Efforts to transform the South African economy into a green economy have been underway for almost a decade. However, this vision remains unrealised.

This paper suggests potential ways for government, business and labour to address the overlapping barriers to ‘greening’ the South African economy:

- **Economic**: facilitate responsible investment, production and consumption decisions.
- **Institutions**: encourage institutional coordination.
- **Technology**: support incubating innovations.
- **Financing**: change lending policies.
- **Skills**: train people so as to create the scarce skills needed in the green economy.
CONTENTS

What is the ‘green economy’? 3
  Genesis of the ‘green economy’ concept 3
  Criticisms of the green economy 5

The green economy context in South Africa 6
  Nine key areas identified in green economy programmes 7

Barriers to transitioning to a green economy 9
  Economic barriers 10
    Economic exclusion of the poor 10
    Mineral Energy Complex 10
    What can be done? 11
  Institutional barriers 15
    Absence of common framework 15
    Domestic policy uncertainty 17
    Bureaucratic barriers 17
    What can be done? 18
  Technology barriers 18
    What can be done? 19
  Finance barriers 22
    Generic barriers 22
    Specific characteristics of green technologies 22
    Lack of dedicated funding for commercialisation 22
    Lack of bankable projects 22
    Lack of enabling environment 23
    Energy sector focused 23
    Initiatives to address financing barriers 24
    What can be done? 24
  Skills barriers 25
    What can be done? 27

Food for thought 29

Talking points 30

Read more 31
WHAT IS THE ‘GREEN ECONOMY’?

Genesis of the ‘green economy’ concept

Defined sustainable development as, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”
The definition combined economic development, social welfare and environmental protection; and provided the building blocks for developing the concept of the green economy.

Encouraged debates around the interdependence of economic growth and environment.

03 Triple Bottom Line Accounting Framework (1994)
Encouraged firms to measure performance along the interrelated dimensions of profits, people and the planet.

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After the financial crisis of 2007, the green economy was portrayed as the avenue for putting economies on a more sustainable path, while achieving a fast rate of economic growth and job creation.

**United Nations Environment Programme (UNEP) (2011):**
Determined that the green economy would lead to, “improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities… [It] is low carbon, resource efficient and socially inclusive.”
- Characterised the green economy by investments in economic sectors that augment natural capital and reduce ecological scarcities and environmental risks.
- Referred to ‘green stimulus packages’ that could stimulate a ‘green economy’.

**The United Nations Economic Social Commission for Asia and the Pacific (UNESCAP) (2011):**
Discussed how green growth is environmentally sustainable progress to foster low-carbon, socially inclusive development.

**The Organisation of Economic Co-operation and Development (OECD) (2011):**
Explained how green growth is a way of fostering economic growth and development while ensuring that natural assets continue to provide resources and environmental services on which our well-being relies – a somewhat different emphasis of the purpose.

**The Green Economy Task Force of the International Chamber of Commerce (2012):**
Defined the green economy as “an economy in which economic growth and environmental sustainability work together in a mutually reinforcing fashion while supporting progress on social development.”

Conceptually, the green economy recognised that the separation of economic development and environment policies is artificial.

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Criticisms of the green economy

While it is clear that persisting with the current economic model will not deliver social justice, development, economic equity, or sustainability, the green economy framing has been criticised on a number of grounds, such as:

- Not considering limits to growth; oversimplification; misplaced optimism; being closely aligned to existing systems; and the assumptions in the models used.\(^6\)

- Modelling in the UNEP framework assigns more funding to the green economy than to the business-as-usual scenario.

- There is an inherent tension in trying to describe an entire economy as green, while at the same time describing green practices as a sub-set of the economy.

- It seems to have a significant overlap with the concept of sustainable development.

- The green economy has been referred to as ‘the next oxymoron’ because of its failure to incorporate the lessons learnt from the implementation of sustainable development.\(^7\)

The acceptance of the Sustainable Development Goals (SDGs) and the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement provide contemporary drivers to pursue green growth. However, the green economy must be rooted in national and sub-national realities, and take national priorities into account. Prefixing the existing taxonomy with ‘green’ is no replacement for the substantive interventions needed to bring about fundamental change.

International Chamber of Commerce Green Economy Roadmap

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In 2010, South Africa identified the driving forces behind the green economy transition in the *Green Economy Summit Statement*, which included:

- Growing concerns about the environmental unsustainability of past and current economic growth patterns
- Increased awareness of a potential future climate crisis
- The need for substantial transformation of behaviour.

Being a developing country, a narrative prevails in South Africa that emphasises the need to ‘balance’ developmental and environmental concerns.

South Africa understands the green economy as a “system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks or ecological scarcities”.

This “implies the decoupling of resource-use and environmental impacts from economic growth” (10). The economy must have the ability to grow without increasing pressure on resources or on the environment. In this interpretation, the green economic transition envisions growth in economic activity leading to investment, jobs and competitiveness in the green industry, and a shift in the economy towards cleaner industries and sectors. The essence lies in shifting the economy “towards a resource efficient, low carbon and pro-employment growth path” (11). This concept of the green economy has been embraced, directly or indirectly in a large number of overarching development strategies and plans, as well as in sectoral policies.
at different levels of governance. In fact, some policies and plans integrated the concept of the green economy around 2009/2010, even before concept clarity was achieved.

Additionally, the government is deploying a range of tools to support the transition:

- It is developing policy instruments.
- It has identified nine programme areas.
- It has organised the necessary funding.

Government, labour and industry also signed a Green Economy Accord for certain key sectors of the economy. However, this Accord was non-binding and didn’t bring about the anticipated changes.

South Africa’s efforts towards a green economy have been criticised as being, “a public relations exercise”, and as “failing to grasp the opportunities to a green economy”, particularly due to leadership issues at all levels, policy coherence, poor implementation capacity, and poor planning. Despite this criticism, key initiatives towards a green economy are being implemented by a wide range of public and private sector partners. Such initiatives can provide us with insights to inform and help prioritise future and additional green investments.

**Nine key areas identified in green economy programmes**

1. Environmental sustainability
2. Sustainable transport and infrastructure
3. Clean energy and energy efficiency
4. Resource conservation and management
5. Sustainable waste management practices
6. Agriculture, food production and forestry
7. Water management
8. Sustainable consumption and production
9. Green buildings and the built environment

**References**

16 DEA, 2018.
Although South Africa has taken measures to enable the transition to a green economy, multiple barriers inhibit this. These barriers can be grouped into the five cross-cutting thematic categories represented on the image below.
Economic barriers

Economic exclusion of the poor

As a developing country, South Africa faces many political and economic challenges that influence its domestic priorities. Beginning in 1994, President Mandela emphasised that addressing key problem areas of slow growth, severe poverty and extreme inequalities should be the “primary motivation ... on the path of rapid economic development”. Through subsequent presidencies, the thread of tackling the triple challenge of poverty, unemployment and inequality have remained, while concerns related to energy security have also found expression. In addition, the legacies of apartheid continue to persist and remain deeply embedded in the social and economic structure of the economy.

Mineral Energy Complex

Despite many policy formulations relating to a green economy, South Africa has found it difficult to shift away from a fossil fuels-driven and water-intensive economic model (which in any case has not delivered economic inclusion of the poor). Domestic literature points to a specific reason for this – the Mineral Energy Complex.

- The Mineral Energy Complex is a form of capital accumulation centred on powerful vested interests around mineral extraction and processing in the South African context.

Coal accounts for two thirds of the country’s energy mix and 90% of electricity generated.

The Arnot Power Station in Middleburg, Mpumalanga

The energy sector is dominated by the state-owned entity, Eskom.

Readily available coal drives down the cost of power generation significantly, making it attractive for energy-intensive industries to operate within South Africa.

Power generation from coal remains the business-as-usual scenario.

Due to technological breakthroughs in renewable energy and other global trends, the Mineral Energy Complex model is becoming increasingly difficult to sustain. Yet it remains central to the South African economy and to the interests of the political elite.

**What can be done?**

It is important and urgent for South Africa to break the control of the Mineral Energy Complex over the economy. While the government alone cannot undertake this major restructuring, it can enable economic actors to do so, and it can put in place instruments to make greener investment, production and consumption decisions relatively more attractive than unsustainable ones.

One way of giving such a signal is to institutionalise a new, independent agency to transition South Africa’s energy system by promoting renewable energy in the economy. Such an agency should be well capacitated to engage closely with relevant ministries, such as:

- National Treasury, which has an overview of the investment and financial flows in the economy
- The Department of Environmental Affairs (DEA), which is responsible for setting targets for high-carbon emitting sectors
- Various other departments, namely, mining, energy, agriculture, chemicals and transport.

The government also needs to promote **interventions at the consumption side:**

- Introducing rating standards for home appliances is a low-hanging fruit that can nudge customers to make informed and environmentally beneficial choices.
- Similarly, setting up an integrated public transport system is essential to reducing congestion in the cities, thus reducing both greenhouse gas (GHG) emissions and local air pollution.
- Municipalities can play a key role in influencing the behaviour of residents. A relevant example is how the City of Cape Town managed to dodge the threat of ‘day zero’ by involving and mobilising its residents. Research organisations and NGOs should study the intervention to identify key learning that can be implanted to other public policy issues.
<table>
<thead>
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<th>Policy</th>
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• Gives equal importance to environmental protection, social equity, and economic efficiency; combined with country’s visions and values. |
| 2008–18: Ten-Year Innovation Plan | • Recognises that South Africa is well-positioned to lead research into climate change and its impacts in Africa; and to identify mitigation efforts to limit long-term effects.  
• Identifies mitigation efforts as an economic opportunity to develop strategies to take advantage of the green economy. |
| 2009: Framework response to the International Economic Crisis | • Identifies the need to develop incentives for investment in programmes to foster employment in industries/facilities designed to mitigate impacts to the environment, and the protection thereof. |
• Identifies challenges, threats and opportunities, as well as policy and governance requirements to realise a green economy. |
| 2010: New Growth Path | • Sets out critical markers for employment creation and growth.  
• Identifies where viable changes in the structure and character of production can generate a more inclusive and greener economy over the medium- to long-term. |
| 2011: Integrated Resource Plan | • Outlines efforts to meet the energy efficiency and renewable energy targets. |
| 2011: Green Economy Accord (signed by organised labour, business representatives, government departments and wider community) | • Identifies 12 commitments to promote the green economy.  
• Commits to mobilising stakeholders to generate five million new jobs by 2020. |
| 2011: National Climate Change Response White Paper | • Identifies green economy sectors as the avenue for job creation.  
• Promotes the green economy as an effective investment to climate change. |
| 2012: National Development Plan (NDP) 2030 | Outcomes related to:  
• Ensuring decent employment through inclusive economic growth  
• Ensuring the workforce to support an efficient, competitive and responsive economy  
• Developing an efficient infrastructure network  
• Developing vibrant, equitable and sustainable rural communities  
• Ensuring food security  
• Valuing, protecting and enhancing environmental assets and natural resources. |
| Annual Industrial Policy Action Plan (IPAP) | • Focuses on manufacturing aspects of the green economy, i.e. green industries and Industrial Energy Efficiency.  
• Supports broad-based industrialisation, including more advanced manufacturing, encouraging cleaner, lower-energy technologies and green jobs. |
| 2014–2019: Medium Term Strategic Framework | • Commits to implementation of National Development Plan. |

A carbon tax on companies’ GHG emissions can be used to address existing economic barriers. Although Treasury has been in favour of such a tax since 2009, a Carbon Tax Bill only reached Parliament in 2018. WWF’s submission to Parliament on the Bill made the points that: the R120/tonne headline tax rate does not correlate with any proposed or internationally operating effective rate; provisions for revising the rate will never catch up to an effective level; tax-free allowances of up to 95% effectively render the tax a token of between R48/tonne and R6/tonne. Where the cost of the tax is less than the cost of taking mitigation action, companies will swallow or pass through the tax. The Bill would benefit by hearing from lower-carbon companies who might enjoy a relative advantage under a low-carbon regime, companies with business models for which such a tax is irrelevant, and companies whose ‘green’ products and services will flourish in such an enabling environment.
Carbon tax should operate as an economy-wide instrument\textsuperscript{18}

Note: The green arrows below indicate where pressure comes back up the supply chain to drive lower-carbon shifts.

Institutional barriers

Absence of a common framework

The country lacks a common national narrative and reference point of the green economy, which is needed for domestic institutions to ensure effective implementation. This absence has meant that different stakeholders construe the green economy differently, and this has led to conflicting goals among the many government departments responsible for promoting the green economy. In turn this has led to a multitude of policies encapsulating the ethos of the green economy, and inconsistency between different policies.

The precise and explicit economic, social and environmental outcomes that a green economy should aim to deliver have not been spelt out. The dominant discourse is that of green growth. However, this is more effectively used to position South Africa as a champion of green growth in the global arena rather than to promote implementation at the national level. In addition, many policies, initiatives and approaches take a narrow view of the greening possibilities, seeing the green aspects as a by-product of the main objective – employment creation. This narrow conception often constricts the possibility of developing the wide coalition that is necessary for economy-wide transitions.

Examples of the policy disconnect

Several examples illustrate this policy disconnect which stunts the growth of the green economy:

- There is a misalignment between the ethos of the green economy, industrial policy, and the structure of the financial system. This has restricted funders’ ability to invest in low-carbon technologies. The stated policy in IPAP2 and the ethos of the green economy as derived from the NDP and the National Climate Change Response Strategy are seen to position South Africa as a technology leader in some respects – particularly in relation to the international audience. The implicit assumption is that South Africa’s financial system is geared towards an economy that is a technology leader. In reality it is geared towards serving an economy that is a follower and adopter of new technologies, rather than towards providing an ecosystem for technological innovation and experimentation – prerequisites to becoming a technology leader. The NDP has also fallen short of integrating the sustainability transition in its vision for South Africa’s future.

References:

There is a lack of institutional coordination necessary to implement policies on the ground. Such misalignment was evident when the South African Renewables Initiative (SARi) was launched in Durban during the 17th Conference of Parties (COP17) to the UNFCCC. The Department of Energy and National Treasury were not consulted during the initiation of SARi, and as a result, SARi didn’t secure domestic buy-in and support to go beyond COP17. SARi symbolises the lack of institutional coordination and silo thinking that often pervades government structures, making it difficult for new concepts and interventions to go beyond policy formulation to actual implementation. A concept such as green growth would essentially need to be implemented by various ministries across various levels of governance. While it is easy to argue for greening the economy at rhetoric level, implementing the measures to greening the economy will face resistance. Therefore, efforts are needed to strengthen institutional coordination for pursuing green growth as a means to simultaneously achieve the developmental state agenda, as well as to tackle vested interests represented by the fossil fuels lobby.

**Domestic policy uncertainty**

Green economic dynamics in South Africa continue to remain sensitive to the policy environment. A favourable and stable policy environment is key to promoting the introduction, nature and pace of green technologies, as well as to promoting innovation. Many aspects for facilitating the green economy in South Africa remain viable only as a result of direct policy intervention. This is in sharp contrast to the increased uptake of policies aimed to promote renewable energy and energy efficiency globally. The long-term ambition of the government to transition to a green economy is perceived to be insufficiently strong.

**Examples of renewable energy projects**

The Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) was set up in 2010 to stimulate the uptake and development of renewable energy technologies. It has been hailed by the government as a programme that has given the country global recognition and attracted R193 billion in private investment. On 4th April 2018, 27 contracts with independent power producers were signed. These projects would add 2 300 MW to the grid and bring investment worth R56 billion into the country. One of the main aspects of REIPPPP is for Eskom to sign power purchase agreements (PPAs) with renewable energy projects to enhance project bankability. After a long standoff, Eskom has now been given the go ahead to sign PPAs. The recently released draft Integrated Resource Plan (IRP) emphasises the role of photovoltaic solar and wind power in South Africa’s energy future. Whether this will be realised or not will be an important signal to gauge the government’s commitment to greening the economy.

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Bureaucratic barriers

Bureaucratic processes involving complex mechanisms, lengthy timeframes, and unclear distribution of responsibilities are delaying and even preventing projects and forthcoming investment in green technologies.  

Examples of bureaucratic barriers

Examples of projects that have faced these bureaucratic processes include:

- BMW’s Tshwane Landfill Gas project, which aims to provide renewable energy to the company’s Rosslyn plant.

- The green technology manufacturing cluster in Atlantis in the Western Cape.  

- The implementation of the SARi, which attracted international support, but failed to get going because, “inter-governmental relations were not firmed up enough, resulting in SARi becoming a political mess”.  

- Similarly, alternative waste management options have generally suffered from licensing and approval processes required by the National Environmental Management: Waste Act (59 of 2008) – NEM:WA.  

What can be done?

- Government must determine which of the socio-economic-environmental imperatives are most critical, and drive them. The task of prioritisation in policy development must engage stakeholders to include multiple perspectives and help support implementation, but government must prioritise broader public interest.

- Government must embark on a process to ensure policy consistency and policy alignment. Clear policy frameworks in sectors where such frameworks are currently absent are also needed. Government is putting in place Sector Emission Targets, to be managed by the relevant national department for each sector. It is hoped that this approach drives departments to mainstream climate change mitigation through all their policies.

- Policy commitment needs to be implemented through coordinated government action across different ministries. Some measures to this end could include: establishing a dedicated interdepartmental team focussed on green growth planning with a clear mandate and terms of reference; and setting up implementation-focused task teams with clear and measurable targets for undertaking actions that promote green growth.

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29 ASSAF, 2014.
30 ASSAF, 2014.
31 Upadhyaya, 2016, pp. 473.
32 ASSAF, 2014.
Technology barriers

Policy frameworks that support investment in green technologies are a necessary, but not a sufficient driver for the green economy transition. The intrinsic risks arising from technologies themselves pose a significant barrier to this transition, for example, the risk of technology failure, of obsolescence, or underperformance relative to expectations.

Other barriers come from the country’s track record of dealing with technology. Evidence suggests that South Africa is a technology adopter rather than technology leader. Although it had the distinction of being an innovator in technologies in the past, this advantage is being fast eroded due to the depleting base of a highly skilled workforce, declining state wherewithal for long Research and Development (R&D) horizons, and the carbon lock-in of innovation systems into the path dependant high-carbon economy. Some of these challenges can be overcome by encouraging technology transfer. However, the country must improve its record considerably when it comes to facilitating this. In the past, South Africa’s limited engagement under carbon market mechanisms, such as the Clean Development Mechanism of the Kyoto Protocol that was designed to facilitate the transfer of technology to the Global South, does not inspire confidence in the government’s ability to establish processes for facilitating access to green technologies by means of international support.

What can be done?

Government, business and labour need to recognise that the global transition to a green economy has the potential to create new export opportunities and markets. At the same time, there is the threat of making certain technologies redundant. We are already witnessing policy interventions to prepare countries for transitions towards flexible energy systems – systems that are not dependent on any one energy source. Well-prepared countries may be able to benefit from being ahead of the curve by incubating innovations for supporting these shifts.

The Global Cleantech Innovation Index (GCTI) explores which countries currently have the greatest potential to produce entrepreneurial cleantech start-ups that will commercialise clean technology innovations over the next 10 years.

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33 ASSAF, 2014.
34 Zikhali, et al., 2016.
37 ASSAF, 2014.
38 ASSAF, 2014.
A recent study on Global Cleantech Innovation ranks South Africa 31st out of the 40 countries studied.  

The government and companies need to support R&D in the green economy not just to develop new technology but also to adapt technologies to local conditions for reducing performance risks, as well as to connect start-ups with the broader ecosystem. Government can also incentivise private sectors’ spend on R&D through sustainable public procurement.

Universities too can play a role by meeting the skills deficit.

One notable entity that plays this role in South Africa is the national public entity, Technology Innovation Agency (TIA). TIA focuses on technology development, including precommercialisation of the technology. Through its Innovation Skills Development programme, it also provides support for business and entrepreneur development. Such entities can play a crucial role in supporting the solar thermal industry in South Africa, also characterised as an ‘infant industry’ that has the potential to make a contribution to economic growth and job creation.  

40 Global Cleantech Innovation Index (GCTI), 2017.
Finance barriers

Generic barriers

A range of market failures inhibit the financing of green technologies. Many of these failures are not specific to green technologies but are a feature of the broader South African economy. For example, patterns of lending currently restrict access to credit for many parts of the economy, such as smaller enterprises. The venture capital industry is small and nascent, restricting the availability of players who are willing to assume risks associated with technology and development. Few mechanisms are available to connect the R&D stage with the commercialisation stage.

Specific characteristics of green technologies

The generic financing barriers are further exacerbated by the specific characteristics of green technologies or green economy projects. Many involve higher upfront expenditure compared with the brown alternatives, or lack commercial viability, even though their full life cycle costs may be lower compared with brown alternatives. Further, unfamiliarity with these technologies and the uncertainties around green economy projects and business models, which entail a certain degree of risk, add to funding risks.

Lack of dedicated funding for commercialisation

The absence of venture capital coupled with the inability and unwillingness of commercial banks and private equity companies to bear the risks associated with technology development, means that there is a lack of dedicated funding to ensure commercialisation and scaling-up of green technologies. Technologies that cross these phases and become commercially viable tend to compete with brown alternatives for a limited pool of investment capital. Inadvertently, they face a disconnect between their financial needs and the lending rules or investment policies of commercial financial institutions, which are often geared to support large conventional projects. The capital-intensive nature of many green technologies means that they are unattractive based on appraisal criteria, such as risk-return profile, and payback periods in the short-term.

Lack of bankable projects

Commercial financial institutions, on the other hand, argue that economically-viable (based on their risk-return profile) green economy opportunities will be financed, citing the REIPPPP example. According to them, it is the lack of bankable projects that presents the single biggest barrier to the transformation to the green economy.

42 NBI & KPMG, 2013.
44 NBI & KPMG, 2013.
46 Naidoo & Goldstuck, 2015.
Lack of enabling environment

Where available, financing mechanisms geared towards the green economy tend to focus on debt funding green technologies, and ignore equity requirements of projects, as well as the need for start-up capital for businesses, or capital to support the growing activity in the green economy. Consequently, current financing mechanisms do not create an enabling environment for businesses to leverage financing for support services required by the green economy.

Energy sector focused

The private equity funds targeting low-carbon projects, and therefore indirectly the green economy, are largely focused on energy, although water, waste and low-carbon industrial development is also on their agenda:

- The US$500 million South Africa’s Clean Technology Fund Investment Plan targeted renewable energy, energy efficiency, and solar water heaters.

- Green bonds too have been aimed at energy projects. For example, in April 2012, the R5 billion bond issued by the Industrial Development Corporation was aimed at facilitating funding for businesses looking to invest in clean-energy infrastructure developments.

This is not to say that funding is not available for other sectors. Examples of environmental financing mechanisms for non-energy sectors include:

- The Drylands Fund to address ecosystem rehabilitation measures.

- The Green Fund (set up by the National Treasury with the Development Bank of Southern Africa as the implementing agency) to promote innovation in the field of green technologies and local manufacturing capacity.

However, with green economy policies being skewed towards the energy sector and the bulk of fiscal support channelled towards the energy sector along with the transport and water sectors, the energy sector is the focus of the bulk of the funding. The lack of clear policy frameworks in sectors such as natural resources and agriculture means that financing for projects in these sectors is inadequate. Additionally, low levels of interest in these areas from project developers means that concessional finance is not focused on these sectors.

47 NBI & KPMG, 2013.
49 Zikhali, et al., 2016.
50 NBI & KPMG, 2013.
52 Montmasson-Clair, G., 2013. The Industrial Development Corporation is one of the domestic development finance institutions in South Africa.
54 Zikhali, et al., 2016.
55 NBI & KPMG, 2013.
Initiatives to address financing barriers

The above market failures are not unknown. Initiatives have been taken to address them. Market instruments have been proposed and green stimulus funds established to support early stage technologies.\textsuperscript{56} A Green Fund has been established by the DEA and is housed within the Development Bank of Southern Africa to catalyse the transition to a green economy.\textsuperscript{57}

In addition, funding is indirectly allocated towards the green economic transformation in the form of climate change and environmentally-related programmes funded through the national budget.\textsuperscript{58} However, the funding is once again primarily directed towards interventions in the transport, water and sanitation, and energy sectors, with the overarching goal of reducing carbon emissions.\textsuperscript{59} Besides, public funding has tended to be channelled towards technologies such as Carbon Capture and Storage that further reinforce the path dependent tendencies of the brown economy.\textsuperscript{60}

What can be done?

- Interventions to overcome financing barriers need to target specific barriers. Banks and financing institutions need to develop dedicated credit lines to scale-up lending to specific sectoral initiatives and promote measures such as loan guarantee schemes and partial credit guarantees to derisk financing of green technologies.
- Technical assistance needs to be provided to project developers to develop green businesses and loan applications. Most of the large banks have focused on the environmental and social impacts of their lending practices over the last decade by committing to the Equator Principles and pursuing the opportunities in financing large-scale renewable energy projects. Unfortunately, they haven’t

\textsuperscript{56} Zikhali, et al., 2016.
\textsuperscript{57} AFRICEGE, 2014.
\textsuperscript{58} Hemraj, cited in Montmasson-Clair, 2013.
\textsuperscript{59} Hemraj, cited in Montmasson-Clair, 2013.
\textsuperscript{60} Furtado & Perrot, 2015.
substantially changed their lending policies or credit models when it comes to coal. However, Nedbank’s decision to not finance any new coal-fired power plants stands out and is an important step in the right direction. Government can set up processes and mechanisms to prepare and coordinate sector-wide interventions such that they meet the requirements of international financing mechanisms, such as the Green Climate Fund and NAMA Facility.

“**The bank has undertaken not to provide project financing or other forms of asset-specific financing where the proceeds will be used to develop a new coal-fired power plant, regardless of country or technology.**”

Nedbank’s 2017 Sustainability Report

**Skills barriers**

The transition to a green economy requires a differently skilled workforce. While unskilled labour would still be needed, investments in developing specific new skills would also be needed to make a section of the workforce ready for the green transition. Both specific and generic skills are required for this, including:

**Specific technical skills** associated with new technologies and infrastructure in the environmental goods and services sector, for example environmental accounting and resource economics skills. These will assist with effectively implementing and supporting the adoption, diffusion and successful use of efficient technologies.

**Generic skills** are needed to support businesses to prepare business plans; build resource efficient business models; understand project financing requirements; use accounting for the natural environment; meet the requirements laid out in national environmental law and policy; and contract new technologies and projects.

In South Africa, the shortage of these skills has been identified as a critical bottleneck in the green economic transition.62

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### Skills supporting resource efficiency

- **Strategic business management skills**: to build resource efficient business models, leading to bottom line benefits, and preparing for new regulations.
- **Business/financial accounting skills**: for carbon and natural environment accounting.
- **Skills to design and adopt technologies, products and processes**: to increase resource efficiency, including lean manufacturing.
- **Project management skills**: to implement resource efficiency.
- **Operator level actions**: to maximise resource efficiency.

### Skills supporting low-carbon industry

- **Skilled scientists and engineers**: for lower-carbon forms of energy.
- **Skilled technicians**: to install energy efficiency measures and retrofit in households and businesses.
- **Skills to design and adopt technologies, products and processes**: to minimise carbon emissions.
- **Skilled operators**: to minimise carbon emissions (e.g. driving in a fuel efficient manner).

### Skills supporting climate resilience

- **Scientific and technical skills**: e.g. to model and interpret climate change projections.
- **Risk management skills**: e.g. to assess future resource availability.
- **Skills to design and adopt technologies, products and processes**: to improve climate resilience.
- **Skilled operators**: to improve climate resilience (e.g. retrofitting water efficient technologies in households and businesses).

### Skills to manage natural assets

- **Accounting skills**: for the natural environment.
- **Environmental impact assessment skills**.
- **Skills to design and adopt technologies, products and processes**: to oversee natural assets.
- **Planning skills**: to interpret environmental legislation targets, ecosystem services design, and management and land-use planning.

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South Africa faces an enormous lack of skilled and semi-skilled workers in many disciplines (even without taking into account the needs of the green economy). Specifically, the skills gap in engineering and technology are acute.64

There is some dispute regarding the nature and extent of these shortages, given that the country also has a large pool of unemployed graduates. However, most evaluations suggest that this pool, and the broad pool of school leavers, lack basic mathematical and scientific ability.65 It has also been suggested that the quality of (public) primary and secondary school education in the country has deteriorated to the extent that it is now among the lowest in the world. This has a bearing on the quality of graduates coming into the workforce.

Additionally, with the human resources and skills development sectors being under-resourced, the ability of these sectors to meet the skills required for planning, analysis, research, training and skills development in general is weak.66 The skills shortage has been aggravated by weak cohesion in research programmes, shortage of market-focused research, and a relatively low tendency among academics to commercialise research.67 This presents significant challenges for green skills, new green skills, and for greening existing skills.68

Government officials too, particularly those in local governments, generally lack the skills to provide the necessary support to green projects and enterprises.69 On the one hand, project developers are unable to access skills necessary for business modelling and preparation of a sufficiently good business plan or loan application for green economy projects to warrant investment; on the other hand, financial institutions face skills constraints to effectively evaluate these projects. Besides, with many green economy technologies being new to South Africa, even legal contracting skills around these technologies have been in short supply.70

What can be done?

Skills development needs to be prioritised and addressed. However, it is important to contextualise these needs. This would involve:

- Defining what qualifies as green jobs
- Disaggregating skill sets required for various green jobs
- Assessing the demand-supply gap between the labour force needed and the labour force available.

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64 ILO, 2010.
65 See ILO, 2010 for example.
70 ILO, 2010.
An example of a “Light green” job in the green economy – a chemical worker that can be re-skilled to design environmentally friendly products.
We need to urgently:

- Identify core competencies across the full spectrum of professionals required to support technological innovation and to meet the demands of the green jobs
- Build capacity within the government itself to support the green economy
- Address the fundamental problems facing the country’s education system, particularly along the technical training aspects.

**Conceptual typology of green jobs**

- **Dark green**
  - Purely environment focused jobs at its core: hydrologist, ecologist, etc.

- **Medium green**
  - For example: sector experts, environmental lawyers, environmental economists.

- **Light green**
  - Artisans, labour and skilled jobs that can become green jobs with little re-skilling
How long and why should the international community support the country with the transition to the green economy when South Africa continues to invest in the brown economy? The cost of the transition will continue to go up as long as investments are made in the brown economy. Why should anyone except South Africa pay those additional costs?

How should South Africa’s primary education system be overhauled to create the scarce skills needed in the green economy?

Should all public funding have green economy objectives/criteria at its heart?

Globally, investors such as the World Bank and Norway’s Government Pension Fund have started to pull back from funding for new coal power plants. The Republic of Ireland’s Strategic Investment Fund is now required by law to sell all investments in coal, oil, gas and peat “as soon as is practicable” which is expected to mean by 2023. What is needed to enable such a law in South Africa?

Technological breakthroughs and economies of scale have made renewables cheaper than coal. This makes further investment in big coal power plants a risky proposition. In addition, with the setting up of the International Solar Alliance (ISA), new mechanisms to provide technological, financial and skills development support to enhance solar capacity will soon be in place. What strategy does government have to leverage such international support mechanisms to benefit from the technological breakthroughs?

South Africa’s energy system is the least flexible in the world. The government needs to signal to international and domestic investors that it wants to make its energy system flexible as a means to promote the green economy. How can it do this?

Inter-ministerial coordination is crucial to break the institutional path of coal dependency. How can we enable effective institutional coordination for transforming South Africa into a green economy?

Breakthroughs in energy storage technologies are expected in the near future to affect the entire electricity value chain. What impact will this have on the transmission and distribution of electricity in South Africa?

How can South Africa transform from being a technology follower to a technology leader?
How can the government signal to the international community that it is taking steps to reduce its reliance on fossil fuels, so as to attract international support?

What steps can be taken to ensure successful implementation of projects aimed at making South Africa a green economy? What are the challenges that hinder implementation?

How can South Africa benefit from initiatives such as the International Solar Alliance?

What can be done to incentivise businesses to develop business models that are built around emerging energy storage technologies?

Further insights on the subject in the South African context can be gathered from a range of studies and reports. Apart from references already listed, below is a non-exhaustive list of some others:


- National Business Initiative’s (NBI), 2013. Barriers to private sector access to climate finance in South Africa: NBI Climate Change Programme.


The climate change mitigation debate in South Africa needs to move from improving efficiency within a projection of the existing economy, to innovation and options beyond the constraints of the current dispensation and structure of the economy. It may take step changes in the development path to achieve mitigation adequate to South Africa domestic and international commitments, and maximise economic development and social wellbeing. Business models presently unconsidered may be waiting in the wings.

The ‘Low-carbon development frameworks in South Africa’ project seeks to deepen understanding of, and reveal opportunities for, transitions to a low-carbon economy. It facilitates and develops contributions at the intersection of climate change mitigation, economic development and socio-economic dimensions, across immediate, medium and long-term horizons.

Working variously with government, business and labour, the project reaches from providing input to emerging government mitigation policies and measures; through investigating the business and socio-economic case for selected mitigation initiatives which hold growth potential in energy, transport, industry, waste, and land use; to analysing potential future economic trajectories and the systemic opportunities offered by these.

This paper is one in a set of ‘Futures food for thought’ papers. It examines what is meant by a ‘green economy’ within the South African context, and suggests a way forward to address the five overlapping barriers to ‘greening’ the South African economy.

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