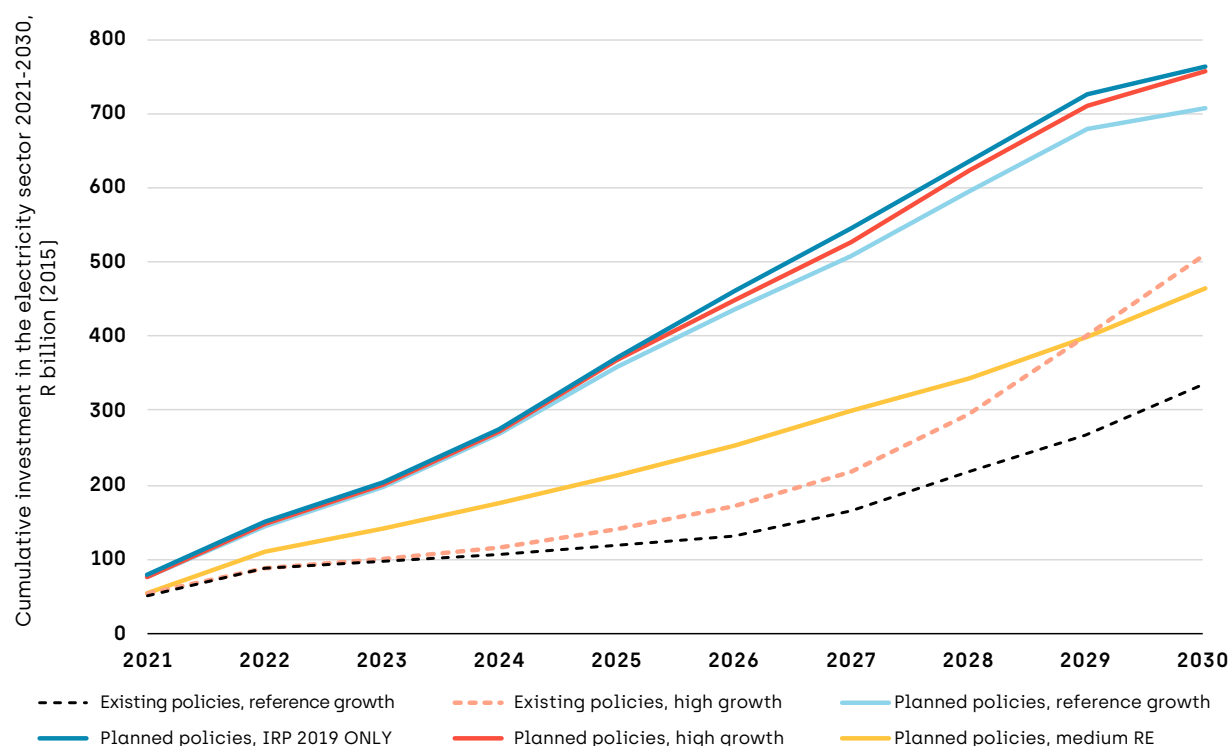
New build in IRP 2019's Table 5 compared to the Planned policies scenario – differences highlighted in yellow

		2022	2023	2024	2025	2026	2027	2028	2029	2030
Coal	IRP 2019	0	750	0	0	0	750	0	0	0
	Planned policies scenario	0	0	0	0	750	750	0	0	0
Hydro	IRP 2019	0	0	0	0	0	0	0	0	2500
	Planned policies scenario	0	0	0	0	0	0	0	0	2500
Storage	IRP 2019	513	0	0	0	0	0	0	1575	0
	Planned policies scenario	513	0	0	0	0	0	0	1575	0
PV	IRP 2019	1000	1000	0	1000	0	0	1000	1000	1000
	Planned policies scenario	1000	1000	0	1000	0	0	1000	1000	1000
Wind	IRP 2019	1600	1600	1600	1600	1600	1600	1600	1600	1600
	Planned policies scenario	0	800	1600	1600	1600	1600	1600	1600	1600
Gas / diesel	IRP 2019	0	0	1000	0	0	2000	0	0	0
	Planned policies scenario	0	0	0	0	1000	2000	0	0	0
Other	IRP 2019	-	500	500	500	500	500	500	500	500
	Planned policies scenario	450	500	500	500	500	500	500	500	500

Source: Authors' analysis, based on UCT (2021)

FIGURE 5

Cumulative investment requirements for the electricity sector 2021–30



Source: Authors' analysis, based on UCT (2021)

Figure 5 presents cumulative investment in the electricity sector from 2021 to 2030 for different policy scenarios. The scenarios that would form part of a plausible implementation of the NDC would be those that include either the IRP or the medium RE programme, which was assessed for comparison. This scenario consists of 500 more MW of solar and around 2000 MW less of wind power, and no new coal plants or imported hydroelectricity. The resulting mitigation difference is small – around 9 Mt in 2030. This widens considerably with more economic growth.

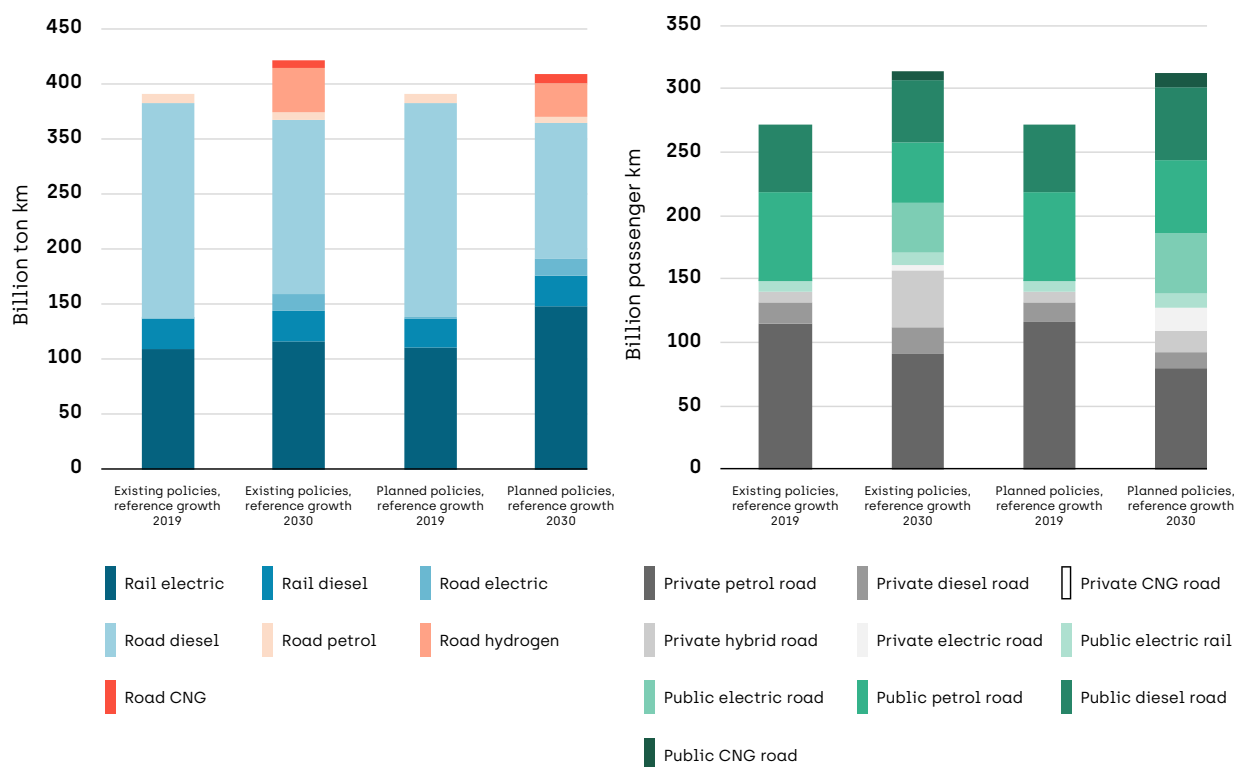
The overall cumulative investment requirement for the electricity sector to achieve its contribution to the NDC ranges quite widely, from ZAR 460–760 billion, depending on the degree of implementation of the IRP and the economic growth rate. This would mostly be for renewable energy technology, but also potentially for a large hydroelectricity project in the Democratic Republic of Congo. The DMRE has also proposed replacing the hydro capacity in the IRP with nuclear power, which would be considerably more expensive. These cumulative figures also include the additional transmission costs (Merven et al. 2021).

The way in which this new generation capacity will be financed is still uncertain. Up to now, renewable energy capacity has been invested in by the private sector and (with one very small exception) not Eskom, under the Renewable Energy Independent Power Producer Programme, via a mix of local and international capital, with a small percentage of concessional climate finance. Power purchase contracts were guaranteed by the South African Treasury. This may not be the case going forward – Treasury guarantees may not be forthcoming, and Eskom is now interested in building a large proportion of future RE capacity. Eskom, or a part of Eskom (current government policy is to separate the transmission system and system operator from Eskom, but it is not clear what form this will take), will be responsible for investment in the transmission system.

The transport sector is considerably more complex, as presented in Figure 6.

FIGURE 6

Ton-kms and passenger-kms per vehicle type, fuel and mode for the Existing and Planned policies scenarios for 2019 and 2030



Source: Authors' analysis, based on UCT (2021)

There are several kinds of shifts taking place, none of which have been clearly costed beyond estimates for specific technologies. The first is a shift in freight transport from road to rail in the main transport corridors of the country, which would require additional investment in the ageing rail infrastructure.

The second is a shift from private to public transport, which would require additional public transport infrastructure, which would take the form mainly of buses. In addition to this is a shift from ICE technology to electric and hybrid mobility (hydrogen), which would require electric and hydrogen infrastructure. This would also result in a significant fiscal impact since it would not be possible to impose fuel taxes in the same way on electricity.

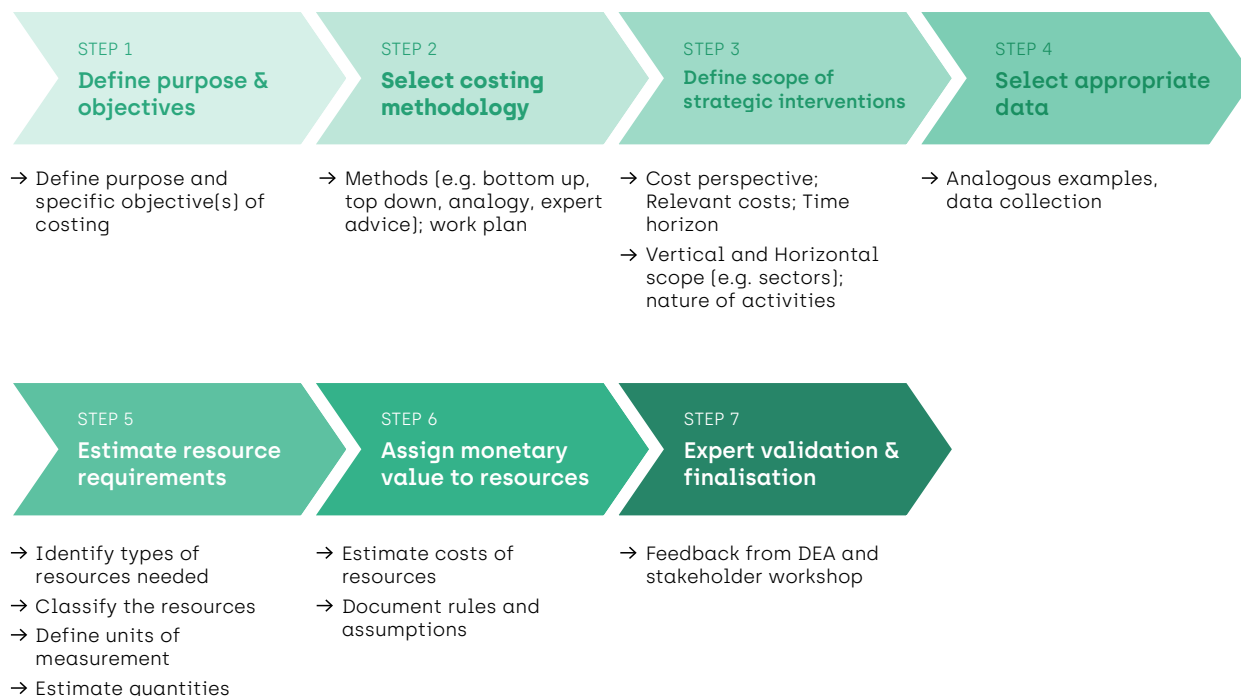
3.2.2 Finance needs for adaptation and the bottom-up costing for adaptation needs (2020–2030)

While ‘the costs of transitioning to a climate resilient economy are staggering and will require significant financial resources’ (Naidoo 2011), estimated costs of failing to transition are even greater. The Paris Agreement recognises ‘that the current need for adaptation is significant and that greater levels of mitigation can reduce the need for additional adaptation efforts, and that greater adaptation needs can involve greater adaptation costs’ (UNFCCC 2015a: Art 7.4). South Africa’s first NDC (DEA 2015) includes estimates for extreme event damage related to water resources, agriculture, forestry, energy, settlements, biodiversity and disaster risk reduction associated with two representative concentration pathway (RCP) scenarios. The scenarios for low levels (RCP 8.5) and moderate to high levels (RCP 4.5) of GHG emission mitigation were applied. Direct and downstream damage costs estimates for the low mitigation scenario were USD 0.42–30.8 billion (with a median value of USD 2.9 billion) for 2020 to 2030, and USD 0.2–53.1 billion (with a median value of USD 3 billion) for 2020 to 2050. For the moderate-high mitigation scenario the damage cost estimates were USD 3.4–29.8 billion (with a median value of USD 2.8 billion) for 2020 to 2030, and USD 0.2–50.0 billion (with a median value of USD 50 billion) for 2020 to 2050.

Under the National Climate Change Adaptation Strategy (NCCAS) (DEFF 2020a), the NAP Global Network, through their support to DEA, supported the development of a first costing of the NCCAS implementation. The costing provides initial estimates for the resources required in order to put in place the interventions committed to within the NCCAS, given realistic assumptions about scope (DEFF 2019). The costing process unpacked the nine priority interventions that are defined in the NCCAS, into sets of activities. Each activity was costed using spatial analogues (or costs for already funded project activities similar in nature and scope) where possible, within the ten-year implementation period. The delimited scope for geographical scale, activity duration or target individuals was based on plausible assumptions that are clearly described in the costing report. The costing process, as illustrated in Figure 7, identified efficiencies to be gained by implementing some of the actions in tandem. These cost synergies and the methodology and assumptions for each costing were described in an unpublished annex to the NCCAS, and made public within a public consultation process.

FIGURE 7

Overview of the National Climate Change Adaptation Strategy costing process



Source: DEFF (2019)

The NCCAS forms the National Adaptation Plan under the UNFCCC, and it implements national policy commitments under the NCCRP. The strategy considers all six adaptation goals outlined in the South African NDC and its purpose is to outline the adaptation actions and associated costs for its 10-year implementation period (2020–2030) (DEFF 2020a).

The needs, in the context of adaptation, can be understood in relation to the four strategic objectives of the NCCAS, which are as follows:

- › Objective 1: Build climate resilience and adaptive capacity to respond to climate change risk and vulnerability.
- › Objective 2: Promote the integration of climate change adaptation response into development objectives, policy, planning and implementation.
- › Objective 3: Improve understanding of climate change impacts and capacity to respond to these impacts.
- › Objective 4: Ensure resources and systems are in place to enable implementation of climate change responses. (DEFF 2020a)

The NCCAS costing includes programmes for building resilience in vulnerable communities, including investing in food security, and for small-scale fishers to adopt early warning systems and undergo sea-safety training. It makes provision for local municipalities to identify individuals and communities at most risk and deliver targeted climate change vulnerability reduction programmes. Costs are included for programmes that drive the adoption of climate-resilient natural resource management, protection of vulnerable ecosystems and landscapes, and the monitoring and control of the spread of alien invasive species that benefit from climate change. Adaptation activities focus on natural resource economic sectors like forestry, agriculture, and water use. The costing provides for fostering ecosystem-based approaches, climate-smart and conservation agriculture practices, and for developing guidelines that support adaptation, for example through environmentally responsible mining practices. It includes investment in high-quality, climate resilient, public infrastructure (DEFF 2019).

Table 4 reports the costing of strategic priorities for adaptation. By far the largest cost is associated with Strategic Intervention 1 in the NCCAS, with ZAR 82 billion over a ten-year period. So the largest need is under the broad aim to reduce human and economic vulnerability, ensure resilience of physical capital and ecological infrastructure and build adaptive capacity. The other priorities together are costed between ZAR 0.1 billion and ZAR 15 billion (or 0.1–2% of the total of ZAR 89 billion).

TABLE 4

Bottom-up costing of adaptation needs

NCCAS strategic interventions	Estimated costs (ZAR billion)	Inflation adjusted cost (ZAR billion)	Share of total (inflation adjusted)
Strategic intervention 1: Reduce human and economic vulnerability, ensure resilience of physical capital and ecological infrastructure and build adaptive capacity	46	82	93%
Strategic intervention 2: Develop a risk, early warning, vulnerability and adaptation monitoring system for key climate vulnerable sectors and geographic areas	0.1	1.5	2%
Strategic intervention 3: Develop vulnerability and resilience methodology framework that integrates biophysical and socio-economic aspects of vulnerability and resilience	0.1	0.1	<1%
Strategic intervention 4: Facilitate mainstreaming of adaptation responses into sectoral planning and implementation	0.3	0.5	1%
Strategic intervention 5: Promote research application, technology development, transfer and adoption to support planning and implementation	0.8	1.5	2%
Strategic intervention 6: Build the necessary capacity and awareness for climate change response	0.2	0.4	<1%

NCCAS strategic interventions	Estimated costs (ZAR billion)	Inflation adjusted cost (ZAR billion)	Share of total (inflation adjusted)
Strategic intervention 7: Establish effective governance & legislative processes to integrate climate change in development planning	0.7	1.2	1%
Strategic intervention 7.3: Enhanced public-private-civil society collaboration and stewardship	0.7	1.2	1%
Strategic intervention 8: Enable substantial flows of climate change adaptation finance from various sources	0.1	0.1	<1%
Strategic intervention 9: Develop and implement an M&E system that tracks implementation of adaptation actions and their effectiveness	0.04	0.1	<1%
Totals	49	89	100%

Source: DEFF (2019)

NCCAS costs relating to service delivery include a more adaptive (decentralised) electricity system, especially for rural areas, and adaptive management in water management institutions. Costs are included for equipping and capacitating healthcare facilities to manage climate change-related health effects, and for establishing climate change-related disease monitoring systems. Resource needs are estimated for disaster management for climate change events and climate change effects on infrastructure. The NCCAS costing includes estimates for the resources required for building institutional capacity and setting up forums for coordination, knowledge sharing, and to foster mainstreaming to implement a longer-term national climate change adaptation response.

Since the NCCAS is cross-cutting across national departments and sectors, and implementation requires support across levels of government and multiple institutions, the process of costing should be treated as iterative. Implementation of the NCCAS strategic interventions is already underway (DEFF 2020a). The draft NCCAS was approved by Cabinet in August 2020. Nonetheless, the NCCAS costing provides well-justified estimates for programmes and activities that are realistic and feasible for implementation, and which lay a foundation for more ambitious adaptation goals in the future.

3.3 Mapping existing finance flows

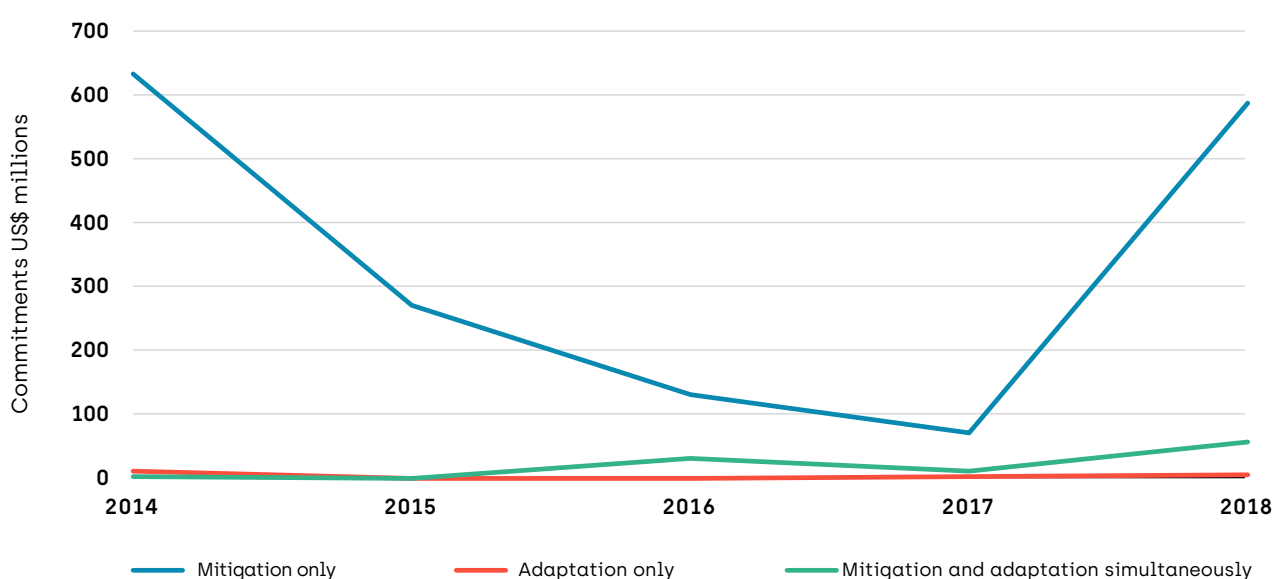
The scale of international climate finance flowing into South Africa is tracked. This section summarises a report provided as an input to this case study, utilising the Stockholm Environment Institute's AidAtlas to map international public finance flowing to South Africa in support of climate change action (Atteridge 2021). Based on data reported by bilateral and multilateral funders to the OECD, the flows are assessed over a five-year period, from 2014 to 2018, with a slightly longer period for finance of carbon-intensive activities. It presents trends over time in the scale of finance, the types of financial instruments used, a comparison between amounts for mitigation and adaptation, an overview of the main funders, and an assessment of the ratio between commitments (approved amounts) and disbursements (amounts actually paid out). The activities to be financed focus on both mitigation and adaptation, as well as on finance that has supported both key areas of climate action. Interested readers may wish to refer to the longer report for further details on data and methodology (Atteridge 2021).

3.3.1 Scale of climate finance fluctuates, no upward trend

The scale of international development finance commitments targeting climate objectives in South Africa fluctuates considerably between years, and there is no clear upward trend over time, as can be seen in Figure 8, despite long-term goals for finance and pledged by developed countries.

FIGURE 8

Trend in development finance commitments targeting climate change objectives in South Africa from 2014 to 2018, in constant 2017 prices



Source: Atteridge (2021a)

The total funding over the five-year period was USD 1.81 billion, which is several orders of magnitude below the mitigation and adaptation cost estimates presented in South Africa's first NDC (Atteridge 2021). Figure 8 shows significant fluctuations across years, varying from a low of USD 85 million in 2017 to USD 650 million in 2018, with the average for the five-year period calculated as USD 363 million per year; overall 'there is no clear sign of an upward trend in the amount of development finance targeting climate change', with annual commitments having peaked in 2013 (ibid.).

The scale of finance flows differs from those reported in another recent study on climate finance (Cassim et al. 2021: see detailed figures below). The difference is methodological. The present study examined international public development finance targeting climate change objective, as reported to OECD DAC by bilateral and multilateral funders, and some private philanthropies (Atteridge 2021: see link to underlying database). The values reported in Figures 8 and 9 are thus a sub-set of those assessed by Cassim et al. (2021).⁷

South Africa is a significant annual emitter of GHGs and has high emissions per capita for a developing country in Africa. This also means that there is significant mitigation potential, and that more finance for mitigation could be absorbed.

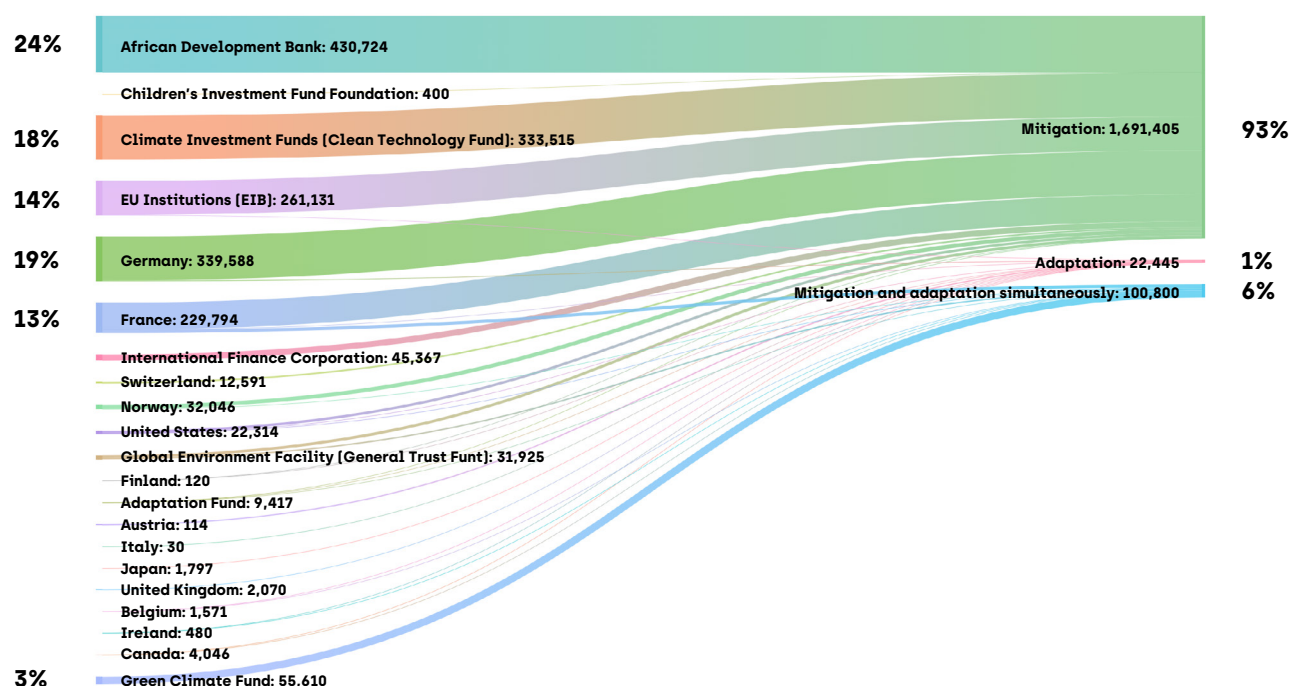
A striking finding is that public international climate finance into South Africa has been almost entirely for mitigation, with far less than one-tenth for adaptation. Public finance flowing into SA has focused almost exclusively on mitigation activities (93%), with most of the remainder targeting both mitigation and adaptation simultaneously (6%) (Atteridge 2021). This is in stark contrast with the rest of sub-Saharan Africa, where funding commitments for the same period are more evenly distributed between mitigation (48%) and adaptation (46%), and much more unequal than funding to the rest of the world where mitigation (70%) attracts nearly three times more funding than adaptation (25%) (Atteridge et al. 2019).

The GCF Board aims at a 50:50 split of mitigation to adaptation at portfolio level (GCF Board, 2014), but such a balance is not being achieved in South Africa. Figure 9 shows the much smaller flows of development finance to adaptation; even if it were assumed that half of the flows that support both areas of climate action went to adaptation, this is much smaller than finance to mitigation. The figure also shows the variety of sources of finance committed.

⁷ Cassim et al. (2021) estimates for domestic public finance are not suitable for this investigation because of the difference in their methodological approach for that subset of data; for example all public expenditure on water is counted as targeting adaptation.

FIGURE 9

Sources and amounts of development finance commitments (in 2017 US\$ thousands) to different climate objectives in South Africa from 2014 to 2018



Source: Atteridge (2021a)

Within mitigation, the majority – almost two-thirds – of activities have been in energy supply sector, with very little going to transport (despite this being the second largest sector in the GHG inventory).

3.3.2 Almost entirely mitigation, less than a tenth for adaptation activities

Of the 'very low level of dedicated adaptation funding (just US\$ 22.4 million over 5 years, plus an additional US\$ 100.8 million that targeted mitigation and adaptation simultaneously)' (Atteridge 2021), only two of the grants are more than USD 1.5 million. Both of these were awarded by the Adaptation Fund. Within the small flows, committed funding for adaptation has targeted disaster preparedness, rural development (sustainable land use), agriculture (financial services in the agriculture sector), environmental education and training, and malaria control. In contrast, tracked domestic public disbursements reveal that, of the South African government climate investments made in 2017 and 2018, more than ZAR 7 billion, or 60% of the annual average amount, was tracked in adaptation and dual benefit sectors (Cassim et al. 2021), equivalent to USD 528–536 million⁸ annually.

⁸ Using average currency conversion rates of ZAR 1 to USD 13.055 for 2017, and USD 13.2488 for 2018.

Importantly, the sum of international and domestic public funding targeting adaptation, and adaptation and mitigation benefits is three orders of magnitude less than initial cost estimates for implementing the National Climate Change Adaptation Strategy (2020–2030) (NCCAS) (see section 3.2).

South Africa may be well advised to proactively request more international funding for adaptation. Possible explanations for the very low share of dedicated adaptation funding shown in Figure 9 may reflect that it has not been prioritised by donors, or that there is need to improve fund accessibility (Omari-Motsumi et al. 2019; Gilder and Rumble 2020). In national policy and negotiations, South Africa has attached high importance to adaptation: national climate policy starts by identifying two main objectives, listing adaptation first and then mitigation (RSA 2011). The country's first NDC included a dedicated section on adaptation, and support for adaptation in a section including finance (RSA 2016). However, this policy priority may not have been translated into practice, with specific requests for funding of adaptation, and possibly a regional focus on adaptation. We are not aware of any study specifically analysing this imbalance, and further research seems warranted.

The core mandate of the national entities accredited by the dedicated climate funds has bearing on what activities are funded. South Africa has two institutions that are accredited to access the Green Climate Fund, the South African National Biodiversity Institute (SANBI) and the DBSA. SANBI is the only entity in the country accredited to access the Adaptation Fund. SANBI focuses on climate projects involved with biodiversity, and in relation to adaptation the DBSA focuses on projects targeting water supply and sustainability. In terms of institutional coverage, the focus of the accredited entities means that sectoral funding needs for agriculture interventions are neglected (SANBI, personal interview 27 November 2020; DBSA, personal interview 4 March 2021).

The closely entwined nature of development (infrastructure and service delivery, economy, livelihoods) and adaptation (climate-proof, climate-friendly, climate-smart) may be another factor that perversely limits international funding for adaptation. The requirement for climate finance proponents to make the case for the incremental climate cost component or global benefit of a proposed project that would otherwise be described as development-focused can contribute to the perception that adaptation and development activities are distinct from one another. According to 'many municipal officials interviewed' for a recent report about catalysing finance for local climate actions, this particular type of 'additionality'⁹ requirement adds a barrier to accessing international climate finance for municipalities that are less able to raise co-funding (Petrie et al. 2018).

9 'Additionality' is a concept that has particular meaning in mitigation, long explored in the literature and still relevant to the Paris Agreement (Baumert 1999; Winkler 2004; UNFCCC 2005; Spalding-Fecher et al. 2017), with incremental costs and benefits of mitigation being easier to separate from development finance than in adaptation. In climate negotiations, whether finance provided by Annex II Parties to developing countries is 'new and additional' has been contested, ever since the term was included in Article 4.3 of the Convention (UNFCCC 1992).

There is a perception that high levels of co-financing ratios required by the GEF, and leveraging required by GCF, create a significant burden for raising finance (Fakir 2020; Petrie et al. 2018). Even large metros skilled at obtaining national grants report difficulty navigating the international fund landscape (Petrie et al. 2018). Private sector sources of co-finance lack patience to go through the 18–36 month processes for proposals for funding from the international dedicated climate funds. Municipal leaders expressed wariness of blended climate finance – specifically the interest rates and conditions packaged with the grants (Petrie et al. 2018). The blended finance approach includes initial grants to finance the development of a project pipeline, followed by loans to finance project execution. Bonds or other long-term investment mechanisms could be used to refinance the original debt in the long-term economic interests of the local government (ibid). Possibly there is a role for a patient finance intermediary with strong fiduciary credibility to help address these two challenges.

The impact of these obstacles to funding could be marked for adaptation if the proposed activities derive non-monetised benefits, and in instances that the funding proponents would be municipalities that typically experience difficulties in raising finance. Finance is needed in a wide range of sectors that are either exposed to climate change risks or can help to strengthen the resilience of individuals and communities to cope with and adapt to climate impacts. To date, adaptation finance has been minimal, not providing a sound basis for drawing conclusions about patterns in sectoral spending. However, given the prevalence of high social and economic inequality, and poverty, adaptation finance could deliver co-benefits for development if it is targeted towards activities that address this underlying context and improve overall health and well-being of people and create sustainable livelihoods.

3.3.3 Shift from earlier support to carbon-intensive electricity to renewable energy

Beyond finance that has climate change as its main objective, other flows of finance have the potential to significantly influence South Africa's emissions profile and climate resilience at the local level, and if not well aligned with climate objectives could undermine spending on mitigation and adaptation. In 2009 and 2010 there were several major commitments supporting coal-fired electricity generation. The International Bank for Reconstruction and Development loaned USD 3.04 billion for a 4800 MW coal-fired power station (Medupi) (Inspection Panel 2011). The loan, in response to concerns among donors that this would increase emissions, was accompanied by funding of USD 0.7 billion for renewable energy and energy efficiency (ibid.), though Eskom has not utilised these fully. It seems likely that such loans in unabated coal-fired electricity generation would not be extended again beyond the end of 2021, given decisions by the G7 countries and various banks in response to new demands made by shareholders and investors and changes to in political discourse prompted by divestment movements (G7 Ministers 2021; Bergman 2018). Given a 25-year tenor of the main loan, disbursements for these have continued even until 2018 and still make up the largest component of total disbursements in the energy sector.

From 2014 to 2018, 'almost two-thirds of mitigation activities (roughly US\$ 1.08 billion) have targeted the energy sector (non-transport), which includes energy generation, transmission and distribution, and energy policy and administrative management. Most of this has been for renewable energy generation (US\$ 963 million)' (Atteridge 2021). Transport, the second-largest emitting sector attracted USD 238 million over the five years, primarily in a single commitment made in 2014 by the African Development Bank to support Transnet (ibid).

Since 2011 funders seem to have shifted significantly away from fossil-fuel based power and have committed the majority of funding for new electricity generation in renewables projects (SEI et al. 2020b; Bergman 2018). Future development finance to provide a diverse range of support measures to today's coal mining regions, to ensure that social and economic transitions in these regions are just and that the environmental legacies left behind after coal-mining are addressed (Atteridge 2021). A just transition transaction is being developed (Meridian Economics 2020b), which would finance accelerated phase out of coal and provide predictable funding into a Just Transition Fund for social justice. Such a transaction would benefit from support from development finance institutions. Finance for electricity generation is now heavily concentrated on renewable sources of energy, with little or no ongoing support for fossil fuel-based electricity generation (Atteridge 2021). However, South Africa's fuel mix for electricity generation remains heavily dominated by coal plants, so support needs scaling-up considerably to speed up a just transition from coal to cleaner energy (NPC 2019; Winkler et al. 2020b,a). Transition finance is needed to accelerate the phase out of coal and social justice (Winkler et al. 2020a), which may more specifically include costs of early closures, incremental investments (including in repowering or repurposing) and enhancing skilled human and institutional capacity within the country. 'Green finance' is increasingly more private rather than public sources, as at least grid-connected wind and solar PV are cost-competitive – both in South Africa and many other countries.

3.3.4 International public funding and adaptation needs

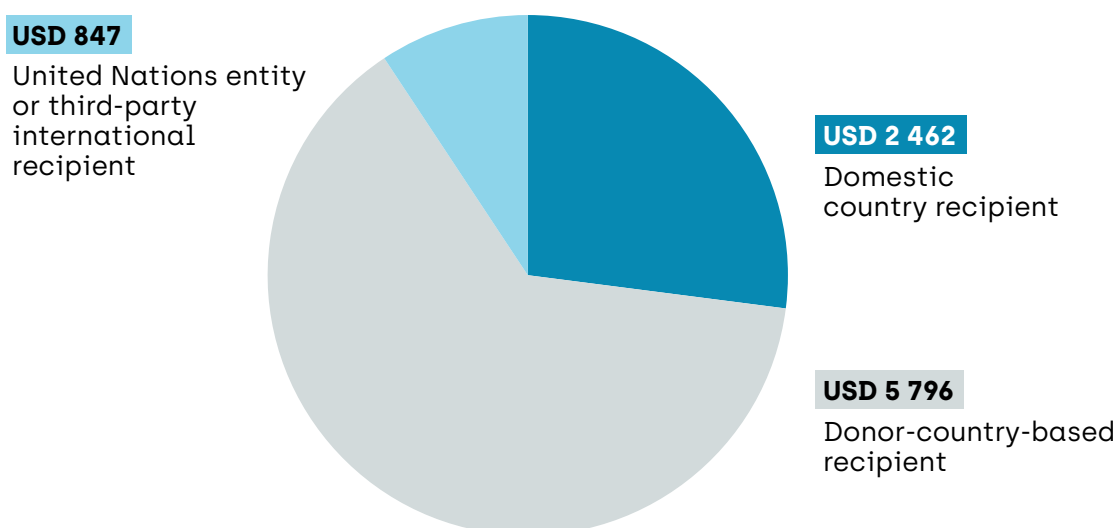
International public funder commitments (in 2014–2018) for adaptation activities include a small grants facility for beneficiaries in highly vulnerable rural communities, and support for climate proofing settlements and strengthening resilience of smallholder livelihoods (Atteridge 2021). It funded early warning system development and piloting, disaster response, malaria monitoring and prediction, vulnerability of large system water supply, and water and sanitation services to address threats to ecosystems and biodiversity funding (ibid). Mainstreaming an ecosystem-based adaptation approach in the national climate response strategy attracted, knowledge partnerships and policy dialogues, and fostering private sector opportunities also attracted funding (ibid).

Of the total funder-reported international finance that targets adaptation, 14% is a non-concessional loan offered by a multilateral development bank to a domestic development bank, and 44% is grant provided by the Adaptation Fund. The remaining 42% is in the form of bilateral grant funding. This grant funding is delivered by implementing recipients that are domestic country, donor-country-based, or United Nations entity or third-party international recipients.

Bilateral grant funding is predominantly offered through donor-country-based recipients as the delivery channel. This means that 64% of bilateral grant funding for adaptation flowed from donor governments into donor country universities, NGOs and the private sector, as shown in the large share in Figure 10. This may be a significant reason why adaptation work is not scaled, although the total amounts are so small that patterns are not robustly established and conclusions should be treated with caution.

FIGURE 10

***Recipients of bilateral grant funding (in 2017 US\$ thousands)
for adaptation in South Africa from 2014 to 2018***



Source: Author's own, using data reported in Atteridge (2021a)

Failure to deliver climate finance through recipient country organisations diminishes opportunities to build the very capacity needed to attract and secure funding. Recipient country organisations have regional membership and activities that offer capacity building opportunities that are not available to donor country organisations. For example, the DBSA has done lots of work with development finance institutions in Uganda, Tanzania, Namibia and Zimbabwe, providing mentoring in their processes to gain accreditation with the GCF (DBSA, personal interview 4 March 2021). The African Research Universities Alliance supports regional centres of excellence and builds research networks in support of intracontinental collaboration.

Funding the development of intellectual property within teaching organisations in developing countries is an opportunity to foster growth of local intellectual capital. Furthermore, the funding of international or donor-country-based organisations rather than developing country implementers is especially relevant for developing country organisations that are often faced with institutional capacity constraints and the struggle to find financial resources to retain staff with technical expertise during periods between project funding (SANBI, personal interview 27 November 2020; Omari-Motsumi and Barnett 2019).

To start to bridge the adaptation funding gap, domestic and donor governments can improve efforts to enhance climate finance absorptive capacity and institutional capacity through support for climate finance proposal processes, selection of finance delivery channels, and by including recipient country organisations in the design, delivery and ownership of internationally financed projects. Domestic and donor governments can improve efforts to enhance climate finance absorptive capacity through support for climate finance proposal processes and in selection of finance delivery channels.



CHAPTER FOUR —————>

Policies, direct or indirect, to more effectively meet climate and other sustainable development objectives

Having outlined some needs (at least initially) and mapped existing finance flows, the paper turns to considering the enabling conditions to shift finance to more effective action. These include direct and indirect enablers – the latter being financial and fiscal policy instruments – though first examined are broader policy instruments that guide flows. In other words, shifting finance flows is not just a matter of financial policies, but broader policy domains. More effective action refers to achieving climate change objectives – including mitigation targets and adaptation goals in South Africa’s first NDC – and other sustainable development (SD) objectives. The National Development Plan contains many objectives, prioritising those that respond to the triple challenge of unemployment, poverty and inequality, and includes a chapter on SD (NPC 2011). The SDGs agreed on in 2015 provide a useful lens for considering climate action (goal 13) at the same time as other SD goals (UN 2015).

We consider how broader policy interventions could enable a shift of finance in the desired direction. This includes a wide range of government policy, such as energy, industrial, housing and many other policy domains. This section first describes what is currently happening in each sector in terms of broader or non-financial policy that is relevant for finance flows and mitigation and adaptation (section 4.1). Then section 4.2 explores financial policy instruments relevant in South Africa for climate action.

4.1 Broader policy instruments

Climate change has increasingly been understood as not only an environmental issue, but one also of socio-economic development. Mainstreaming climate into development (Halsnaes and Shukla 2005) and into finance such as that provided by multi-lateral development banks (Sohn et al. 2005) has been proposed for over a decade. The position in this paper is that climate finance is shaped by a broader range of policy instruments in South Africa. National climate policy needs to be aligned with policies governing energy, industrial, and transport – all of which are key for mitigation given our GHG profile – and many more, for adaptation to climate impacts in agriculture, housing, local government, health and other sectors. Indeed, it is difficult to think of a domain of public policy that does not relate to either mitigation or adaptation.

The challenge is to shift development pathways to become less energy- and emissions-intensive (Winkler and Marquard 2009) and more employment-intensive (Black 2016). Hence energy and industrial policy will be important policy domains that inform where finance flows. Aligning energy, industrial and climate policy requires coordination to avoid incoherence, a challenge elaborated in section 5 below.

4.1.1 Industrial policy

South Africa may develop some competitive advantage in employment in intensive light manufacturing. Manufacturing in the country has declined, with employment having fallen sharply in recent years (Black 2018). Black points out that policy has supported capital-intensity, rather than labour-intensity, and argues that industrial policy ‘should focus more on supporting employment-intensive growth by subsidising labour and training rather than capital investment, electricity and infrastructure for capital-intensive firms’. Further research is needed to understand whether such industrial policy could support emission reductions and at the same time boost employment. It is unlikely that there are only synergies between strategies to achieve these two objectives, so research is needed to identify where there are trade-offs. The Industrial Development Corporation (IDC) could be an important policy lever for industrial policy; however, its levels of disclosure are a concern (see section 4.3 below).

4.1.2 Incentives and economic policy

Changing incentive structures implies an essential shift in economic and fiscal policy. The climate and development aim is clear: to phase out subsidies from capital- and energy-intensive activities to employment-conducive and high-mitigation ones, and support activities in sectors with low emissions and high employment potential. Burton et al. (2018b) quantified fossil fuel subsidies, and found that, since 2008, ‘direct transfers have ranged between USD 454 million and USD 2.09 billion per year, whereas quantified revenues foregone have been between USD 2.45 million and USD 336 million’. Continuing such levels of subsidy would continue to lock South Africa into a high-emissions development pathway by incentivising ongoing protection of fossil fuel investments to avoid their becoming climate-related stranded assets, whereas subsidies need to shift to employment-intensive and low-emissions development. The political economy of achieving a shift is, to say the least, challenging. Actors with vested interests in fossil fuel subsidies will not lightly agree to such shifts. However, a positive element is that some low-emissions technologies, notably wind and grid-connected solar PV have become competitive in South Africa (and many other countries), and no longer need subsidies. There may be other technologies, such as energy storage – whether in batteries, hydrogen or integrated into solar thermal plants – that would need support to become commercially viable.

4.1.3 Energy policy

Energy policy has long aimed at diversifying the fuel mix away from coal (DME 1998). Yet the minerals-energy complex remains influential (Fine and Rustonjee 2018; Burton 2011), and interests in the coal value chain continue to shape energy policy in a direction not compatible with deep cuts in GHG emissions (Burton et al. 2018a). Procurement of renewable energy since 2015 has seen rapidly falling prices for wind and solar PV (IPP office 2020). South Africa also has a small but growing renewable energy (RE) industry. GreenCape is leading a process for a South African RE Masterplan (GreenCape 2020).

Supporting the RE industry is an obvious strategy. However, RE technologies may create relatively few local jobs when compared to the massive scale of the unemployment crisis. Studies report significant job creation benefits of RE development. Such jobs in renewable energy can, from a national perspective, offset some of the jobs losses in coal, with jobs there estimated to decline by 35–40% from 2020 to 2050, while jobs in renewable power generation are concentrated in the services, construction and manufacturing sectors (Hartley et al. 2019). However, around 70% of new power-sector jobs associated with RE are highly skilled, whereas the need is to create relatively low-skilled jobs. Furthermore, net job gains at the national level are not very meaningful for a household in which a breadwinner has lost a job at a coal plant or at a coal mine, or in a service industry in a town where all livelihoods depend on coal. Financing a just transition must create livelihoods in the affected communities, and it seems unlikely that appropriate jobs will be created by renewable energy alone. Other, complementary measures are needed, including social plans, skills training and education, regional economic development, and support from the growing RE industry to socio-economic development.

The REI4P has in part addressed socio-economic development through procurement requirements for community benefit and ownership (Wlokas 2017). However, in a just transition that phases out coal-fired power stations and the mines feeding them, and reduces energy-intensive beneficiation, not all workers employed in the coal value chain will obtain new jobs in a local RE industry. It could be argued that the REI4P has successfully sent policy signals by underwriting risk for project finance for mitigation, and that the employment potential should be better utilised and supplemented with job creation in other sectors.

At the time of finalising this report, the President announced an amendment to the Electricity Regulation Act to increase the licensing threshold for embedded generation projects from 1 MW to 100 MW, regardless of whether they are connected to the grid (Ramaphosa 2021). This reform was developed by a team located in the National Treasury and the President's Office, and the Minister of Finance, and it makes it significantly easier to invest in embedded generation. It enables companies to build their own generation facilities, and has the potential to reduce the energy demand burden on Eskom, which is currently operating a system of rolling load-shedding (the pre-planned shutdown of electricity supply to certain areas in turn). The reform is motivated by businesses concerned about the unreliable electricity supply, and it unblocks a longstanding obstacle to growth in this segment of the RE market. While the move was widely welcomed, the risks of large customers defecting from the grid, and thereby reducing Eskom revenues, will need to be carefully managed.

A possible area of synergy between energy and climate policy is to support energy service companies (ESCOs), which implement energy efficiency and renewable energy for businesses and richer households. ESCOs themselves, as creators of employment, could be backed by institutions that support SMEs. Broader housing policy might offer incentives. Potentially it might become a condition of house-transfer to meet energy-efficiency and low-emissions energy requirements. Financing would have to differentiate by household income groups – which can be arranged through mortgage bonds for richer households, whereas poor households would require government subsidies.

4.1.4 Transport policy

A Green Transport Strategy to 2050 was adopted in 2018 (DoT 2018), and the 2007 Public Transport Strategy promotes cleaner mobility. The Green Transport Strategy includes local production of electric vehicles and batteries, fuel economy norms and standards for fuel efficiency and emissions, and it envisages a roll-out of solar-powered charging stations for electric vehicles. Investment will be required for construction, maintenance and security of widespread clean energy-charging infrastructure.

Transport policy needs to support a shift from vehicles using internal combustion engines using petroleum products to electric vehicles. The Motor Vehicle Industrial Development Programme (MIDP) was considered relatively successful industrial policy (Barnes and Black 2013). It reduced tariffs and provided strong support for exports. However, easy access to import credits saw rapid increase in imports, to unsustainable levels (ibid.). It is unclear to what extent the development of the industry benefitted local communities or created low-wage employment. The MIDP might be reconfigured to support the development of low-emission vehicles, but should consider the implications for employment-intensive development. Shifting to electric vehicles will impact tax revenues; fuel tax applies to petrol, diesel, and biodiesel based on volume per litre. Electric vehicles do not incur similar taxes so a shift to electric transport may lead to reassessment of the tax regime for transport. A process to redesign tax for transport could be an opportunity to use tax to support strategic objectives in the Green Transport Strategy.

4.1.5 Agricultural policy

Agriculture in South Africa is employment-intensive but contributes relatively little to GHG emissions. Climate-smart and conservation agriculture practices can build resilience of farmers to stresses and lower emissions. Negative economic impacts are anticipated for agriculturally important areas and for dryland areas because of increased variability in yields (SANBI et al. 2014). In areas with high poverty rates and dependence on dryland agriculture, such as KwaZulu-Natal, poverty may be intensified (SANBI et al. 2014).

A broader approach to the land sectors – including also removals by sinks – is part of a mix of policies to support shifts in finance. Finance is needed to address the variability in South African sinks, first to understand emissions from wildfires and then more substantial support to managing those that are not ‘natural disturbances’ (as defined in IPCC inventory category 3b). An IPCC special report on land identified options including bioenergy (noting trade-offs with other objectives); carbon dioxide removal on land; dietary changes; incentives, tools and rules; and many others (IPCC 2019). Early analysis of mitigation potential included options in agriculture, forestry and other land use (AFOLU) sectors and estimated costs: 1) increasing afforestation; 2) shifting to low- or non-till farming practices; 3) changes in livestock management to reduce emissions from enteric fermentation; 4) improvements in manure management options; 5) fire control; and 6) improved waste management (Taviv et al. 2008). South Africa’s national climate policy refers generically to ‘options for mitigating non-energy emissions in agriculture and land-use’, noting that AFOLU sectors are a small share of national emissions (RSA 2011). Baseline projections are complicated by including both emissions by sources and removals by sinks, with analysis under a national terrestrial carbon sinks assessment resulting in a more robust GHG emissions baseline for the AFOLU sector (Stevens et al. 2016).

4.1.6 Information to inform policies on adaptation

The list of policies that might inform adaptation to adverse impacts of climate change is likely to be even longer than that for mitigation. Virtually every government department would be involved in responses to adaptation. Long-term adaptation scenarios for South Africa identified some initial priority sectors and focus areas: water, agriculture and forestry, human health, marine fisheries, and biodiversity (DEA 2013). A macro-economic assessment was included as part of the supporting Long-Term Adaptation Scenarios Flagship Research Programme for South Africa. The economy-wide (as distinct from financial) analysis focused on dryland agriculture yields, road transport and water availability for industrial and agricultural use as the three pathways for which economy-wide modelling was undertaken (DEA 2014). The research concluded that climate change is expected to induce GDP losses in a range of ZAR 217–651 billion over the period 2015 to 2050 (with a median loss of ZAR 259 billion, equivalent to almost 10% of GDP in 2012) (SANBI et al. 2014). Policy to positively shift finance flows for agriculture would include consideration of physical climate risk disclosures, extension and research, subsidies for farm inputs, or tax concessions, public investment from DBSA and internationally, and information instruments such as climate-smart agriculture campaigns.

Cross-cutting policy issues relating to adaptation include land use, health, poverty, and food security, and any legislative response to adaptation needs to take into account linkages to these and other societal concerns (Rumble 2019). The National Medium-Term Strategic Framework (MTSF) 2019–2024 targets five sector plans to reduce vulnerability to climate change risk, for implementation by the DFFE, National Department of Health, Department of Land Reform and Rural Development, Department of Human Settlement and Sanitation, and the Department of Cooperative Governance and Traditional Affairs (DPME 2019). In this way adaptation becomes an area of key performance area with budget allocation within national government (section 4.2.3 discusses public finance). The energy, transport and tourism sectors are important next foci for risk and vulnerability assessments, and for drafting response plans. The draft National Climate Change Bill (2018) mandates implementation of climate change needs and response assessments, including risk and vulnerability assessments for sector departments, provinces and municipalities, and state-owned entities. In this way the draft Bill devolves responsibility for adaptation across government.

Private sector investment opportunities include climate-proofing of supply chains, for example by supporting climate-smart agriculture, and returns for investors arising from multiple benefits of conservation agriculture and ecological restoration practices. Micro-finance initiatives that build financial resilience in poor communities can build on the experiences of community ‘savings clubs’ or stokvels,¹⁰ thereby creating financial capital to invest in more resilient livelihoods. For example, SaveAct has years of experience in KwaZulu-Natal and is now starting savings clubs in communities in the Northern Cape, where there is reportedly good appetite for this sort of initiative (SaveAct and Conservation South Africa, pers. comm., 17 February 2021).

4.1.7 Local government

Local government plays an important role in implementation. Key changes here would include allowing municipal energy service departments to procure directly from RE producers. This matter has long been held up by disputes between national and local authorities (especially Cape Town) about the constitutional rights to distribute electricity.¹¹ Increasingly, the larger metropolitan authorities – Johannesburg, eThekweni and Cape Town – are permitting two-way metering by households installing solar PV.

Within municipalities, adaptation can be mainstreamed into spatial development frameworks and policies for land use management and building controls (Petrie et al. 2018). Provincial and municipal could incorporate climate considerations in regulations for building and infrastructure design and placement, and to delineate ‘no development zones’ in 100-year flood zones (ibid). Policies for water and electricity include minimum standards for resource use and water use restrictions to encourage the use of non-potable water (ibid).

10 Stokvels are community-based credit unions or saving schemes where members contribute fixed sums of money to a central fund on a regular, agreed basis. They are established to meet individual or community-wide savings goals.

11 *The City of Cape Town vs National Regulator of South Africa and Minister of Energy* (2020) in the High Court of South Africa, Gauteng Division, Pretoria. Case No: 51765/17

Increasing attention is being focused on Mpumalanga province, and some districts specifically. Supporting regional economic development, at provincial or district level, needs to consider a more comprehensive approach to job creation and sustaining livelihoods. Policy signals should direct domestic and international finance to regional economic development.

Coherent climate policy requires coordination – across multiple policy domains, tiers of government and across mitigation and adaptation. The requirements for, and considerations of the challenge of policy coordination, are discussed in section 5.6 below. Next, however, the paper turns to consider a fiscal and financial tool-kit.

4.2 Fiscal and financial policy

Fiscal and financial tools are the direct ‘tool-box’ of instruments available to governments, and can help increase scale and shift the direction of finance towards increased sustainability. Whitley et al. (2018) identify ‘four key sets of tools that primarily governments can employ to shift finance’. The focus in their study is on national governments, and the tool-kit available to shift finance flows at domestic (as distinct from international) scale. They suggest the following categories: financial policies and regulations; fiscal policy levers; public finance; and information instruments. These tools can be shaped by regulatory and economic instruments in a broader perspective. Without actors to implement them, policies remain on paper. By policies are also here meant plans and programmes, not only government policy documents. The following subsections therefore look at both at the financial tool-kit and the wider policies, with the distinction to be elaborated.

4.2.1 Financial policy and regulations

Financial policies and regulations include lending requirements, accounting systems, mandates of supervisory authorities, standards, plans and strategies, and disclosure requirements (Whitley et al. 2018).

The National Treasury and DEFF’s joint technical paper on sustainable finance is structured in a manner to address all financial institutions – local banking, insurance, pensions, collective investments, private equity and capital markets participants (Treasury and DEFF 2020). It proposes identifying, managing and disclosing the environmental and social risks in their portfolios, governed by a regulatory framework that enables good practice. The two government departments signal that they intend to establish minimum standards in relation to environmental, social and governance investment, and specifically climate change (Treasury and DEFF 2020).

Treasury is developing a Green Finance Taxonomy for South Africa, with support from the International Finance Corporation, and with the National Business Initiative (NBI) and Carbon Trust as part of a working group¹² considering a social and transition taxonomy as well as an exclusion list. Identifying needs, the kind of finance that would fit those needs, and indicators to track progress are important parts of a complex assessment (see section 5.5 below).

4.2.2 Fiscal policy

Fiscal policy levers include taxes, royalties, price support or controls, public procurement and budget support (Whitley et al. 2018). The repayment of debt is another fiscal policy lever, which we would add to the list. Indebtedness may become more important, in the context of high debt levels in South Africa, exacerbated under Covid-19. Loans for responding to economic impacts of the pandemic include: from AfDB: Covid-19 Response Facility – ZAR 5 billion (USD 288 million); from New Development Bank: Covid-19 Emergency Programme – USD 1 billion and maybe another USD 1.5 bn; and from International Monetary Fund, Rapid Financing Instrument – SDR 3.051 billion (~USD 4.3 billion), at 1% interest, with repayment over five years. Fiscal policy may need to consider debt and debt relief. We have argued that a just transition transaction for South Africa can help with, though not on its own address all of, Eskom debt of ZAR488 billion (USD 28 billion) (Winkler et al. 2020a). Local economists warn of risks, inter alia, to South Africa's international credit ratings, which would in turn undermine the country's ability to raise foreign finance (Collocott 2019).

Legislation for the South African carbon tax, developed by National Treasury, was passed in 2019 (RSA 2019). The tax rate has been a relatively low ZAR 120 per ton of CO₂-eq, with exemptions and initially increasing with inflation; but Treasury has signalled that higher tax rates are contemplated for the future. Certainly, at less than USD 10 per ton, the carbon price is much lower than a high-level economic commission concluded is 'consistent with achieving the Paris temperature target [of] at least US\$40–80/tCO₂ by 2020 and US\$50–100/tCO₂ by 2030, provided a supportive policy environment is in place' (Stiglitz et al. 2017). While treasuries oppose 'ring-fencing' as incompatible with good public finance management, on-budget allocations of the revenue are possible as part of green industrialisation. There could be spending in two broad categories: firstly to reduce energy poverty and ensure that poor households benefit from climate action (Winkler 2017); and, secondly, transitional assistance to emissions-intensive firms, subject to binding mitigation targets (National Treasury 2017). If the carbon tax rate were increased in future, more revenues would become available for job creation and poverty reduction.

Not all incentives are managed by fiscal policy, as the example of restructuring incentives, from coal to renewable energy, makes clear. Hepburn et al. (2020) identify key opportunities to recover from Covid-19 and reduce emissions in 'clean physical infrastructure, building efficiency retrofits, investment in education and training, natural capital investment, and clean R&D. In lower- and middle-income countries (LMICs) rural support spending is of particular value while clean R&D is less important'.

12 <http://sustainablefinanceinitiative.org.za/taxonomy-working-group-oct/>

4.2.3 Public finance

Mainstreaming climate objectives into the national budget is a key tool. Public finance includes as a very important element the national budget, developed by National Treasury and presented in a speech by the Minister of Finance around February each year (Mboweni 2020a), with a medium-term budget policy statement around September (Mboweni 2020b). Treasury receives requests from other national government departments, state-owned entities and provincial and local authorities, and has to allocate funds. The MTSF (2019–2024) includes budget for capacitating and resourcing municipalities to implement climate change programmes, and for sectoral GHG reduction plans and carbon transition plans. Effectively the national Department of Planning, Monitoring and Evaluation translates objectives in the NDP into performance targets for national departments, and the MTSF in turn translates these into key performance indicators with allocated budget.

National Treasury is developing a climate budget tagging system, testing draft guidance and methodologies with pilot implementation at national, provincial and local levels in 2021 (National Treasury 2020). Tagging climate-related public expenditure will provide useful information to understand the extent to which spending aligns with climate policy objectives.

The Green Fund is a national fund established in 2012 and implemented by the DBSA to support green initiatives that contribute towards the transition of South Africa to a development pathway that is low-carbon, resource-efficient and climate-resilient, ‘delivering high impact economic, environmental and social benefits’ (DBSA 2021b). The fund targets public and private sector recipients and makes funding available in three investment windows: 1) ‘Green Cities and Towns’ for green infrastructure, sustainable built environment and integrated planning; 2) ‘Low Carbon economy’ for energy initiatives, and 3) ‘Natural Resource Management’ focusing on ecosystem services, sustainable agriculture and rural adaptation models (Green Fund Secretariat).

The DBSA recently issued its first green bond (see section 2.5.2). Under the DBSA Green Bonds Framework, green bond proceeds can be used to finance or refinance eligible projects that yield mitigation and, or adaptation benefits, or that align with the National Development Plan objective of an ‘environmentally sustainable and equitable transition to a low carbon economy’ for South Africa; or that align to the SDGs, in particular SDGs 6, 7, 8 and 11 (DBSA 2021c).

Other public finance levers include use of institutional funds, in the South African context particularly the Public Investment Corporation (PIC). A trade union federation, the Congress of South African Trade Unions (COSATU), proposed to utilise funds overseen by the PIC to address Eskom debt (COSATU 2020). Further technical details are contained in a paper by the Alternative Information and Development Centre (AIDC 2020). Government pension funds hold large assets, and the idea was that the PIC would take a share of debt to relieve Eskom debt. Whether this is done in a climate-friendly manner is unclear; two members of the National Union of Mineworkers argued that what ‘we should debate is whether as a country we need a plan to stabilise Eskom or a plan to finance the energy transition from fossil fuels to a low carbon economy’ (Cloete and Sikwebu 2020). As it stands, Treasury has provided repeated ‘bail-outs’ or cash injections into Eskom as a state-owned enterprise. It could be argued that the use of institutional funds to improve factors that determine investment grade, or to provide access to capital markets, or to underwrite sovereign guarantees, can mobilise international and domestic investment.

Pension funds are large investors with total assets of ZAR 4.3 billion in 2017, of which 46% was privately administered (Registrar of Pension Funds 2013). Government employee pensions are held in a fund governed by the PIC (see above). A legal opinion on pension funds and climate risks (Hunter 2019) has found that, under regulation 28 of the Pension Funds Act (Union of South Africa 1956), pension fund trustees are required to consider environmental, social and governance factors when making investment decisions. Commissioned by an NGO called JustShare, the opinion indicated that the boards of pension or provident funds are required to take into account climate-related risks and opportunities when making investment-related decisions on behalf of their funds. If they do not do so, this would likely amount to a breach of duty, under both the common law principles and Regulation 28 of the Pensions Fund Act. Shareholder activism could use this regulation to guide investment towards adaptation and mitigation.

Some local authorities in South Africa have significant budgets, notably the larger cities. While local authorities obtain part of their revenue through a so-called ‘equitable share’ from national government, they also achieve their own revenue bases, including by levying of rates and taxes on household and on-selling of electricity (from Eskom) through municipal electricity service departments. Cities have large administrations with human capacity and, where budgets allow it, officials can implement climate action. The fact that ‘South African municipalities have not been sufficiently supported by donors’ (Montmasson-Clair 2013), remains a challenge.

4.2.4 Information tools

The literature suggests that information is an important tool (Watson and Schindler 2017; Naidoo 2019; Whitley et al. 2018). Under the Convention, developing countries have long reported through national communications and, following the Bali Action Plan, nationally appropriate mitigation actions are to be ‘measurable, reportable and verifiable’ (MRV) (UNFCCC 2007). MRV requirements are embedded across all international climate finance frameworks (Naidoo, 2011).

In tracking progress on finance, might the provisions of the Paris rulebook on finance be helpful? South Africa has submitted three biennial update reports and is in the process of finalising its fourth, and has included information on finance for both mitigation and adaptation, in increasing detail. Reporting under the enhanced transparency framework will come into effect from 2024. The modalities procedures and guidelines were agreed (UNFCCC 2018), with negotiations continuing to define tables for reporting. These include tables for finance needed and received.

The Paris Agreement's enhanced transparency framework (Article 13.7(b)) requires all Parties to regularly provide 'information necessary to track progress made in implementing and achieving its nationally determined contribution under Article 4' (UNFCCC 2015a). Developing countries can voluntarily ('should') provide information on financial, technology transfer and capacity-building support needed and received (*ibid.*, Article 13.9). Information on mitigation and support provided by developed countries undergoes a technical expert review process, but information on adaptation as well as finance needed and received is not subject to such a process.

South Africa has been developing systems to implement its response to climate change. In 2016, GHGs were formally declared priority air pollutants under the existing National Environmental Management Act. This was followed in 2017 by the gazetting of GHG reporting regulations, together with the requirement that large emitters submit annual pollution prevention plans detailing means to cut GHG emissions.

A recent assessment found that South Africa has a relatively advanced system for tracking mitigation goals and is progressing well in terms of selecting appropriate indicators, enacting legislation, and enhancing transparency (Ross 2020; Ross and Winkler 2021). It finds room for improvement in collecting data, reporting on socio-economic outcomes, and making changes in national policy (*ibid.*). The DFFE continues to refine a mitigation system and develop systems for adaptation.

Communicating voluntary information on finance needed and received can help to make data collection more systematic. Officials in DFFE responsible for reporting have done impressive work in compiling information ad hoc for initial biennial update reports. More recently, DFFE and Treasury have collaborated in producing a technical paper on 'financing a sustainable economy', in which climate finance is presented as 'part of the budget process and fiscal risks monitoring by Treasury' (Treasury and DEFF 2020).

Climate budget tagging under development by the Treasury would create a system tracking in the public sector, but this does not take care of tracking private finance. From interviews with officials for this case study, it is clear that more information is available on public than private flows of finance in South Africa. Gathering information on private investment is an unrewarding task – companies are unwilling or unable to share information, and surveys to scope private finance for climate action have gathered relatively few responses (Cassim et al. 2021; McNicoll et al. 2017). One way to address the issue of limited information on private domestic finance flows might be to explore proxies for tracking progress. DFFE is developing a national climate finance strategy.

4.3 Roles of domestic private actors and civil society

Institutions and governance outside of the domestic public sector can also set norms and shape finance flows. This paper discusses institutions mostly in the narrower sense of actors, both domestically in South Africa (in this section) and international actors (in section 4.4 below). Major investments are made by businesses and banks in South Africa. The 'big four' banks – FirstRand, Standard, Nedbank and ABSA – may be asked provide USD 7 billion of commercial finance, together with USD 4 billion of concessional development and climate finance, as part of a just transition transaction (Tyler and Steyn 2019; Meridian Economics 2020b; Winkler et al. 2020a). The NBI, in collaboration with Business Unity South Africa and supported by Boston Consulting Group, has launched an initiative to find a common position on mitigation pathways and a just transition (NBI 2020), as well as specific investment opportunities (directly inputting into requests for international support made by South Africa).

The NBI has been working with the South African National Biodiversity Institute to engage the private sector in South Africa's GCF proposal development processes. In 2021 it established a Private Sector Community of Practice and is exploring climate adaptation project opportunities around (i) agriculture and food systems; (ii) water management and security; and (iii) ecosystems and sustainable natural resource use, through joint process with role-players from different industrial sectors, such as manufacturing, banking, insurance, packaging, retail and mining houses (Tshindane 2021).

Increasingly, shareholder activism seeks to influence investments by large corporations. The NGO JustShare has lobbied for more ambitious climate targets and more transparent disclosure by entities such as Sasol and Eskom. Activists have lobbied for universities to disinvest from fossil fuels and invest in more sustainable solutions; the University of Cape Town established a University Panel on Responsible Investment in 2017.¹³

Civil society organisations are increasingly engaging in shareholder activism. The Centre for Environmental Rights has published reports on 'financing fairly', benchmarking the DBSA and Industrial Development Corporation on environmental, social and governance standards (CER 2020). Particular emphasis was placed on two themes: climate change and power generation. The report found the DBSA's Environmental and Social Safeguards Standards to be comprehensive, scoring high, while the IDCs failure to disclose its policies 'is worrying'.

¹³ <https://tinyurl.com/2ab4zhkt>

Social movements can play a key role in shifting the parameters of public debates (Habib 2018). In the context of climate and development, South African NGOs have advocated for more climate actions, and recently for a 'deep just transition' (CJC movement 2020). Organised labour has been a key missing voice in many debates around climate change; however, trade unions have engaged more actively in debate to define a 2050 vision and pathways for a just transition (NPC 2019), and on the issue of resolving Eskom debt (see above, sections 2.3, 4.2.2, 4.2.3).

4.4 Roles of international actors

Multilateral and inter-governmental processes are important in norm-setting in a country like South Africa where the political culture is responsive to international agendas (Rennkamp and Marquard 2018). The country sees itself as a 'responsible global citizen', including in its climate policy (RSA 2011). The UNFCCC and its Paris Agreement are important actors in norm-setting in relation to climate change generally, and climate finance in particular. The entities serving as the financial mechanism of UNFCCC and also serving the Paris Agreement are the Green Climate Fund and Global Environmental Facility. The Adaptation Fund is considered particularly important, in being funded by a share of proceeds on CDM projects, its balanced governance and its support of adaptation. The Adaptation Fund will serve the Paris Agreement, though negotiations on a share of proceeds under Article 6 are not yet concluded.

Donors provide technical support and capacity building relevant for policy decisions, for example (in 2018–2019) to Denmark on renewable energy systems in power integration, to the United Kingdom through events for the 2050 Pathways Calculator that explores mitigation options and impacts, and to Germany's GIZ for training municipality stakeholders to package climate project proposals (DEFF 2020b). Analysis for the years 2018–2019 shows that technical support and capacity building tends to focus on mitigation, and there are some activities that target 'mitigation and adaptation' (ibid). None focused exclusively on adaptation.

International financial institutions are important in international finance. South Africa has interacted with the Bretton Woods institutions, including the World Bank, notably in recent history through obtaining a USD 3 billion loan for the coal-fired Medupi power station, with USD 0.5 billion for energy efficiency and renewable energy – a transaction that was closely scrutinised at the time (Inspection Panel 2011). However, there has been a significant shift away from investment in fossil fuels. The Institute for Energy Economics and Financial Analysis has reported that 'over 100 and counting globally significant financial institutions have announced their divestment from coal', with detailed reports on specific entities and regions on their website.¹⁴

¹⁴ <https://ieefa.org/exiting-oil-gas/>

Development finance institutions are not limited to the World Bank, but also include Agence Française de Développement, KfW Development Bank, and the African Development Bank (AfDB continentally and DBSA for the Southern African Development Community). Development banks can provide grant-based finance, remove barriers to investment to attract commercial investors to projects, and help to improving risk-adjusted returns on investment and blended finance.

The private sector is increasingly challenged to provide fuller disclosure not only of climate-friendly investments, but its full portfolio, including investments in fossil fuels. The Task Force on Climate-related Discourse aims to increase transparency, making 'markets more efficient and economies more stable and resilient' (TCFD 2017).

CHAPTER FIVE —————>

Policy coherence and coordination

To implement a broad and coherent mix of policies, coordination is needed across a range of ministries and national departments. Responding to the climate emergency is a complex undertaking – not a narrow environmental problem but involving every sector of the economy and society. The pace and scale of climate action required means that major systems have to change. However, even within national government there are different priorities, and departments are expected to stick to their mandates. Researchers have pointed to misalignment of climate policy with economic plans, industrial policy and integrated resource planning for electricity (Trollip and Tyler 2011). Policy on energy and industrial development, for example, may not be aligned with climate policy. This section considers possibilities for more coordination (processes and mechanisms) leading to more coherent policy (an outcome).

5.1 Reflections on governance: coordination, mediating interests and setting strategy

The examples in section 4.1 illustrate that broader policy relevant to financing mitigation includes industrial, energy, agricultural, and transport policy. The list is not comprehensive, but suffices to make the point that a wide range of government policies is needed to provide signals to direct finance flows to more effective climate action in South Africa. Governance needs to enhance coordination and mediate interests in order to set strategy more coherently (see also Figure 14 below). Some reflections from theories of policy processes may be useful at this point.

More generally, theories of policy processes have developed beyond the focus on single agencies or 'iron triangles' (Cerny 2001), in which policy-making actors protect each other's interests in three-way mutually beneficial relationships, to consider a much wider range of actors (Sabatier 1991; Nowlin 2011). Consistent with this approach, we have examined empirically actors in government, sketched the relationship with business, while also recognising the ability of social movements to shift the parameters of debates. It is important to identify key opportunities for mitigation and low-emissions development (Hochstetler and Kostka 2015).

Different actors have various interests. When considering actions across broad policy domains, mediation of interests is critical. Upadhyaya et al. (2021) have outlined the importance of setting goals even while mediating interests. A review of policy process theories applied to environmental governance, including climate change, points out that 'key drivers of environmental governance outcomes, such as social inequities, environmental justice, poverty, and economic structures, remain largely unaddressed on the periphery of empirical policy process scholarship' (Ruseva et al. 2019). Alignment with a national shared vision is key. So the inclusion of climate in other agendas becomes important. Yet this will not be a smooth process, involving only synergies – some trade-offs will have to be managed across climate and development objectives (Ürge-Vorsatz et al. 2014).

Institutional arrangements are needed to set strategy that is coherent and fit for purpose. Climate change requires change at a pace, scale and breadth that is unprecedented. Strategy is important, and tools include target-setting underpinned by framework laws (Averchenkova and Nachmany 2017). In the South African context, this would mean mitigation targets in the NDC and a just transition to net zero (in the LEDS).

In the context of India, Dubash et al. (2021) argue for institutional arrangements that advance mitigation through the pursuit of equitable low-carbon development pathways. The policy brief draws on analysis of Indian climate governance, informed by 31 interviews with officials, politicians and analysts. Dubash et al. suggest the need to innovate but also to ‘work with the grain’ of existing machinery of government, mainstreaming climate considerations through informational and procedural requirements, as well as incentives. The details are specific to the Indian polity, but, more broadly, applicable lessons are to enhance deliberative and analytical functions. They propose a new Low Carbon Development Commission, and a renewed Executive Committee on Climate Change, working with line-function ministries and states, as illustrated in Table 5. These could tackle three main challenges – setting strategy, building consensus and coordinating implementation. Setting strategy includes visioning, and becomes concrete by defining low-carbon pathways and analysing trade-offs and synergies. The flip-side of building consensus is mediating conflicts, something that they proposed be included in the institutional design. Coordination is both horizontal (across line functions) and vertical (across tiers of government), and they argue for building stable and consistent governance mechanisms that are also evolutionary to respond to new information and circumstances (Dubash et al. 2021), notions that are consistent with a ‘capable state’ in the National Development Plan (NPC 2011) – but the lack of which has been holding back economic progress (NPC 2020).

TABLE 5

Meeting challenges of setting strategy, building consensus and coordinating implementation in context of India

Challenge/ Institution	Strategy setting	Building consensus	Coordinated implementation
Low Carbon Development Commission	Define low-carbon development pathways	Convene government and stakeholders around:	Review and analyse annual ministerial reports
	Analyse synergies and trade-offs across multiple objectives	› Low-carbon development pathways	Review key UNFCCC communications
	Examine transmissions trajectories and progress towards them	› Emissions trajectories, targets and pledges	Advise ECCC and ministries on cross-ministerial policy packages and missions
	Advise	› Contentious issues leading to winners and losers	
	› Ministries and Executive Committee as requested	› Sub-national discussions	
	› On NDC formulation	› Cross-ministerial collaboration	
	› States on metrics and frameworks	› Inform public debate through:	
	Revisit and recommend changes in climate governance in response to a shifting context	› Annual submissions to parliament	
		› White papers	
		› Championing data transparency	

Challenge/ Institution	Strategy setting	Building consensus	Coordinated implementation
Executive Committee on Climate Change	Modify and update sectoral and cross-sectoral strategies drawing on LCDC analysis and agenda-setting	Respond to parliamentary questions and recommendations	ECCC
+		Provide necessary data and inputs to LCDC for informing public debate	› Solve implementation challenges
Line ministries	Identify cross-sectoral opportunities and pathways		› Guide cross-sectoral missions
+			› Line ministries
Ministry of Environment, Forests and Climate Change			› Implement policies
			› Build cross-sectoral missions
			› Submit annual mainstreaming reports to Parliament
			MoEFCC
			› Continue as nodal ministry

Source: Dubash et al (2021b)

Marquard (2020) has argued that future GHG emissions levels are an abstraction for policy-makers and imply a range of other key policy implications, themselves embedded in a number of existing policy and political contexts. He posed a key question for updating NDCs: 'whether these will follow from further developments in national policy, whether these will be accommodated within existing policy, or whether the NDC process itself will drive policy' (Marquard 2020b). Historically in South Africa, in a context in which the level of ambition of mitigation policy has been strongly contested within the state, the responsible government department (see footnote 4) has had difficulty exercising influence over key mitigation-relevant policy domains such as energy and industrial policy, which are overseen by more powerful national departments. However, the DFFE also acts as South Africa's focal point for the UNFCCC and its Paris Agreement, and is ultimately responsible for proposing and communicating mitigation targets to the UNFCCC. The 2009/2010 communication of mitigation targets by South Africa to the UNFCCC (for 2020 and 2025) in the context of the Cancun Agreements (COP 16) was very influential in driving renewable energy policy, first as part of the process on IRP 2010 (for which the DFFE proposed a GHG emissions cap for the first time) and later the REIPPPP. This was in the absence of a coherent mitigation policy for the electricity sector at the time.

By contrast, the 2020 update of the mitigation target range in South Africa's first NDC was primarily driven by the projected impact of currently existing mitigation-relevant policy measures, and the drive for further ambition has come from outside government. The current debate on further ambition has seen divergent views between actors (primarily some in government) who have approached setting the NDC target very cautiously in relation to existing policy, and other actors who favour ambition beyond existing policy (eNGOs and some in business), some of whom consider higher ambition essential to attract large-scale international climate finance. In other words, the NDC is being updated in a complex and contested space, defined by perceptions concerning the accessibility to South Africa of large-scale international climate finance for a faster decarbonisation of the economy and for social justice, and varying expectations concerning the state's ability to successfully implement ambitious mitigation policies.

We argue that coordination, mediation of interests and setting coherent strategy are critical for more effective climate action – which is what climate finance should support. Improving governance means reviewing institutional arrangements, to which we return in section 5.3 below. The paper next turns to information related to adaptation, and local government is also considered (the above focus having been on the national scale).

5.2 Examples of success and failure to improve coordination

There are examples of success in making policy coherent, and others of failure to coordinate. An example that shows that enhancing coherence across broader policy is possible is the intergovernmental grant system. The system makes disbursements on the basis of grant conditions prescribed each year in the Division of Revenue Act. Coherence is not perfect, but coordination across fragmented and complex terrain makes it better. An example of failure to coordinate is the structuring of infrastructure grants, which does not explicitly address climate change (Pegasys 2018; Petrie et al. 2018) and so constrains investment in climate-proof public infrastructure. A paucity of information about the extent of climate resilience and climate risk for urban infrastructure may contribute to this gap in infrastructure grants. The MTSF (2019–2024) starts to build evidence by mandating larger municipalities (i.e. the district and metropolitan municipalities) to audit the maintenance of municipal infrastructure resilience and readiness for climate change disasters (DPME 2019). Urban spatial development policy can better support adaptation and mitigation, for example through policy promoting densification (Pegasys 2018) and pro-poor development. While there are examples of failed and successful attempts to improve coordination, there are new institutional arrangements emerging in South Africa which provide a fresh opportunity to coordinate.

5.3 Institutional arrangements

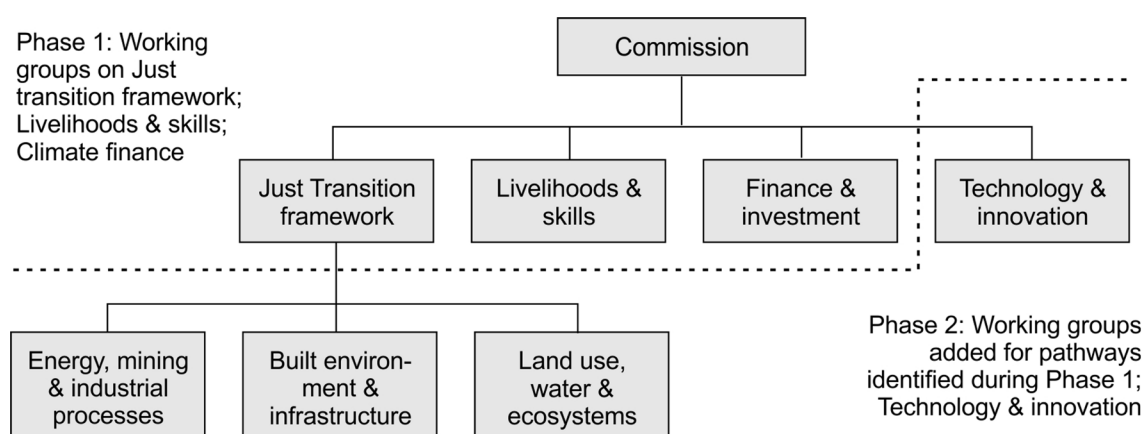
South Africa convened a Job Summit in 2018, which agreed to establish a Presidential Climate Commission (PCC). This new institution is tasked with coordination across climate change. It is designed to provide oversight at the highest political level, the Presidency – across topics, institutions, different levels of government. A framing element for the PCC is the just transition, emerging from the original mandate from the 2018 Jobs Summit. The National Planning Commission (NPC) undertook a two-year process to develop a draft '2050 vision and pathways for a just transition to a low carbon, climate resilient economy and society' (NPC 2019).

The NPC process built relatively broad support, and held a concluding conference in May 2019 at technical level; however a summit to adopt the vision was postponed repeatedly due to elections and the Covid-19 pandemic. Achieving a more coherent set of policies, through more effective coordination (Dubash et al. 2021), would send clearer and consistent signals on where finance is to flow. This in turn would support the implementation of climate policy and achieve targets and goals in NDC.

The PCC was earlier referred to as the Presidential Climate Change Coordinating Commission (P4C), but once it started meeting, the name was simplified. The earlier name did indicate a key function as a coordinating body, bringing together individuals from various key organisations and actors. Another important role is overseeing the just transition. The PCC is located in the Presidency, providing mandate at the highest level. Members of the PCC were appointed in late 2020 (Presidency 2020) and the Commission has begun work in 2021. The PCC was agreed to be a statutory body. This may be done through finalisation of a Climate Change Bill, which underwent extensive consultation in 2018, but was delayed until after elections and then by Covid-19, and is to be introduced to Parliament in 2021. Given this short history, only initial elements of the new institutional arrangements can be known. It is not yet clear exactly how the Commission will tackle the challenges, as it has been working for a few months only. However, some picture is emerging of the institutional arrangements by which the PCC intends to coordinate. Figure 11 shows a suggested structure, though this is still emergent. Finance and investment is part of the structure, within a just transition framework (to be developed), livelihoods and skills; and technology and innovation. This can be understood as combining both techno-economic considerations (finance and technology) and important societal aspects (framing social justice and protecting livelihoods).

FIGURE 11

Early suggestion of structure of Presidential Climate Commission



Source: Presentation to Presidential Climate Commission meeting by Crispian Olver, PCC Secretariat, 30 April 2021

5.4 Areas of work and other institutional arrangements

The PCC has identified broad areas of work, as shown in Figure 12. Finance comes in relatively late, flowing from a vision, pathways to reach such a vision – in a feasible and just manner – focusing then on employment and skills, with technology and finance as further enabling conditions. A process of monitoring and review indicates that the work would be iterative, tracking progress to realising the vision and achieving its goals.

FIGURE 12

Provisional broad work areas of Presidential Climate Commission



Source: Presentation to Presidential Climate Commission meeting by Crispian Olver, PCC Secretariat, 30 April 2021

The PCC is undoubtedly an important mechanism for coordination. However, there are existing processes and mechanisms for coordination, which also deserve attention and to which we turn next.

The MTSF aims to bring better coordination, coherence and integration of government planning and interventions, and it is the existing framework guiding public finance (DPME 2019) (for examples, see sections 4.1.6, 4.2.3, 5.2). If it increasingly mainstreams climate, it could guide domestic flows to include mitigation and adaptation.

Risk assessment across all spheres of government to vulnerabilities to climate impacts may be a starting point for policy coherence to inform an adaptation response. DEFF has published National Climate Risk and Vulnerability Assessment Framework guidance in order to enable some comparability and aggregation across assessments and thereby underpin an integrated climate adaptation response across scales (DEFF 2020c). Impacts and adaptation will differ locally, meaning that involvement of local authorities and stakeholders is important.

Some argue that policy coherence and co-ordination of efforts across a multi-level governance system with sectoral departments and national, provincial and local tiers of government is key to driving efficient and ambitious climate actions (Petrie et al. 2018). Local government is close to implementation and would have a more granular view of climate impacts and local needs for adaptation. Bottom-up identification of vulnerabilities and risk, assessment of resource needs and response capacity, and prioritisation of interventions can enhance effectiveness of climate actions. Such bottom-up and top-down (PCC, MTSF) approaches are sometimes in tension. However, policy coordination should aim at iterations that flow from bottom to top and back again.

5.5 Finance needs: Understanding what needs to be financed

A better understanding of what is to be financed is a foundation to guiding flows. Yet finance needs are poorly articulated. In early 2021, there was a call for proposals by GIZ for work on a climate change needs analysis for South Africa. The work will include a proposal for a Climate Response Finance Coordination Mechanism, as part of a national strategy. If established, the Coordination Mechanism could play an important role in managing the complex coordination tasks on climate finance. The work also entails an M&E framework, relevant to information flows and tracking progress. A process to develop a deeper understanding of climate targets, pathways and necessary technologies is required. This understanding needs to be shared across stakeholders. Tracking of what is already being funded is also required. Appropriate costings will need to be iteratively developed and the specific national or even sub-national barriers to climate finance considered when seeking climate finance, or finance more broadly (Parry et al. 2017; Maimbo and Zadek 2017).

Policies need to guide funding of both mitigation and adaptation – but policy signals are not clear. As shown in section 3.3 above, most flows into South Africa have been for mitigation. Clearer policy signals are needed from national government on where funding is needed for adaptation and mitigation, and structural challenges of adaptation funding need to be explored. In addition to public funding, consideration should be given to opportunities for private finance and work done to improve understanding on when blended finance is advisable, what the risk tolerances are, and when private sector investment is needed or not.

The updating of South Africa's first NDC is considering more ambitious mitigation targets and revising adaptation goals (RSA 2021). Already, South Africa has committed to ultimately moving towards a goal of net zero carbon emissions by 2050 (RSA 2020), which provides a long-term perspective on near-term targets. While greater ambition does not translate automatically into increased funding, it is a necessary step. Work on financing a just transition has been undertaken (Meridian Economics 2020b), including costing (Meridian Economics 2020a), and Eskom has established a just transition office. This is an example of developing costings more generally, on the basis of which financing should be sought, operationally. In that process, specific national or even sub-national barriers to climate finance, or finance more broadly, need to be overcome (Watson et al. 2020; Naidoo 2019).

Greater coordination among stakeholders, including development banks, international funders, national funds and private companies can enhance prospects for successful and effective disbursement of funds (Gilder and Rumble 2020).

Building on earlier work, we suggest that funds for the just transition might be channelled through a Just Transition Fund, described in earlier work (Meridian Economics 2020b; Winkler et al. 2020a), resourced by predictable flows from concessional value accruing from a JT transaction, as well as other finance. These funds should flow to work programmes that prioritise benefits for affected communities and workers. As the PCC mandate includes overseeing a just transition, the overall governance of a JT Fund might fall under the Commission, within its finance and investment area of work.

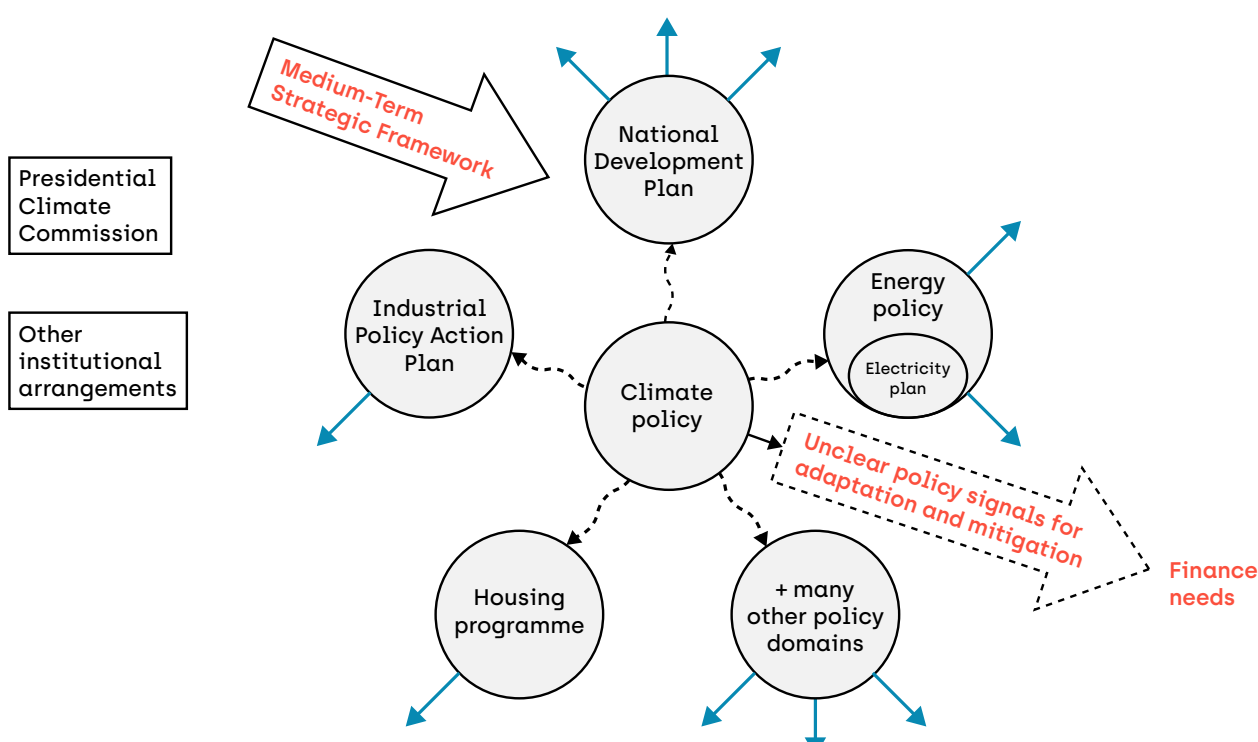
5.6 Coordination is easy to say and hard to do

Policy coherence needs to be implemented in a very challenging environment in South Africa. There are, firstly, structural challenges, in an institutional environment which has struggled to deal with complex cross-sectoral policy problems and has since 1994 been preoccupied with addressing the all-important issues concerning post-apartheid transformation. On top of these structural challenges, there are more recent challenges, including recovering from the Zuma years (which have damaged key institutions, and worsened crises in key state enterprises), the impacts of Covid-19, and other urgent development challenges (such as South Africa's very high unemployment rate).

These many challenges in the South African context, including extreme unemployment (52% of the population since the onset of Covid-19); high degrees of fragmentation, including internal divisions in the ruling African National Congress, citizens with different world views and competing interests across government; increasing levels of public debt, the largest part in Eskom. These and many others render successful policy coordination a potentially Sisyphean task. An important implication is that the policy signals sent are unclear and hence unlikely to articulate finance requirements well, or coordinate these in seeking international climate finance, as illustrated in Figure 13.

FIGURE 13

Challenges in coordinating policy for more coherence and need for clearer policy signals



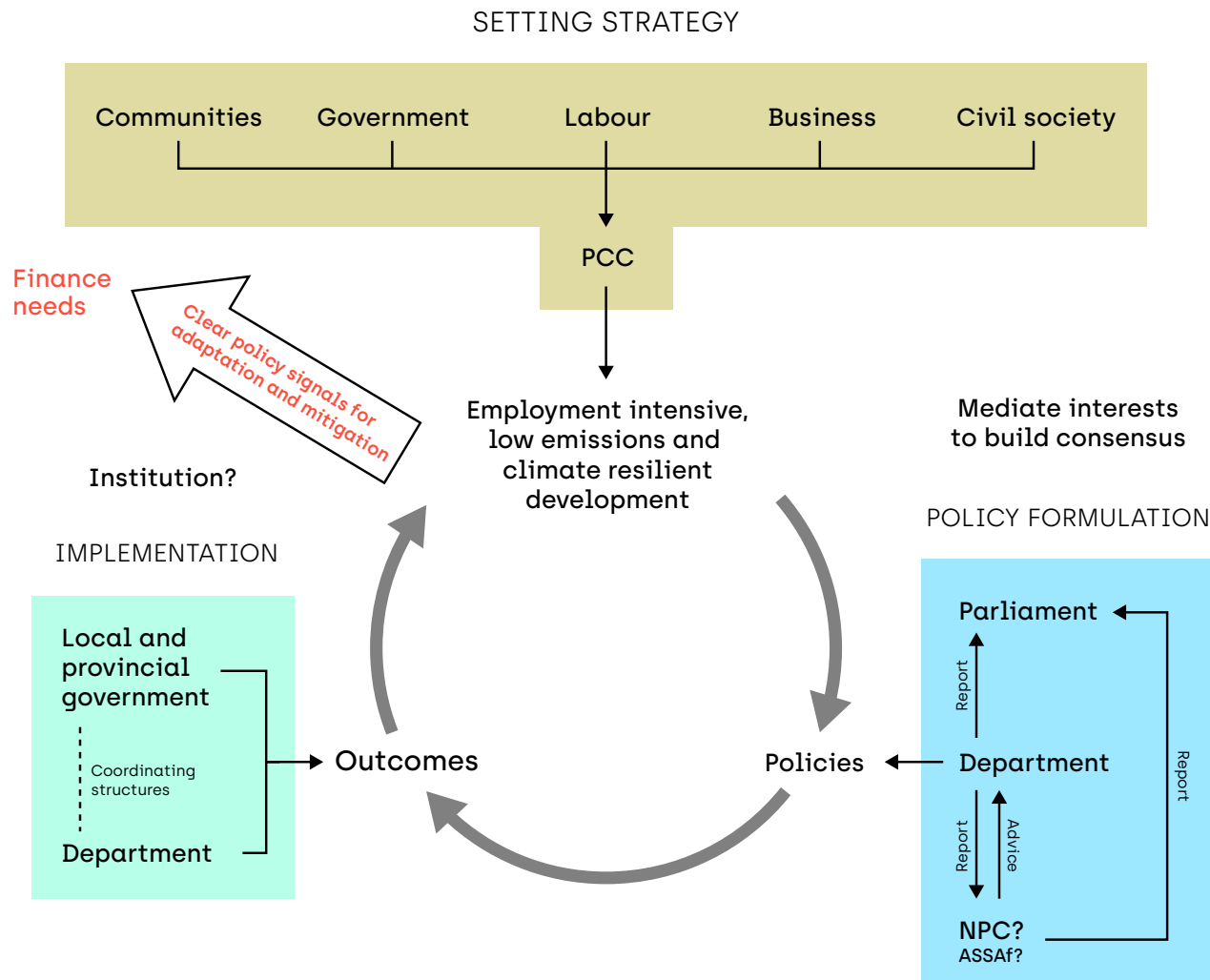
Source: Authors' analysis

Climate policy is shown in Figure 13 at the centre of various policy domains. Addressing climate requires not only institutions dedicated to climate change, but also others – working on multiple aspect of development, from industry, energy, to housing, agriculture and many others. In this regard, the figure illustrates what was elaborated in section 5.1 above, showing the challenge of misalignment. The problem is that energy and industrial policy ‘point’ in different directions, as do others – illustrated by the difference in directions of the blue arrows in Figure 13. The National Development Plan provides a single document guiding the country’s development; yet a closer reading suggests the NDP points in several directions. If climate policy connects to all, it is ‘pulled’ in different directions. The PCC is shown on the left, mandated to coordinate. Work by Treasury on a taxonomy may help such a process.

Drawing on Dubash et al (2021b), we suggest that working with existing institutions and creating new ones are both important. Figure 13 includes other institutional arrangements, and a possible set of institutions that might set strategy, build consensus by mediating interest and coordinate policy are shown in Figure 14.

FIGURE 14

Setting strategy, mediating interest and coordinating policy by existing and new institutions in South Africa



Source: Authors, inspired by Dubash et al (2021b)

Figure 14 is centred on employment-intensive, low emissions and climate-resilient development. Setting strategy is illustrated at the top, across government, labour, business, communities and civil society. Even without breaking those broad consistencies down further, the need to mediate interest is apparent. The PCC is an important new institution that would coordinate. It can build on a strong tradition of wide consultation, including facilitated stakeholder processes for early long-term mitigation scenarios (SBT 2007) and recommendations of the NPC.

However, we suggest there is some contradiction between the PCC aiming to both mediate interests and provide 'independent' advice, which has already been a subject of debate within the Commission. The composition of the PCC is representative – based on constituencies, however the Commissioners are appointed in the individual capacities. Not shown in Figure 14 are various technical working groups which are to be run by line-function departments and state research councils. That does not suggest independent advice, and it may be better institutional design to separate the consultative functions from the analytical.

The NPC could potentially play an analytical role. The NPC was also created by government, though most Commissioners are from outside government. The first NPC developed a Vision 2030, whereas the second has focused more on mainstreaming. Potentially it could play a role of providing independent analytical advice, as shown in Figure 14. Another possibility would be the Academy of Science of South Africa (ASSAf), which has in the past provided a reflective space to inform public debates. It has recently established a Forum on Just Transition, but it is too early to tell whether this is an appropriate structure to advise on overall climate policy.

While there are new institutions, existing institutions are crucial for policy formulation and implementation. Line-function departments at national scale coordinate with local and provincial governments. Better understanding is needed on interventions across a different spatial scale – national to local – and broader policy as well as fiscal policy instruments. Together, these should guide project implementation, if climate finance is to lead to action on the ground. 'Working with the grain' is essential to integrating governance in development strategies (Levy 2014). The same applies to climate change, which requires both innovation that departs from historical trends and working with existing institutions to implement. The diagram also shows national departments reporting to Parliament, providing accountability through Portfolio Committees and other existing structures. Potentially the NPC (or ASSAf, or another analytical institution) would be mandated to provide independent advice to Parliament, and in turn advise Departments.

The outcomes would, it is suggested, send clearer policy signals for adaptation and mitigation (connecting back to Figure 13) and develop costings and operationally pursue specific investment opportunities. This would help to meet finance needs more fully.



CHAPTER SIX —————>

Conclusion

The aim of this paper is to contribute to better understanding ways to increase the quantity of international and domestic financing for climate action and to shift the direction of finance flows going to climate objectives in South Africa. To do so, it examined international finance flows for development and climate objectives – provided to fulfil finance support obligations and finance mobilised internationally, through grants, loans and other financial instruments, with a geographical focus on South Africa. A conceptualisation of ‘Paris-compatible’ finance is drawn together in Figure 1, illustrating international climate finance as support by developed countries and other finance flows, domestic public and private investment, and levels of data certainty.

The paper reports that government has adopted a definition of sustainable finance, and is working on a Green Finance Taxonomy for South Africa and climate budget tagging. It considers, without offering a formal definition, financial resources that support mitigation and adaptation to be part of climate finance. It is clear that significantly more is known about public than private finance in South Africa. The development of the domestic market for green bonds and reflections on prospects for market maturation is briefly outlined. We review, and acknowledge that we are building on, existing literature, reviewed in section 2.

Assessing initial bottom-up estimates of finance needs for both mitigation and adaptation, the paper finds that the overall cumulative investment requirement for mitigation ranges from ZAR 460–760 billion, depending on the degree of implementation of the IRP and the economic growth rate. In South Africa’s draft updated NDC, 83% of contribution to the mitigation come from the electricity sectors. In the transport sector, several shifts are taking place – freight from road to rail, private to public modes, and internal combustion engine technology to electric and hybrid mobility – that contribute 8% to the target. However, none of these shifts in transport systems have been clearly costed, making this an area for future research. The other sectoral contributions to the costing for mitigation are less than 3%.

In reviewing the bottom-up costing of strategic interventions in the National Climate Change Adaptation Strategy, which is the strategic framework for implementing adaptation action for 2020–2030 in South Africa, it was found that 93% of the costs were for reducing the vulnerability of people and economy, ensuring resilience of physical and natural capital and building adaptive capacity. Further research might unpack this large set and discover to what extent these resource priorities are being met. The other priorities are costed between ZAR 0.1 billion and ZAR 15 billion (or 0.1–2% of the total of ZAR 89 billion for the ten-year period). It might be useful to benchmark such costings against those to other developing countries, which will be possible when the work on determination of the needs of developing country Parties is published, currently in outline form (SCF 2020).

The paper finds that international public finance for climate action does not reflect expectations arising from the Paris Agreement. Inputs to this case study by Aaron Atteridge (2021) find total development finance over the five-year period from 2014 was USD 1.81 billion. The average of USD 363 million per year is not the only estimate of international climate finance to South Africa. We conclude that methodologies and accounting are important, to narrow ranges and increase understanding of funding volumes and needs. The scale of international development finance commitments targeting climate objectives in South Africa fluctuates considerably between years, and there is no clear upward trend over time.

A key finding is that international climate finance over those five years was almost entirely for mitigation. There are two possible reasons for this: that priorities, interests and preferred implementation modalities of funders and the South African government do not always coincide; and a lack of clear policy signals from the South African side; both of these hypotheses bear further examination. In response to the first, dialogue formats are proposed to achieve more convergence of viewpoints, as well as further analysis on the adaptation funding needs to inform such processes, including improved conceptual approaches to fund adaptation, which moves away from requiring co-finance and leveraging for intervention where benefits are not monetised or otherwise suitable project proponents struggle to raise capital. Also, a pipeline of fundable project proposals should be developed and brought to the international negotiation table for finance as a national priority. To help this process, an improved process for linking finance needs assessment with national policy priorities of disaster risk management, health, and agricultural production is recommended. Domestic and donor governments can improve efforts to enhance climate finance absorptive capacity through support for climate finance proposal processes and in selection of finance delivery channels. Further research into how domestic finance flows and international financial support can better meet adaptation needs seems warranted.

There is little evidence that international funding is targeting the needs identified in the NDC and NDC update. Not all the support needs are immediately fundable – for example, the updated NDC states that evidence of shifting to lower emission transport will be apparent only around 2025. Nonetheless, some of the support needs are immediate, such as investment in renewables electricity generation and the setting up of the system for implementing the NCCAS over the short-to-long term. Assessment of which needs have been resourced and which still require funding, and the urgency of the requirement may provide insights into what is needed to increase the rate and appropriateness for support, especially for adaptation and just transition to a low emissions development pathway.

The paper suggests several possible ways to increase the quantity of international and domestic finance for climate action and shift the direction of flows in South Africa. The South African government could engage more proactively with international climate finance providers to scale-up adaptation finance. There could be more elaboration of plans and assessment of what needs to be financed. This requires governance and coordination, to which we return below. Funders might re-consider funding priorities and approaches, and retain flexibility to co-financing and leveraging requirements. While co-financing and leveraging approaches mean that it is possible to mobilise increasing volumes of investment, these strategies create a barrier for local-level implementers that struggle to raise capital and for funding interventions that do not yield benefits that are easily monetised. Notwithstanding possible other reasons for the shortfall, the gap between international support for mitigation and adaptation in South Africa is so vast that consideration of feedback from the implementing community is warranted.

A central argument of the paper is that broader policy is key to guiding finance flows and shaping climate finance. By policies is meant public sector interventions, institutions, governance and other enabling conditions. In the context of South Africa, these broader policy interventions include an imminent amendment to the Electricity Regulation Act that will enable companies to build their own generation facilities for their own energy needs or to supply to grid. The reform aims to reduce economic losses as a result of inadequate electricity supply, and it unblocks a longstanding obstacle to growth in this segment of the renewable energy market.

Policy to shift public finance flows includes the mainstreaming of climate objectives in key performance areas and public budget in the National Medium-Term Strategic Framework 2019–2024, and the draft National Climate Change Bill (2018), which requires sectoral climate change response plans.

On financial instruments, the categories suggested by Watson and Schindler (2017) and elaborated by Whitley et al (2018) are found useful: financial policies and regulations; fiscal policy levers; public finance; and information instruments. It is anticipated that the Green Finance Taxonomy under development will provide a basis for regulating the finance sector. A taxonomy that included climate finance would provide a basis for monitoring fiscal risks, and guide particularly, large institutions investors, such as pension and sovereign wealth funds, towards climate action and direct finance flows away from directions not compatible with the Paris Agreement. Some reform of fiscal policy may be driven by the Green Transport Strategy to 2050, which promotes cleaner mobility and may negatively impact fuel tax revenues. A process to redesign tax for transport could be an opportunity to use tax to support strategic objectives in the Green Transport Strategy to target environmental benefits. The climate budget tagging system being developed by the National Treasury will provide information on whether domestic public finance is balanced across mitigation and adaptation. There is scope for increased mainstreaming of adaptation and mitigation objectives in provincial and municipal policy for spatial planning. Informational tools, including those to report and track finance, are important. Tracking international climate finance will need to distinguish finance provided from finance mobilised to assess fulfilment of obligations under Article 9.3 of the Paris Agreement. Private sector finance flows are understood to be significant, although not tracked. Tracking private investment over the short to medium term could provide data required to assess the effectiveness of policy aimed at leveraging climate investment. Research is needed to identify methodologies fit for purpose and enable timeous data collection.

Aligning policy (broad and financial) requires coordination to avoid incoherence, and even the National Development Plan has different directions. With greater coordination, clear policy signals – for both adaption and mitigation – would be sent. That, it is argued, would help meet finance needs more effectively. Possible options for coordination have been described – horizontally across different constituencies, and also across line-functions in national government, as well as vertically, across spheres of government. Vertical coordination of multi-level governance may need to include coordination of resourcing for regional to highly localised scales of implementation, especially in where municipal government is tenuously connected, if at all, to sources of funding to meet climate objectives.

Different actors have various interests, so achieving greater policy coherence requires institutional arrangements to set strategy, mediate interests and coordinate implementation. The new Presidential Climate Commission (PCC) has the potential to play an important role in this regard. The PCC is starting to lead collaborative development and iteration of vision for just transition to an employment-intensive, climate resilient economy and society. The National Planning Commission and/or ASSAf might provide analytical functions.

In a sense, then, South Africa is doing what the literature suggests, and is in the process of realigning institutions. This involves both a new institution (the PCC) and must also, we suggest, work with existing institutions in national and local scale. Implementation requires working with the grain, even while climate change is a challenge that requires institutional innovation. Better institutional alignment would enable government to send clearer policy signals. And that in turn can shift finance to support climate action, balanced across mitigation and adaptation. The new institutional arrangements are emergent – the PCC met for the first time while this study was being undertaken. These matters would benefit from further research and analysis.

Glossary of terms and explanation of acronyms

AOSIS	Alliance of Small Island States. An ad hoc coalition of 42 low-lying and island countries that are particularly vulnerable to sea-level rise and share common positions on climate change.
BASIC	Brazil, South Africa, India and China. Environment Ministers coordinate on climate change issues, not a formal negotiating group – does not adopt formal positions.
Bunker fuels	Fuels used in aviation and maritime transport.
CBDR&RC	Common but Differentiated Responsibilities and Respective Capabilities (principle of equity in Article 3.1 of the Convention). Under the Paris Agreement, CBDR&RC was qualified with the addition ‘in the light of different national circumstances’ (Art 2.2 and elsewhere). Differentiation under Paris is not based on lists of Parties, whereas under the Convention, different obligations applied to Parties listed in Annex I (from non-Annex I Parties). The Paris Agreement refers to developed and developing countries, but there is no listing.
CCS	Carbon capture and storage.
CDM	Clean Development Mechanism. A project-based emissions trading system under the Kyoto Protocol that allows industrialised countries to use emission reduction credits from projects in developing countries that both reduce greenhouse gas emissions and promote sustainable development. Activities under the CDM may be continued under Article 6 of the Paris Agreement. CMA. Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. Sessions of the CMA are held during the same period as the COP and CMP. Usually these meetings are in November or December of each year.
COP	Conference of the Parties to the Climate Convention. The supreme body of the Convention. It currently meets once a year to review the Convention’s progress. The word ‘conference’ is not used here in the sense of ‘meeting’ but rather of ‘association,’ which explains the seemingly redundant expression ‘twenty-sixth session of the Conference of the Parties.’
CMP or COP/MOP	Conference of the Parties serving as the Meeting of the Parties to the Protocol. The Kyoto Protocol’s supreme body, which will serve as the Protocol’s meeting of the Parties. The sessions of the COP and the COP/MOP are held during the same period.

DC	Developing country.
DFFE	Department of Forestry, Fisheries and the Environment. Formerly Department of Environmental Affairs.
EIT	Economy in transition. EITs typically include the countries of Central and Eastern Europe (e.g., Poland), the former Soviet Union (e.g., Russia), and Central Asian Republics (e.g., Kazakhstan).

Environmental benefits

Include reductions in air, water and land pollution, reductions in GHG emissions, improved energy efficiency, responsible use and conservation of natural resources, as well as the mitigation of and adaptation to climate change. (Treasury and DEFF 2020).

Environmental and social (E&S) risk management

The integration of the consideration of E&S risks into governance and specifically risk management frameworks and systems of financial institutions and the active management and mitigation of those risks. (Treasury and DEFF 2020).

Environmental, social and governance (ESG)

A term increasingly used by investors to refer to the type of risks assessed as part of responsible investment practices. Sustainable finance is used here as an overarching definition that incorporates this concept. (Treasury and DEFF 2020).

EU European Union. Includes 27 member states (28 prior to Brexit).

G-77&China Group of 77. Founded in 1967 under the auspices of the United Nations Conference for Trade and Development (UNCTAD); seeks to harmonize the negotiating positions of its 133 developing-country members.

G-7 An international forum for the governments of Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. The EU participates as a guest, presented by the Presidents of the European Council and European Commission. Russia was part of the former G8.

GDP Gross domestic product. A measure of total economic output of a country. Increasingly regarded as imperfect, yet remains very widely used.

GEF Global Environment Facility. A designated financial mechanism for international agreements on biodiversity, climate change (i.e., the UNFCCC), and persistent organic pollutants. Established in 1991, the GEF helps developing countries fund projects and programs that protect the global environment.

GCF Green Climate Fund, established in Cancun, with detailed design underway in 2011.

GHG Greenhouse gas. Any gas that absorbs and re-emits infrared radiation into the atmosphere. The main greenhouse gases include water vapor (H₂O), carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).

Global warming potential (GWP)

An index that allows for comparison of the various greenhouse gases. It is the radiative forcing that results from the addition of 1 kilogram of a gas to the atmosphere compared to an equal mass of carbon dioxide. Over 100 years, methane has a GWP of 25 and nitrous oxide of 310. The GWP value of methane has been revised in IPCC WGI reports. Other metrics to convert to CO₂ equivalents have been proposed, including a global temperature potential and 'GWP*'. Decision 18/CMA.1 agreed that Parties must use GWP-100 for reporting and may also, additionally use other metrics.

Green Bonds A green bond is a bond specifically earmarked to be used for climate and environmental projects. These bonds are typically asset-linked and backed by the issuer's balance sheet, and are also referred to as climate bonds. To promote integrity and overcome inconsistencies in definition and use of green bonds, a set of voluntary Green Bond Principles were adopted by the International Capital Markets Association in 2018. (Treasury and DEFF 2020).

Green economy

An economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. It is low carbon, resource efficient, and socially inclusive (UNEP, 2011 in (Treasury and DEFF 2020)).

Green finance

Financing of investments that provide environmental benefits in the broader context of environmentally sustainable development. It involves efforts to internalise environmental externalities and adjust risk perceptions to boost environmentally friendly investments and reduce environmentally harmful ones. It covers a wide range of financial institutions and asset classes, and includes both public and private finance. (Treasury and DEFF 2020). Treasury has undertaken a process to develop a green finance taxonomy, which is expected to provide a more formal definition of green finance, likely including climate finance

IMF International Monetary Fund.

IPR Intellectual property rights.

ITMO Internationally transferred mitigation outcome. Term used in Article 6 of the Paris Agreement, roughly comparable to credits under emissions trading and the CDM of the Kyoto Protocol, but subject to different rules (still being negotiated in 2021).

IPCC	Intergovernmental Panel on Climate Change. Conducts authoritative assessment of the state of knowledge in three Working Groups: WGI on the physical science basis; WGII on impacts, vulnerability and adaptation; and WGIII on mitigation. A synthesis report (SYR) draws together findings across the three Working Groups and special report during an assessment cycle (roughly every 5 to 7 years). Governments agree outlines, accept chapters and approve summaries for policy-makers (SPMs) in plenary meetings. The IPCC is an example of the science-policy interface.
IRP	Integrated Resource Plan. The official plan for electricity, currently IRP2019. Supposedly integrating demand and supply, though in practice debate tends to focus on electricity supply options.
KP	Kyoto Protocol. An international agreement adopted by all Parties to the Climate Convention in Kyoto, Japan, in December 1997. Not ratified by the US.
LDC	Least developed country. A category of countries (currently 49) deemed by the United Nations to be structurally handicapped in their development process, facing more than other developing countries the risk of failing to come out of poverty as a result of these handicaps, and in need of the highest degree of consideration from the international community in support of their development efforts.
LEDS	Low Emission Development Strategy. Encouraged under Article 4.19 of the Paris Agreement, for long term. South Africa submitted its LEDS up to 2050 (RSA 2020).
LMDC	Like minded developing countries. A group of countries in the trade and climate negotiations. In the UNFCCC and Paris Agreement, the LMDC includes Algeria, Bangladesh, Bolivia, China, Cuba, Ecuador, Egypt, El Salvador, India, Indonesia, Iran, Iraq, Jordan, Kuwait, Malaysia, Mali, Nicaragua, Pakistan, Saudi Arabia, Sri Lanka, Sudan, Syria, Venezuela and Vietnam.
NDC	Nationally determined contribution. Equivalent of Party commitments under the Paris Agreement. They are obligations of conduct, that is, Parties must submit NDCs every five years, but not obligations of result, that is, there are no legal consequences to not achieving targets set in a NDC. Widely regarded as a 'bottom-up' element of Paris, in that countries decide their own targets, and there is no multilateral process to agree them. Parts of NDCs, on mitigation and support provided, are subject to technical expert review.
NDP	National Development Plan. First and only one so far produced in 2011 by the NPC.
NPC	National Planning Commission. Commissioners are mostly not from government.
MRV	Measurable, reportable and verifiable. See also transparency.
NGO	Non-governmental organisation.
ODA	Official Development Assistance.

OECD	Organisation for Economic Cooperation and Development. An international organisation consisting of the major industrialised countries. The OECD includes Mexico and the Republic of Korea, which are non-Annex I countries under the Kyoto Protocol.
PAMs	Policies and measures. The promotion of renewable energy, energy efficiency, forest conservation, or other actions for the reduction or limitation of greenhouse gases or for sustainable development(to be implemented by Annex I Parties under Article 2.1 of the Protocol).
Paris Agreement	Agreement of Parties to the UNFCCC, adopted in Paris in 2015.
Party	A state (or regional economic integration organization, such as the European Union) that agrees to be bound by a treaty and for which the treaty has entered into force.
RE	Renewable energy. RE sources are flows, unlike fossil fuels, which are stock. This means that RE flows are 'renewed' every year. Wind, insolation, hydro, geothermal are major RE sources for electricity generation. Biofuels are RE liquid fuels.
REDD	Reducing emissions from deforestation and degradation in developing countries.
REIPPP	Renewable Energy Independent Power Producer Programme. Auctioning programme that increased RE capacity significantly.
SBI	Subsidiary Body for Implementation. An official body of the Climate Convention, open to all Parties, that makes recommendations on policy and implementation issues to the Conference of the Parties and, if requested, other bodies.
SBSTA	Subsidiary Body for Scientific and Technological Advice. An official body of the Climate Convention, open to all Parties, that serves as the link between the information and assessment provided by expert sources (such as the Intergovernmental Panel on Climate Change) on the one hand, and the policy-oriented needs of the Conference of the Parties on the other.
SIDS	Small Island Developing States.
SR1.5	IPCC special report on global warming of 1.5 °C. SR1.5 was requested by Parties in adopting the Paris Agreement, and published by IPCC in 2018. A headline finding was that to keep 1.5 °C in reach, global emissions need to reach net zero CO ₂ 'around 2050'. This is an assessment, largely based on integrated assessment models.

Sustainable financial system

A sustainable financial system is stable and creates, values, and transacts financial assets in ways that shape real wealth to serve the long-term needs of a sustainable and inclusive economy along all dimensions relevant to achieving those needs, including economic, social, and environmental issues; sustainable employment; education; retirement financing; technological innovation; resilient infrastructure construction; and climate change mitigation and adaptation. (Treasury and DEFF 2020).

Sustainable development

Sustainable development has many definitions internationally, from the Brundtland report (WCED 1987) to the adoption of the Sustainable Development Goals (UN 2015). Sustainable development is a shared aspiration and is understood in different contexts. In South Africa, sustainable development is taken by government to mean the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations. (National Environmental Management Act (NEMA), (Act No. 107 of 1998) in Treasury and DEFF 2020).

Transparency

Arrangements for reporting and review, to make information transparent. Article 13 of the Paris Agreement established an enhanced transparency framework. See also MRV (under the Convention).

UNFCCC United Nations Framework Convention on Climate Change (Climate Convention, or Convention). A treaty signed at the 1992 Earth Summit in Rio de Janeiro by more than 150 countries.

WB World Bank.

WTO World Trade Organisation.

References

- AIDC, 2020: *The PIC, Eskom Debt & financing a Just Energy Transition*. 0–26 pp. http://aidc.org.za/download/the_public_investment_corporation_pic_and_the_government_employees_pension_fund_gepf/The-Public-Investment-Corporation-and-Financing-a-Just-Energy-Transition-Final.pdf.
- Ashton, P. J., D. Hardwick, and C. Breen, 2008: Changes in water availability and demand within South Africa's shared river basins as determinants of regional social- ecological resilience",. *Burn. MJ Weav. AvB*, 279–310.
- Atteridge, A., 2021: *Mapping international finance flows to South Africa in support of climate change action. Input to case study, SNAPFI project*. Preprint: <https://doi.org/10.6084/m9.figshare.14528910.v1> . Dataset: <https://doi.org/10.6084/m9.figshare.14528922.v2>. University of Cape Town,.
- Atteridge, A., G. Savvidou, S. Sadowski, F. Gortana, L. Meintrup, and A. Dzebo, 2019: *Aid Atlas*. <https://aid-atlas.org>.
- Averchenkova, A., and M. Nachmany, 2017: Institutional aspects of climate legislation. *Trends in Climate Change Legislation*.
- Barnes, J., and A. Black, 2013: The Motor Industry Development Programme 1995–2012: What have we learned? *Int. Conf. Manuf. Growth Employ. Equal.*, 1–38.
- Baumert, K., 1999: Understanding additionality. *Promoting development while limiting greenhouse gas emissions: Trends & baselines*, World Resources Institute & United Nations Development Programme, 135–145.
- Bergman, N., 2018: Impacts of the Fossil Fuel Divestment Movement: Effects on Finance, Policy and Public Discourse. *Sustainability*, 10, <https://doi.org/10.3390/su10072529>.
- Bisseker, C., 2021: DBSA's green bond: funding the future. *Financial Mail*, March.
- Black, A., 2016: Towards employment-intensive growth in South Africa.
- , 2018: *Why has manufacturing employment declined so rapidly?* Econ3x3,.
- Bodnar, P., and Coauthors, 2020: *How to retire early: Making accelerated coal phaseout feasible and just*. Rocky Mountain Institute, <https://rmi.org/insight/how-to-retire-early>.
- Bongaerts, D., and D. Schoenmaker, 2019: The next step in green bond financing. *SSRN Electron. J.*,.
- Buchner, B., P. Oliver, X. Wang, C. Carswell, C. Meattle, and F. Mazza, 2017: *Global landscape of climate finance* . Climate Policy Initiative, <https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2017/>.
- Burton, J., T. Caetano, and B. McCall, 2018a: *Coal transitions in South Africa: Understanding the implications of a 2°C-compatible coal phase-out plan for South Africa*. IDDRI and Climate Strategies, https://coaltransitions.files.wordpress.com/2018/09/coaltransitions_finalreport_south-africa_2018.pdf.
- , T. Lott, and B. Rennkamp, 2018b: Sustaining carbon lock-in: fossil fuel subsidies in South Africa. *The politics of fossil fuel subsidies and their reform, chapter*, J. Skovgaard and H. Van Asselt, Eds., Cambridge University Press, 229–245.
- Burton, J. A. S., 2011: *The role of industrial policy in pursuing climate change mitigation objectives in South Africa: Industrial energy demand and the minerals-energy complex in post-apartheid South Africa. Publishable paper (summary of MSc Thesis)*. Energy Research Centre, University of Cape Town,.

- Caldecott, B., 2020: Defining transition finance and embedding it in the post-Covid-19 recovery. *J. Sustain. Financ. Invest.*, 0, 1–5, <https://doi.org/10.1080/20430795.2020.1813478>. <https://www.tandfonline.com/doi/full/10.1080/20430795.2020.1813478>.
- Carbon Trust, 2020: *Evaluation of the Nedbank Sustainable Development Goals Issuance Framework and SDG-Linked Sustainability Bond: Second Opinion*.
- Carley, S., and D. M. Konisky, 2020: The justice and equity implications of the clean energy transition. *Nat. Energy*, <https://doi.org/10.1038/s41560-020-0641-6>.
- Cassim, A., J.-V. Radmore, N. Dinham, and S. McCallum, 2021: *South African climate finance landscape 2020*. GreenCape, Bertha Centre for Social Innovation and Entrepreneurship and Climate Policy Initiative, <https://www.green-cape.co.za/assets/South-African-Climate-Finance-Landscape-2020-January-2021.pdf>.
- CER, 2020: *Financing fair*.
- Cerny, P., 2001: From “Iron Triangles” to “Golden Pentangles”? Globalizing the Policy Process. *Glob. Gov.*, 7, 397–410. <http://www.jstor.org.ezproxy.uct.ac.za/stable/27800313>.
- Chandra, R., 2018: Adaptive state capitalism in the Indian coal industry. Doctoral dissertation. Harvard University, <https://dash.harvard.edu/handle/1/41127494>.
- City of Johannesburg 2014 in Ngwenya and Simatele, 2020: Joburg Pioneers Green Bond. *S. Afr. J. Sci.*, 116, <https://doi.org/1996-7489>.
- CJC movement, 2020: *Climate Justice Charter*. <https://www.safsc.org.za/climate-justice-charter/>.
- Climate Bonds Initiative 2017 in Ngwenya and Simatele, 2020: City of Cape Town Green Bond. *S. Afr. J. Sci.*, 116.
- Cloete, K., and D. Sikwebu, 2020: Outcry against Cosatu’s call to use state pensions to save Eskom muddies waters: Plan’s weakness is focus on saving power utility rather than on guiding and financing energy transition. *Business Day* <https://www.businesslive.co.za/bd/opinion/2020-03-17-outcry-against-cosatus-call-to-use-state-pensions-to-save-eskom-muddies-waters/>.
- Collocott, C., 2019: Recent ANC comments on prescribed assets for financial institutions – Brief II of II. <https://hsf.org.za/publications/hsf-briefs/recent-anc-comments-on-prescribed-assets-for-financial-institutions-brief-ii-of-ii>.
- Constantatos, O., 2020: JSE Debt Listing Requirements: Improvements are still missing.
- COSATU, 2020: Key Eskom and economic intervention proposals. <http://mediadon.co.za/wp-content/uploads/2020/02/COSATU-Key-Economic-Intervention-Proposals-19-01-2020.pdf>.
- DBSA, 2021a: DBSA Launches Green Bond.
- , 2021b: Fund Management.
- , 2021c: DBSA Green Bond Framework.
- DEA, 2013: Long-term adaptation scenarios for South Africa: Together developing adaptation responses for future climates. Summary for policy-makers. https://www.environment.gov.za/sites/default/files/docs/summary_policymakers_bookV3.pdf.
- , 2014: *The economics of adaptation to future climates in South Africa. Report No 6 for the Long Term Scenarios Flagship Research Programme (LTAS) for South Africa*.
- , 2015: South Africa’s Intended Nationally Determined Contribution (INDC). *UNFCCC*, 1, 1–8.
- DEFF, 2019: *The cost estimate for implementation of the National Climate Change Adaptation Strategy. Final Report*. Department of Environment, Fisheries, and Forestry.

- , 2020a: National climate change adaptation strategy. https://www.environment.gov.za/sites/default/files/docs/nationalclimatechange_adaptationstrategy_ue10november2019.pdf.
- , 2020b: South Africa's 4th Biennial Update Report to the United Nations Convention on Climate Change.
- , 2020c: National climate risk & vulnerability (CRV) assessment framework. https://www.environment.gov.za/sites/default/files/docs/climatechange_vulnerabilityassessment_framework.pdf.
- DME, 1998: White Paper on Energy Policy for South Africa. http://www.energy.gov.za/files/policies/whitepaper_energypolicy_1998.pdf.
- DMRE, 2019: Integrated Resource Plan 2019. 98. <http://www.energy.gov.za/files/docs/IRP>.
- Dorfleitner, G., S. Utz, and R. Zhang, 2021: The pricing of green bonds: external reviews and the shades of green. *Rev. Manag. Sci.*, 1–38.
- DoT, 2018: *Green Transport Strategy for South Africa (2018-2050)*. Department of Transport, [https://www.transport.gov.za/documents/11623/89294/Green Transport Strategy 2018 2050_onlineversion.pdf/71e19f1d-259e-4c55-9b27-30db418f105a](https://www.transport.gov.za/documents/11623/89294/Green+Transport+Strategy+2018+2050_onlineversion.pdf/71e19f1d-259e-4c55-9b27-30db418f105a).
- DPME, 2019: *Medium Term Strategic Framework (2019-2024)*. Department of Planning, Monitoring and Evaluation, <https://www.dpme.gov.za/keyfocusareas/outcomesSite/Pages/mtsf2021.aspx>.
- Dubash, N., A. V. Pillai, and P. Bathia, 2021: *Building a Climate-Ready State: Institutions and Governance for a Transformative Low Carbon Development. Policy Brief, Initiative for Climate, Energy, and Environment*. Centre for Policy Research, <https://www.cprindia.org/research/reports/building-climate-ready-indian-state-institutions-and-governance-transformative-low>.
- Egli, F., and A. Stünzi, 2019: A dynamic climate finance allocation mechanism reflecting the Paris Agreement. *Environ. Res. Lett.*, 14.
- Engelbrecht, F., and Coauthors, 2015: Projections of rapidly rising surface temperatures over Africa under low mitigation. *Environ. Res. Lett.*, 10, 085004, <https://doi.org/10.1088/1748-9326/10/8/085004>.
- EU Parliament and Council, 2020: Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R0852&from=EN>.
- Fakir, Z., 2020: Global Climate Finance Landscape and Domestic Links. *Unlocking Private Sector Involvement in The Green Climate Fund Projects in South Africa: Building an Adaptation Project Pipeline. Phase 1: Building the Capacity of South African Business to Adapt to a Rapidly Changing World. Event 2: An Introduction to an, National Business Initiative*.
- Fine, B., and Z. Rustomjee, 2018: *The political economy of South Africa: From minerals-energy complex to industrialisation*.
- G7 Ministers, 2021: G7 Climate and Environment Ministers' Meeting Communiqué.
- Gilder, A., and O. Rumble, 2020: *Improving sub-Saharan African Access to Climate Change Finance : An Alternative View. Policy Briefing*. <https://saiaa.org.za/research/improving-sub-saharan-african-access-to-climate-change-finance-an-alternative-view/>.
- Green Fund Secretariat, no date. The Green Fund. Fact Sheet 1. https://www.environment.gov.za/sites/default/files/docs/fact_sheet1_greenfundV2.pdf.
- GreenCape, 2020: *Background to the South African Renewable Energy Masterplan (SAREM)*. Department of Trade, Industry and Cooperation, Department of Mineral Resources & Energy, GreenCape, https://www.green-cape.co.za/assets/SAREM_Background-Information_20200812.pdf.
- Growthpoint Properties, 2018: Appendix A: Growthpoint Properties Green Bond Framework.

- Habib, A., 2018: *Rebels and rage*. Jonathan Ball,.
- Hall, S., K. E. Roelich, M. E. Davis, and L. Holstenkamp, 2018: Finance and justice in low-carbon energy transitions. *Appl. Energy*, **222**, 772–780, <https://doi.org/10.1016/j.apenergy.2018.04.007>. <https://doi.org/10.1016/j.apenergy.2018.04.007>.
- Halsnaes, K., and P. R. Shukla, 2005: *Mainstreaming international climate agenda in economic and development policies*. UNEP Risø Centre,.
- Hartley, F., J. Burton, G. Cunliffe, B. McCall, T. Caetano, N. Ntuli, R. Fourie, and L. Chiloane, 2019: Future skills and job creation through renewable energy in South Africa: Assessing the co-benefits of decarbonising the power sector. *COBENEFITS study*, A. Okunlola, D. Jacobs, N. Ntuli, R. Fourie, S. Borbonus, L. Nagel, and S. Helgenberger, Eds., Council for Scientific and Industrial Research and Institute for Advanced Sustainability Studies. http://webcms.uct.ac.za/sites/default/files/image_tool/images/119/Papers-2019/COBENEFITS_Employment_Power_Sector_Study%2BExecutive_Report%2BMarch2019.pdf.
- Hepburn, C., B. O’Callaghan, N. Stern, J. Stiglitz, and D. Zenghelis, 2020: *Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change?* *Smith School Working Paper 20-02*. Faculty of Economics University of Cambridge, <https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf>.
- Hochstetler, K., and G. Kostka, 2015: Wind and solar power in Brazil and China: interests, state–business relations, and policy outcomes. *Glob. Environ. Polit.*, 15, 74–94.
- Hunter, R., 2019: *Pension funds and climate risk. Why pension funds must invest responsibly for climate resilience. Legal opinion prepared by Fasken*. Just Share and Client Earth,.
- Inspection Panel, 2011: *Investigation Report: South Africa: Eskom Investment Support Project (IBRD Loan No. 78620-ZA). Report No. 64977-ZA*. World Bank, https://www.inspectionpanel.org/sites/www.inspectionpanel.org/files/ip/PanelCases/65-Investigation_Report_%28English%29.pdf.
- IPCC, 2019: *Climate Change and Land. An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems*. <https://www.ipcc.ch/srccl-report-download-page/>.
- IPP office, 2020: Independent Power Producers Procurement Programme (IPPPP): An overview, as at 31 March 2020. <https://www.ipp-projects.co.za/Publications>.
- JSE Limited, 2021: *Summarised consolidated annual financial results and ordinary dividend declaration for the year ended 31 December 2020*.
- Kessler, L., T. Matsuo, D. Nassiry, and P. Bodnar, 2019: *Reinventing climate finance. Four levers to drive capital stock transformation*. <https://rmi.org/insight/climate-finance->.
- Levy, B., 2014: *Working with the Grain: Integrating Governance and Growth in Development Strategies*. Oxford University Press,.
- Magazi, G., 2019: *Presentation at workshop on South Africa’s Long Term Low Emission Development Strategy. Director: Economic Services, Public Finance, National Treasury. 6 and 7 March*. https://www.environment.gov.za/sites/default/files/docs/workshop_longterm_lowemissiondevelopmentstrategy06March2019.pdf.
- Maimbo, S. M., and S. Zadek, 2017: Roadmap for a sustainable financial system.
- Marquard, A., 2020a: *Considerations for enhancement of SA’s current NDC, and framing the next NDC. Annex II of report for RIPPLES*. RIPPLES project, <https://www.cop21ripples.eu/wp-content/uploads/2020/03/RIPPLES-D2.5.pdf>.
- , 2020b: *Considerations for enhancement of SA’s current NDC, and framing the next NDC*. RIPPLES project, <https://www.cop21ripples.eu/resources/deliverable-2-5/>.

- Mbeva, K. L., and P. Pauw, 2016: *Self-differentiation of countries' responsibilities addressing climate change through Intended Nationally Determined Contributions. Discussion paper*. Deutsches Institut für Entwicklungspolitik, https://www.die-gdi.de/uploads/media/DP_4.2016.pdf.
- Mboweni, T., 2020a: *Budget Speech by the Minister of Finance. 26 February*. National Treasury, [http://www.treasury.gov.za/documents/National Budget/2020/speech/speech.pdf](http://www.treasury.gov.za/documents/National%20Budget/2020/speech/speech.pdf).
- , 2020b: Medium term budget policy statement. <http://www.treasury.gov.za/documents/mtbps/2020/mtbps/FullMTBPS.pdf>.
- McCall, B., J. Burton, A. Marquard, F. Hartley, F. Ahjum, G. Ireland, and B. Merven, 2019: *Least-cost integrated resource planning and costoptimal climate change mitigation policy: Alternatives for the South African electricity system*. Energy Research Centre, University of Cape Town, <https://tinyurl.com/yxkelke8>.
- McNicoll, L., R. Jachnik, and G. Montmasson-Clair, 2017: *Estimating publicly-mobilised private finance for climate action: A South African case study*.
- Meridian Economics, 2020a: A vital ambition: Determining the cost of additional CO2 emission mitigation in the South African electricity system. <https://meridianeconomics.co.za/wp-content/uploads/2020/07/Ambition.pdf>.
- , 2020b: The role of transition finance for climate mitigation: A just climate transaction for South Africa. <http://tiny.cc/rI0Inz>.
- Merven, B., J. Schers, J. Burton, B. McCall, A. Marquard, and C. Bergh, 2021: Comments for the National Energy Regulator of South Africa on the Ministerial Determination on the procurement of 2500 MW new generation capacity from nuclear.
- Montmasson-Clair, G., 2013: *Tracking climate finance Inflows to South Africa*. Trade & Industrial Policy Strategies, <https://ssrn.com/abstract=2748010> or <http://dx.doi.org/10.2139/ssrn.2748010>.
- Naidoo, C., 2011: *Financing climate change*. Department of Environment, https://www.environment.gov.za/sites/default/files/docs/financing_climate_change.pdf.
- Naidoo, C. P., 2019: Relating financial systems to sustainability transitions: Challenges, demands and design features. *Environ. Innov. Soc. Transitions*, <https://doi.org/https://doi.org/10.1016/j.eist.2019.10.004>. <http://www.sciencedirect.com/science/article/pii/S2210422419302606>.
- National Treasury, 2017: Explanatory memorandum for the carbon tax bill. [http://www.treasury.gov.za/public comments/CarbonTaxBill2017/Annexure 1 Explanatory Memorandum Draft Carbon Tax Bill December 2017.pdf](http://www.treasury.gov.za/public_comments/CarbonTaxBill2017/Annexure%201%20Explanatory%20Memorandum%20Draft%20Carbon%20Tax%20Bill%20December%202017.pdf).
- , 2020: 2021 MTEF Technical Guidelines for Provinces: Guidelines for the preparation of expenditure estimates for the 2021 Medium Term Expenditure Framework (MTEF).
- NBI, 2020: Launch of the NBI Just Transition Pathways Project. <https://www.nbi.org.za/luanch-of-the-nbi-just-transitions-pathways-project/>.
- Nedbank, 2019: South Africa's first commercial bank green bond. *The JSE Annual ESG Investor Showcase, 29 October 2019*, Nedbank Group Limited.
- Ngwenya, N., and M. D. Simatele, 2020a: Unbundling of the green bond market in the economic hubs of Africa: Case study of Kenya, Nigeria and South Africa. *Dev. South. Afr.*, **37**, 888–903, <https://doi.org/10.1080/0376835X.2020.1725446>. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85080995983&doi=10.1080%2F0376835X.2020.1725446&partnerID=40&md5=beb3411dd1456a855ecf6bb97f1e968>.
- , and M. D. Simatele, 2020b: The emergence of green bonds as an integral component of climate finance in South Africa. *S. Afr. J. Sci.*, **116**, <https://doi.org/10.17159/sajs.2020/6522>. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85078907187&doi=10.17159%2Fsajs.2020%2F6522&partnerID=40&md5=0b3d55ec704c72edf2487aa2f705e3cb>.

- Noor, K. B. M., 2008: Case study: A strategic research methodology. *Am. J. Appl. Sci.*, <https://doi.org/10.3844/ajassp.2008.1602.1604>.
- Nowlin, M. C., 2011: Theories of the Policy Process: State of the Research and Emerging Trends. *Policy Stud. J.*, **39**, 41–60, https://doi.org/10.1111/j.1541-0072.2010.00389_4.x. <https://doi.org/10.1111/psj.12317>.
- NPC, 2011: Our future - make it work: National development plan 2030. <http://www.npconline.co.za/pebble.asp?relid=757> accessed 23 August 2012.
- , 2019: 2050 vision and pathways for a just transition to a low carbon, climate resilient economy and society. Draft proposal version two, October. National Planning Commission. <https://oneworldgroup.co.za/wp-content/uploads/2019/10/NPC-JT-Vision-and-Pathways-draft-2-final.pdf>.
- , 2020: Economic progress towards the National Development Plan's vision 2030: Recommendations for course correction. [https://www.nationalplanningcommission.org.za/assets/Documents/Review of Economic Progress NPC Dec 2020.pdf](https://www.nationalplanningcommission.org.za/assets/Documents/Review%20of%20Economic%20Progress%20NPC%20Dec%202020.pdf).
- OECD, 2019: Aligning development co-operation and climate action: The only way forward.
- Omari-motsumi, K., and M. Barnett, 2019: Background Paper Broken Connections and Systemic Barriers : Overcoming the Challenge of the ' Missing Middle ' in Adaptation Finance.
- Omari-Motsumi, K., M. Barnett, and L. Schalatek, 2019: *Broken Connections and Systemic Barriers: Overcoming the Challenge of the 'Missing Middle' in Adaptation Finance. Global Commission on Adaptation. Background paper.* <https://us.boell.org/en/2020/01/10/broken-connections-and-systemic-barriers-overcoming-challenge-missing-middle-adaptation>.
- Parry, J.-E., A. Dazé, J. Dekens, A. Tertton, M. Brossmann, and S. Oppowa, 2017: Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goal.
- Pegasys, 2018: *Climate mainstreaming in South African cities: A review of infrastructure grant conditions, outputs and outcomes*.
- Petrie, B., P. Wolpe, Y. Reddy, P. Adriázola, M. Gerhard, T. Landesman, L. Strauch, and A. Marie, 2018: *Multi-level climate governance in South Africa. Catalysing finance for local climate action*. OneWorld, Sustainable Energy Africa, adelphi,.
- Presidency, 2020: *Presidential Climate Change Coordinating Commission appointed. 17 December*. Republic of South Africa, <http://www.thepresidency.gov.za/press-statements/presidential-climate-change-coordinating-commission-appointed>.
- Ramaphosa, C., 2021: *State of the Nation Address by President Cyril Ramaphosa. 11 February*. Parliament,.
- Registrar of Pension Funds, 2013: *Registrar of Pension Funds 2013 Annual Report*. 60 pp.
- Rennkamp, B., and A. Marquard, 2018: South Africa's multiple faces in current climate clubs. *South African J. Int. Aff.*, 1–19, <https://doi.org/10.1080/10220461.2017.1421479>. <http://www.tandfonline.com/doi/abs/10.1080/10220461.2017.1421479>.
- Roberts, J. T., R. Weikmans, S. Robinson, D. Ciptet, M. Khan, and D. Falzon, 2021: Rebooting a failed promise of climate finance. *Nat. Clim. Chang.*, **11**, 180–182, <https://doi.org/10.1038/s41558-021-00990-2>.
- Ross, K., 2020: *Effective tracking of Nationally Determined Contributions. MPhil thesis, Department of Mechanical Engineering*. University of Cape Town, <http://hdl.handle.net/11427/32762>.
- , and H. Winkler, 2021: Effective tracking of nationally determined contributions: A case study on South Africa. *J. Energy South. Africa*, **32**, 11–25, <https://doi.org/10.17159/2413-3051/2021/v32i2a8744>. <https://journals.assaf.org.za/index.php/jesa/article/view/8744>.

- RSA, 2011: National Climate Change Response White Paper. Government Gazette No. 34695, Notice 757 of 2011. http://www.gov.za/sites/www.gov.za/files/national_climatechange_response_whitepaper_0.pdf.
- , 2015: South Africa's Intended Nationally Determined Contribution (INDC). online 25 September 2015. [http://www4.unfccc.int/submissions/INDC/Published_Documents/South Africa/1/South Africa.pdf](http://www4.unfccc.int/submissions/INDC/Published_Documents/South_Africa/1/South_Africa.pdf).
- , 2016: South Africa's Nationally Determined Contribution (NDC). 1 November. [http://www4.unfccc.int/ndcregistry/PublishedDocuments/South Africa First/South Africa.pdf](http://www4.unfccc.int/ndcregistry/PublishedDocuments/South_Africa_First/South_Africa.pdf).
- , 2019: Carbon Tax Act. Government Gazette no. 42483. https://www.gov.za/sites/default/files/gcis_document/201905/4248323-5act15of2019carbontaxact.pdf.
- , 2020: South Africa's low emission development strategy 2050. Communicated to the UNFCCC in accordance with Article 4.19 of the Paris Agreement. [https://unfccc.int/sites/default/files/resource/South Africa%27s Low Emission Development Strategy.pdf](https://unfccc.int/sites/default/files/resource/South_Africa%27s_Low_Emission_Development_Strategy.pdf).
- , 2021: Proposed updated Nationally Determined Contribution. South Africa's First Nationally Determined Contribution under the Paris Agreement. Updated in 2021. https://www.environment.gov.za/sites/default/files/reports/draftnationallydeterminedcontributions_2021updated.pdf.
- Rumble, O., 2019: Facilitating african climate change adaptation through framework laws. *Carbon Clim. Law Rev.*, **13**, 237–245, <https://doi.org/10.21552/cclr/2019/4/4>.
- Ruseva, T., M. Foster, G. Arnold, S. Siddiki, A. York, R. Pudney, and Z. Chen, 2019: Applying Policy Process Theories to Environmental Governance Research: Themes and New Directions. *Policy Stud. J.*, **47**, S66–S95, <https://doi.org/10.1111/psj.12317>. <https://doi.org/10.1111/psj.12317>.
- Rydge, J., 2020: Aligning finance with the Paris Agreement. Policy.
- Sabatier, P. A., 1991: Toward Better Theories of the Policy Process. *PS Polit. Sci. Polit.*, **24**, 147, <https://doi.org/10.2307/419923>. <http://www.jstor.org.ezproxy.uct.ac.za/stable/419923>.
- SANBI, DEA, and GIZ, 2014: Climate Change Adaptation: Economics. 1–2.
- SBT, 2007: Long Term Mitigation Scenarios: Strategic Options for South Africa. https://open.uct.ac.za/bitstream/handle/11427/16804/Scenario_Building_Team_Long_Term_Mitigation_2007.pdf?sequence=1.
- SCF, 2020: Outline of the first report of the Standing Committee on Finance on the determination of the needs of developing country Parties related to implementing the Convention and the Paris Agreement. https://unfccc.int/sites/default/files/resource/Outline_2020NeedsReport.pdf.
- SEI, IISD, ODI, C. Analytics, CICERO, and UNEP, 2020a: *The discrepancy between countries' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C*. <http://productiongap.org/> (Accessed December 11, 2019).
- , —, —, —, —, and —, 2020b: *The production gap: The discrepancy between countries' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C*. <http://productiongap.org/> (Accessed December 11, 2019).
- Semieniuk, G., E. Campiglio, J. F. Mercure, U. Volz, and N. R. Edwards, 2020: Low-carbon transition risks for finance. *Wiley Interdiscip. Rev. Clim. Chang.*, <https://doi.org/10.1002/wcc.678>.
- Sohn, J., S. Nakhooda, and K. Baumert, 2005: Mainstreaming climate change considerations at multi-lateral development banks. *WRI Issue Br.*, **July 2005**, 1–12.
- Sovacool, B. K., J. Axsen, and S. Sorrell, 2018: Promoting novelty, rigor, and style in energy social science: Towards codes of practice for appropriate methods and research design. *Energy Res. Soc. Sci.*, **45**, 12–42, <https://doi.org/10.1016/j.erss.2018.07.007>. <http://www.sciencedirect.com/science/article/pii/S2214629618307230>.

- Spalding-Fecher, R., F. Sammut, D. Broekhoff, and J. Füssler, 2017: *Environmental integrity and additionality in the new context of the Paris Agreement crediting mechanisms. prepared by Carbon Limits AS, Stockholm Environment Institute-US Center and INRAS*. Swedish Energy Agency, <http://www.energimyndigheten.se/contentassets/2600659ecfa54ec995b835a4c99d75fb/environmental-integrity----final-report-2017.01.24.pdf>.
- Stadelmann, M., A. Michaelowa, and J. T. Roberts, 2013: Difficulties in accounting for private finance in international climate policy. *Clim. Policy*, <https://doi.org/10.1080/14693062.2013.791146>.
- StatsSA, 2021: Quarterly Labour Force Survey. Quarter 4: 2020. Statistical release 23 February 2021. <http://www.statssa.gov.za/publications/P0211/P02114thQuarter2020.pdf>.
- Stevens, L., A. J. Henri, M. Van Nierop, E. van Staden, J. Lodder, and S. Piketh, 2016: Towards the development of a GHG emissions baseline for the Agriculture, Forestry and Other Land Use (AFOLU) sector, South Africa. *Clean Air J.*, **26**, 30–34, <https://doi.org/http://dx.doi.org/10.17159/2410-972X/2016/v26n2a11>.
- Stiglitz, J., and Coauthors, 2017: *Report of the high-level commission on carbon prices. Supported by the World Bank Group; Agence de l'Environnement et de la Maitrise de l'Energie; Ministere de la transition ecologique et solidaire, Republique Francaise. Carbon Pricing Leadership Coalition*, <https://www.carbonpricingleadership.org/report-of-the-highlevel-commission-on-carbon-prices>.
- Tashakkori John W., A. C., 2007: The new era of mixed methods. Editorial. *J. Mix. Methods Res.*, **1**, 3, <https://doi.org/10.1177/1558689806293042>.
- Taviv, R., R. Wise, M. Van der Merwe, and H. Winkler, 2008: Potential for, and costs of, reducing greenhouse gas emissions from nonenergy sources in South Africa. *Sci. real Relev. 2nd CSIR Bienn. Conf.*, <http://researchspace.csir.co.za/dspace/handle/10204/2580> Accessed 25 May 2009.
- TCFD, 2017: Final report: Recommendations of the Task-force on Climate-related Financial Disclosures.
- Treasury, and DEFF, 2020: Financing a sustainable economy: Technical paper. [http://www.treasury.gov.za/publications/other/Sustainability technical paper 2020.pdf](http://www.treasury.gov.za/publications/other/Sustainability%20technical%20paper%202020.pdf).
- Trollip, H., and E. Tyler, 2011: *Is South Africa's economic policy aligned with our national mitigation policy direction and a low carbon future: An examination of the carbon tax, industrial policy, new growth path and integrated resource plan. Research paper for the National Planning Co. Sustainable Energy Africa.*
- Tshindane, M., 2021: *Update on Unlocking Private Sector Involvement for South Africa (Issue 9 April)*. . DEFF, SANBI.
- Tyler, E., and G. Steyn, 2019: A transformative Just Transition Climate Transaction for South Africa.
- UCT, 2021: *Technical Analysis to support the update of South Africa's first NDC: Mitigation target ranges*. Energy Systems Research Group, University of Cape Town.
- UK, 2019: Green Finance Strategy: Transforming finance for greener futures. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820284/190716 BEIS Green Finance Strategy Accessible Final.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820284/190716_BEIS_Green_Finance_Strategy_Accessible_Final.pdf).
- UN, 2015: Resolution adopted by the General Assembly on 25 September 2015: Transforming our world: the 2030 Agenda for Sustainable Development. A/RES/70/1 (Sustainable Development Goals - SDGs). http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E.
- UNFCCC, 1992: United Nations Framework Convention on Climate Change. <http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf>.
- , 2005: Tool for the demonstration and assessment of additionality. Version 2, November 2005. <http://cdm.unfccc.int>.
- , 2007: Bali Action Plan. Decision 1/CP.13.

- , 2015a: Paris Agreement. Annex to decision 1/CP.21, document FCCC/CP/2015/10/Add.1, 29 January 2016. <http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf#page=2>.
- , 2015b: Decision 1/CP.21, document FCCC/CP/2015/10/Add.1. <http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf>.
- , 2018: Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement. Decision 18/CMA.1, advanced unedited version, final will be document FCCC/PA/CMA/2018/XXX/Add.YY. https://unfccc.int/sites/default/files/resource/cp24_auv_transparency.pdf.
- Union of South Africa, 1956: *Pension Funds Act. Act 24 of 1956. Union Gazette Extraordinary, 11th May.*
- Ürge-Vorsatz, D., S. T. Herrero, N. K. Dubash, and F. Lecocq, 2014: Measuring the co-benefits of climate change mitigation. *Annual Review of Environment and Resources*. Annu. Rev. Environ. Resour., 549–582.
- Watson, C., and H. Schindler, 2017: *Financing the transition from brown to green: How to track country performance towards low carbon, climate-resilient economies*. Climate Transparency, https://www.climate-transparency.org/wp-content/uploads/2017/12/Financing_the_transition.pdf.
- , M. Robertson, A. Ramdin, and C. Bailey, 2020: *Assessment and overview of climate finance flows: Antigua and Barbuda 2014–2017*. UNFCCC, <https://unfccc.int/documents/231984>.
- WCED, 1987: Our Common Future. Document A/42/427. <https://sustainabledevelopment.un.org/milestones/wced>.
- Weikmans, R., H. V Asselt, and J. T. Roberts, 2020: Transparency requirements under the Paris Agreement and their (un)likely impact on strengthening the ambition of nationally determined contributions (NDCs). *Clim. Policy*, **20**, 511–526, <https://doi.org/10.1080/14693062.2019.1695571>.
- Whitley, S., J. Thwaites, H. Wright, and C. Ott, 2018: *Making finance consistent with climate goals: Insights for operationalising Article 2.1c of the UNFCCC Paris Agreement*. Overseas Development Institute, <https://www.odi.org/sites/odi.org.uk/files/resource-documents/12557.pdf>.
- Winkler, H., 2004: National policies and the CDM: Avoiding perverse incentives. *J. Energy South. Africa*, **15**.
- Winkler, H., 2017: Reducing energy poverty through carbon tax revenues in South Africa. *J. Energy South. Africa*, **28**, 12, <https://doi.org/10.17159/2413-3051/2017/v28i3a2332>. <http://journals.assaf.org.za/jesa/article/view/2332>.
- Winkler, H., and A. Marquard, 2009: Changing development paths: From an energy-intensive to low-carbon economy in South Africa. *Clim. Dev.*, **1**, <https://doi.org/10.3763/cdev.2009.0003>.
- Winkler, H., S. Keen, and A. Marquard, 2020a: *Climate finance to transform energy infrastructure as part of a just transition in South Africa. Case study for IKI-SNAPFI*. University of Cape Town, <http://www.diw.de/snapfi/en> and <https://open.uct.ac.za/handle/11427/32176>.
- , —, and —, 2020b: *Just transition transaction in South Africa. Policy brief*. University of Cape Town, <https://tinyurl.com/y7kmg4u5>.
- Wlokas, H., 2017: Implementing community renewables: Institutional work in South Africa's renewable energy procurement programme. PhD thesis. University of Cape Town, .
- Wolski, P., 2019: Twice the global rate. *CSAG blog*. <http://www.csag.uct.ac.za/2019/09/25/twice-the-global-rate/>.
- Wright, J. G., T. Bischof-Niemz, J. R. Calitz, C. Mushwana, and R. van Heerden, 2019: Long-term electricity sector expansion planning: A unique opportunity for a least cost energy transition in South Africa. *Renew. Energy Focus*, **30**, 21–45, <https://doi.org/10.1016/j.ref.2019.02.005>. <https://linkinghub.elsevier.com/retrieve/pii/S1755008417301795>.

