



Green Jobs

and related policy frameworks

An overview of South Africa



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Sustainlabour, February 2013

This report is part of the project titled “Social Dialogue for Green and Decent Jobs. South Africa - European Dialogue on Just Transition” funded by EuropeAid’s budget line SA/21.060200-01-08. The project has been cofunded by Sustainlabour. The Congress of South African Trade Unions – COSATU acts as partner organization.

The research has carried out by TIPs (Trade and Industrial Policy Strategies), Ana Belén Sánchez and Laura Martín from Sustainlabour.

We would like to thanks TIPS for their work, Brian Ashley from the Alternative Information and Development Centre (AIDC) and Jorge Maia from the South African Industrial Development Corporation (IDC) for their excellent comments

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1. EXECUTIVE SUMMARY

South Africa's workforce faces two main challenges: on one hand the high level of unemployment, about 25% the population is unemployed that means that 4 700 000 people are unemployed. The youth (15-34 years) accounts for the highest proportion (70.9%) of the unemployed. On the other hand, there is a significant divergence in income and welfare between highly paid and skilled workers and low-skill low-wage workers.

South Africa faces important environmental challenges as well with % of GHG emissions, water scarcity and increasing erosion and soil degradation. These challenges are however not separated and can not be addressed in a separate manner either. The country has made commitments under the Cancun Agreement for its greenhouse gas emissions to "peak, plateau and decline", with reductions in emissions compared to a "business as usual" scenario of 34% in 2020 and 42% in 2025.

Addressing environmental challenges in South Africa would mean improving energy efficiency, increasing the share of renewable energies in the supply energy systems, providing sustainable transport to all citizens, based on public transport, retrofitting buildings as well as a sustainable management of natural resources.

Under this framework, the New Growth Path job creation target is particularly important. The strategy policy aims at creating 300 000 additional direct jobs by 2020 in green economy sectors, including 80 000 in manufacturing. Construction, operations and maintenance of new environmentally-friendly infrastructure would account for the remainder. Some of the sector with higher potential for local jobs creation is solar heaters, where 40% of the market was captured by importers in 2009.

The mandate for a Green Economy in South Africa derives from the country's constitution, which enshrines sustainable development in the Bill of Rights. However, the concept – along with the associated idea of "green jobs" – really only rose to prominence since the beginning of the global financial crisis, as a result all of stakeholders (government, business and trade unions and other civil society organizations) signed in 2011, the Green Economy Accord, endorsing a shift to a greener economy as a means for both improving the resilience of the economy against external shocks and as a driver for more job-intensive growth. The Accord describe as well the specific tasks to be carried out by each constituency for every commitment, ranging from awareness raising and establishing joint green workplace committees to aspiration sectoral energy efficiency targets (e.g. 15% in residential and 10% in transport by 2015). Commitments and tasks will be reviewed within a 5-year period.

Furthermore, the new development policy, the New Growth Path, aims at the creation of 5 million new Jobs by 2020. The strategy lays out the vision to achieve a more developed, democratic, cohesive and equitable economy and society over the medium term, in the context of sustained growth and the generation of more inclusive and greener economy over the medium to long run. Social dialogue is recognized as key to achieve this goal.

In fact, the objective of creating decent work and sustainable livelihoods lies at the core of the South Africa National Strategy for Sustainable Development and Action Plan 2011-2014¹. It was already the priority one of the South African strategic framework (2009-2014).

The Strategy calls for the development of cleaner, lower-energy technologies and green jobs. It is as well recognized that a transitional period will be needed to ensure that is a fair transition. A total of 17 interventions will ensure this objective is achieved by the end of the Strategy. Up to now, the Strategy has achieved mixed results. On the positive side, a number of sectors have incorporated sustainability criteria into some of their policies and strategies however, on the other, inadequate resources, an institutional framework with unclear mandates, lack of management and institutional capacity, and the absence of an effective monitoring and evaluation of progress have prevented its full implementation.

The challenges and opportunities that the transition to a low carbon economy might mean for employment are as well reflected in the National Climate Change Policy. This policy aims to “limit jobs contraction to those areas of the economy where excessive carbon intensity is unsustainable, whilst promoting and expanding the green economy sectors”. In order to ensure the opportunities become real, government will set the path to just transition by promoting conditions to increase mobility of labour and capital out of carbon-intensive sectors to greener productive sectors. Accurate assessments (through National Employment Vulnerability Assessment and Sector Jobs Resilience Plans) of the capacity of various sectors to adapt to a lower-carbon environment will inform practical interventions, including incentives to investors to reallocate capital and labour to green economy sectors.

Overall it is clear that South Africa has a very large number of policies and strategies in place with respect to the Green Economy, many of which originated before the concept even came into widespread use, around 2008 as a result of the publication of the Green Jobs Report by the ILO/UNEP/ITUC/IOE.

This report includes an analysis of national-level policy and strategies. Various provincial and local governments have developed different initiatives in relation to the promotion of green economy, for example provincial green economy or green industry strategies in Gauteng, Western Cape and KwaZulu-Natal, but those are not part of the current report.

Economic impacts of environmental degradation

South Africa's economy and society do not stay out of the impact of environmental degradation. Every single impact of environmental degradation has some level of economic impact in the countries. Land degradation is most prevalent in communal and rural districts, which means that it both impacts the poor the worst and that the poor are in the best position to address it. As a way of example: Soil degradation alone costs South Africa an average of nearly R2 billion annually in dam sedimentation and increased water treatment cost.

The costs associated with neutralizing the effects of acid rain (caused by energy generation) on soils in Mpumalanga are estimated at R25 million per year, while the loss of soil nutrients through degradation costs R1.5 billion per year.

¹ The National Strategy can be read here:
http://www.environment.gov.za/sites/default/files/docs/sustainabledevelopment_actionplan_strategy.pdf

On the other side, environmental protection can become an income economic and employment creation source in many ways, as it is shown by the Green Jobs in South Africa report that estimates the employment creation potential in land conservation initiatives in 111 373 jobs in the medium term.

Green jobs employment data by sector

The country does not report green jobs individually in any of its major surveys or statistics of employment, nor does it measure or report the size or growth of “green industries”. There is not an official agreed definition of green jobs, either. However there have been important efforts from different organizations to measure the role of the so-called green economy and the number of green jobs in South Africa.

Recent research on green jobs in South Africa estimates that the employment potential in the formal sector of the green economy in South Africa is approximately 98 000 new direct jobs in the short term (2011-2012), almost 255 000 in the medium term (2013-2017) and around 462 000 “employment opportunities” or part-time jobs in the long term (2018-2025), in sectors like energy generation, energy and resource efficiency, emission and pollution mitigation, and natural resource management.

In the long term, almost 50 % of this job creation potential stems from natural resource management, i.e. activities associated with biodiversity conservation and ecosystem restoration, as well as soil and land management.

Sector approach- Green Jobs

The Green Economy already provides employment for several hundred thousand South Africans, predominately in sectors related to recycling, renewable energy production, biodiversity conservation and eco-tourism. Many more new green jobs can still be created. The growth of a Green Economy presents an opportunity for the creation of new employment, without sacrificing the quality of employment overall. In fact, the New Growth Path estimates that up to 300 000-400 000 new jobs to be created in green industries in the long term, while the One Million Climate Jobs Campaign estimates that up to one million new jobs can be a reality in South Africa in the near future if appropriate policies are put in place to that end. The only area where some decline in employment is expected is coal mining, driven by a decrease in demand for coal exports rather than changes in domestic demand.

Initiatives to generate green jobs have not only direct impact on labour markets, but also impact on better (especially rural) livelihoods, improved access to services and the structural reform of the economy through subsidies for “goods” (a social wage) and taxes on “bads” that simultaneously act to reduce negative impacts on the environment.

Energy

South Africa has excellent potential to produce energy from wind and sun. In fact, South Africa has one of the best solar resources in the world, in the Northern Cape and North West

provinces in particular. The country has almost 300 days of sunshine per year, which makes it ideal for any solar-based electricity generation technology.

Compared to coal, renewables have considerable less carbon emissions, few external costs, especially with regard to the environment and health, and result in significantly less air and water pollution. Compared to nuclear, it is significantly cheaper and safer and produces less waste. Renewable energy reduces both carbon emissions and the environmental social costs of electricity generation. If South Africa produces at least half its electricity from renewable energy within then years, greenhouse gas emissions will be cut by at least a fifth. Nonetheless it is possible to produce all country's electricity from renewable sources by 2040.

Current energy plans in South Africa includes a mix of energy supply sources, where coal and nuclear new power plants will be built together with new renewable energy plants, however the latter will count with fewer capacity. South Africa announced in 2011 a bidding process of 3 750 MW of renewable energy generation. Two bidding exercises have taken places since then. Both the participating and winning bidders in the first and second rounds consisted of companies from around the world usually in a consortium with a South African company in order to satisfy economic development (local ownership and content) requirements. Procurement of renewable energy in particular is expected to result in investment worth R120 billion in the first round alone, rising in time to over R500 billion.

Energy saved through energy efficiency measures are also part of the national energy plan. The national target for an energy efficiency improvement is 12% by 2015.

According to the Green Jobs in South Africa Report, energy generation is the second sector in terms of green jobs creation potential with more than 130 000 employment opportunities (28% of the total), in the long term (2013-2020). In addition, job creation in energy and resource efficiency is expected to double to 68 000 in the long term, accounting for 15% of the total. Only in solar photovoltaic energy South Africa could create 8 500 direct jobs in the long term in the manufacturing sector by developing the local production of PV, owing to the relatively low cost of energy and the abundance of minerals. It should be noted the need to put in place skills development programmes and other measures to ensure a just transition for those workers in the electrical geyser whose jobs will be at risk due to the use of solar energy thermal panels, where more than 1 225 jobs could be created.

An alternative energy development scenario for South Africa focused on renewable energy and energy efficiency would lead to 27% more employment in the energy sector in 2030 than a business-as-usual scenario, renewable energy would employ 76 000 jobs.

Transport

There is a clear need to improve public transportation systems in South Africa. According to the National Household Travel Survey undertaken in 2003, 38 million people lived in household that did not have access to a car and about 14 million people relied on a form of public transport on weekly basis. Transport is a good example of a sector where many new jobs can be created in sub-sustainable transport sectors: public transport, clean vehicles, bicycles, etc. However, there will be very likely the need for a just transition framework to address the labour impact of the transitional period. In other words, despite substantial job

destruction in the existing bus and minibus industries, there will be an important net direct job creation impact taking place in O&M activities (central operations, station management and bus operating functions).

Agriculture

Employment in the agriculture sector has declined by a third in the last decade. This decline is not due to environmental reforms associated with a green economy, but rather to increased cost pressures and mechanisation.

Switching to organic farming can lead to 20–90% increases in production, due to the reduction in cost of chemical agricultural products and with the potential to create 20 000 jobs over a ten year period.

Mining

Employment in the mining sector has seen a massive decline in recent years, similar to the agriculture sector, this decline has not an environmental reason but is associated with a mechanisation and costs. The sector however could be impacted by international measures.

Up to 17 000 jobs in the South African coal sector are at risk from a climate action-related decrease in global demand for coal (rather than domestic policies) and its effect on South African coal exports.

At the same time, the green economy presents new mining opportunities and therefore option to create employment:

- Renewable energy technologies in general use more iron ore than fossil fuelled technologies
- Light-weight materials for improved energy efficiency in vehicles and other technologies require specialist minerals like titanium.

Forestry, fisheries and natural resources management

Natural resources protection and sustainable management may become in powerful green jobs drivers. The creation of 454 full-time equivalent jobs in the Land-Care programme, 12 000 jobs in the refurbishment of silvicultural operations and fire protection and 5 000 of job opportunities through Working for Fisheries Programme are some of the expected results of the programmes deliverables related to the green economy for forestry and natural resources management. Despite this important potential little progress was made up to now.

Water

The challenge for South Africa on water management is to manage these resources in a manner that promotes equity, sustainability and efficiency. In particular, the country must harness the water resources in the battle against the inequality, poverty and deprivation that continue to plague the nation.

In addition, increasing efficiency in water management may become a green jobs engine. A good example is the Working for Water programme, an employment policy that aims at creating new jobs by fighting against alien plants growing in water infrastructures. The programme successfully has provided jobs and training to approximately 20 000 people from among the most marginalized sectors of society per annum. Of these, 52% were women.

Green taxation

South Africa has a number of environmentally-related taxes already in place (e.g. general fuel levy, aviation fuel levy, plastic shopping bags levy, water resource management charge, etc.). In 2005/2006 accounted for approximately 2% of GDP, around 10% of total tax revenue.

Moreover, South Africa is considering a new tax, called resource rent tax (RRT) based on the excess profits by companies from the sale of South Africa's mineral resources. This tax could potentially replace current taxes and royalties on mineral resource extraction and could also potentially incorporate the carbon tax (for example by using the carbon content of fossil fuels extracted in or imported to the country as a proxy for the emissions associated with its use).

Green taxation would have a very important impact on the low-income households. Because the poor spend a disproportionate share of their income on energy (electricity, coal and paraffin) and transport (especially busses and taxis) compared to the high income households, taxes, levies and tariffs which affect the cost of energy and transport tend to be regressive (i.e. disproportionately impacting the poor) if measures are not taken to offsetting these costs on the poor. Existing measures to achieve this include public transport subsidies and free basic electricity allowances.

Changes in the structure and labour-intensity of the economy

African economy is primarily based on foreign trade with more than half of the Gross National Product (GNP) derived through exports and imports². Trade liberalization could made a positive contribution to growth with exports increasing in volume and value, however it did not result in commensurate growth in employment or a drop in poverty. Capital intensity in manufacturing as in other sectors like mining contributed to a loss of employment by unskilled and semi-skilled workers. In addition, foreign capital is concentrated in polluting sectors like mining, which contributes a small portion of overall employment.

Thus, to the extent that green economy initiatives act to reduce the interdependence of mining and energy (e.g. coal for electricity and liquid fuels or electricity for smelters) and reduce the country's trade exposure to global measures to protect the environment (particularly with regards to climate change), it supports a structural change towards a more equitable and labour-intensive economy. The extent and impact of these changes are, however, significantly harder to measure or model.

² ILO and NEDLAC (2010). Republic of South Africa Decent Work Country Programme 2010 to 2014.

Changes in employment quality

A Green Economy does not, in and of itself, lead to better work conditions or quality of employment. Green Jobs will be developed under good labour conditions following Decent Work criteria only to the extent Labour Laws are effectively enforced.

In some sectors, such as organic agriculture, there is a direct reduction of occupational health risks, due to the reduction of chemical products use. However, other dimensions of employment quality such as working hours, wages or equal opportunities for men and women are not necessarily improved. Other examples can be found in the large number of the jobs that would be created through ecosystem restoration (e.g. invasive alien clearing) or waste management. These jobs may well be informal, providing a source of additional income, but little skills development and a short-term job rather than a career.

Green jobs in sustainable construction might face the same challenges that current building workers are facing now: high level of accidents at work, very low levels of women workers, very low salaries and working hours above the legality. Some services jobs, like those in waste collection or ecosystem restoration may not represent formal and/or full-time jobs, but are likely to provide lifeline incomes to those currently unemployed, rather than displacing existing “decent” jobs.

Policies and measures to promote green economy should be accompanied of policies and programmes to ensure decent working conditions for all these jobs.

Ensuring the growth of the Green Economy and that South Africans benefit from higher quality jobs requires – as with all other industries – an increase in people with managerial and technical (engineering and artisan) skills.

The Decent Work Agenda and the Green Economy

Green Jobs cut across the four pillars of the Decent Work Agenda:

- *Offering new employment and income opportunities:* the Green Economy is likely not only to create more new work opportunities (formal and informal) than the work that it would replace. In addition, it is expected and intended to play a role in safeguarding existing jobs from the impacts of environmentally-related pressures, like rising commodity prices (especially for food and energy).
- *Social dialogue and tripartism:* Organised sectoral social dialogue can greatly facilitate the shift to a green economy. It can generate positive outcomes and mitigate any adverse effects of structural change. While a variety of prior initiatives have addressed part of the Green Economy agenda, it was only really formalized through NEDLAC-mediated collective action by government, business and labour in the country’s response to the 2008/9 Global Financial Crisis. Government’s policy and regulatory response to the Green Economy has also been characterized by greater public-private partnership (for example in the procurement of renewable energy and energy efficiency) than has been the norm in traditionally state-monopolized “brown” industries, like electricity generation.

Constraints to growing high-quality green jobs.

Similarly to other countries, skill shortages have been identified as a critical issue in both the biodiversity and renewable energy industries. A significant shortfall in professional, managerial and technical (engineering and artisan) skills has the potential of acting as a “bottle-neck” for the growth of green industries.

Overall, one of the major challenges for Green Economy initiatives lies in coherence among multiple policies and coordination among the multiple departments and other government actors responsible for its implementation. This is as well the case for South Africa.

2. GREEN JOBS DATA IN SOUTH AFRICA (CURRENT STATISTICS AND FORECASTS)

South African economy and the impact of trade on employment

According to prior analysis by the ILO South African *Decent Work Programme 2010-2014*, the South African economy is “primarily based on foreign trade with more than half of the Gross National Product (GNP) derived through exports and imports. Trade liberalization has been one of the central policies of South Africa’s development strategy since 1994. While trade liberalization made a positive contribution to growth with exports increasing in volume and value, it did not result in commensurate growth in employment or a drop in poverty. Capital intensity in manufacturing as in other sectors like mining contributed to a loss of employment by unskilled and semi-skilled workers.”³

The adverse impact of capital-intensity on labour-intensity is also one of the factors cited by the Second Economy Project of the Presidency, which identifies this as a contributor to structural unemployment in the country.

In addition, the exposure of South Africa’s economy to trade means that green economy measures (like the application of carbon pricing) outside of South Africa would significantly impact the economy.

Thus, to the extent that green economy initiatives act to reduce the interdependence of mining and energy (e.g. coal for electricity and liquid fuels or electricity for smelters) and reduce the country’s trade exposure to global measures to protect the environment (particularly with regards to climate change), it supports a structural change towards a more equitable and labour-intensive economy. The extent and impact of these changes are, however, significantly harder to measure or model.

2.1. ESTIMATES OF CURRENT AND POTENTIAL EMPLOYMENT BY GREEN INDUSTRY SECTOR

Introduction

South Africa is characterized by high levels of unemployment, 25% of the population is unemployed that means 4 700 000 people are unemployed. The youth (15-34 years) accounts for the highest proportion (70.9%) of the unemployed. Furthermore, 31.4% or 3.3 million of the youth are not in employment, education or training (NEET)⁴. Within the employed population, there is a significant divergence in income and welfare between highly paid and skilled workers and low-skill low-wage workers.

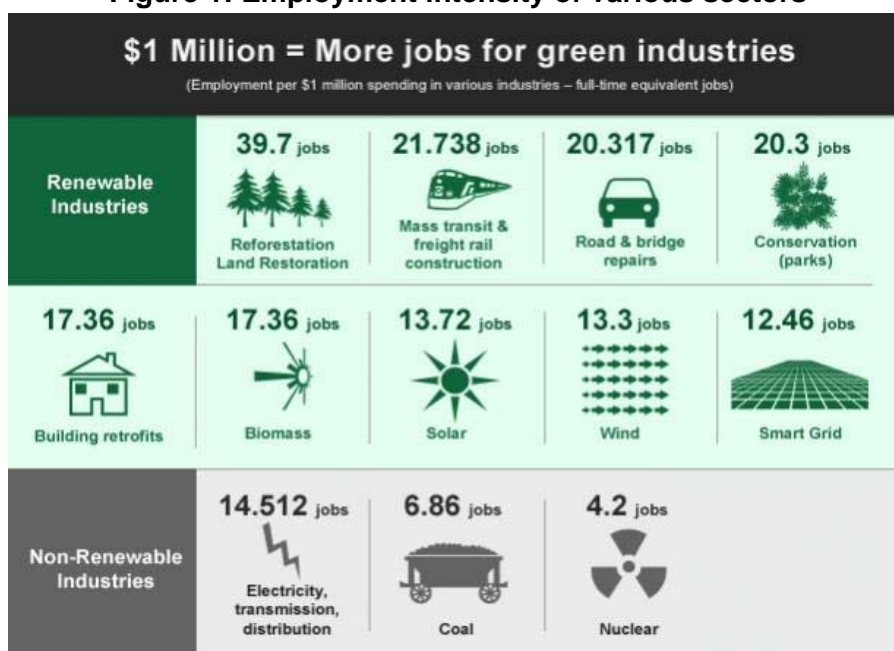
³ ILO and NEDLAC (2010). Republic of South Africa Decent Work Country Programme 2010 to 2014.

⁴ According to the third quarter report released by the South African statistic office unemployment raised to 25,5%, 4,7 million people. http://www.statssa.gov.za/news_archive/press_statements/QLFS-Q3-2012.pdf

The country does not report green jobs individually in any of its major surveys or statistics of employment, nor does it measure or report the size or growth of “green industries”. There is not an official agreed definition of green jobs, either. However there have been important efforts from different organizations to measure the role of the so-called green economy and the number of green jobs in South Africa.

Green industries generally create more jobs per unit of investment, unit of capacity or unit of production than the industries for which they are a substitute.⁵ This is particularly true for land-based industries (e.g. land restoration or conservation) and renewable energy production which are highly labour-intensive.

Figure 1: Employment intensity of various sectors



Source: Heidi Garrett-Peltier, Political Economy Research Institute, University of Massachusetts at Amherst

In 2006 a report from NEDLAC indicated that- the Environmental Goods and Services (EGS) sector (more commonly referred to as “green industries” in later years) was valued at between R14.5 billion and R23.2 billion in 2004, i.e. from 1.0-1.6% of GDP. Waste management accounted for 80% of the sector by value.⁶

Four years later, in 2011 it was published the report on Green jobs in South Africa by IDC/DBSA/TIPS⁷ that assessed the number of jobs and enterprises existing at that time in the South African green economy and the potential for green jobs creation in the short, medium and long term of these same sectors provided policies to support their growth were

⁵ UNEP, ILO, IOE and ITUC (2008) Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World.

⁶ Blueprint (2006). Strategy to Stimulate Growth in the South African Environmental Goods and Services Industry, FRIDGE Report for NEDLAC.

⁷ The report published by Industrial Development Corporation (IDC), Development Bank of South Africa (DBSA) and Trade and Industrial Policy Strategies (TIPS) can be seen here: <http://www.idc.co.za/projects/Greenjobs.pdf>

implemented. The study estimated the employment potential in the formal sector of the green economy in South Africa to be approximately 98 000 new direct jobs in the short term (2011-2012), almost 255 000 in the medium term (2013-2017) and around 462 000 “employment opportunities” or part-time jobs in the long term (2018-2025). In total, 26 broad types of activity were covered including in sectors like energy generation, energy and resource efficiency, emission and pollution mitigation, and natural resource management.⁸

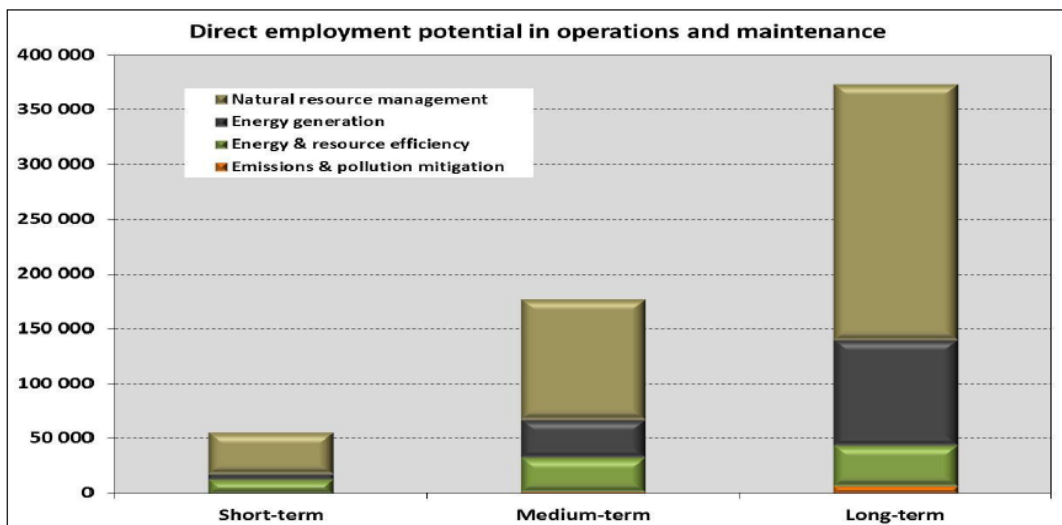
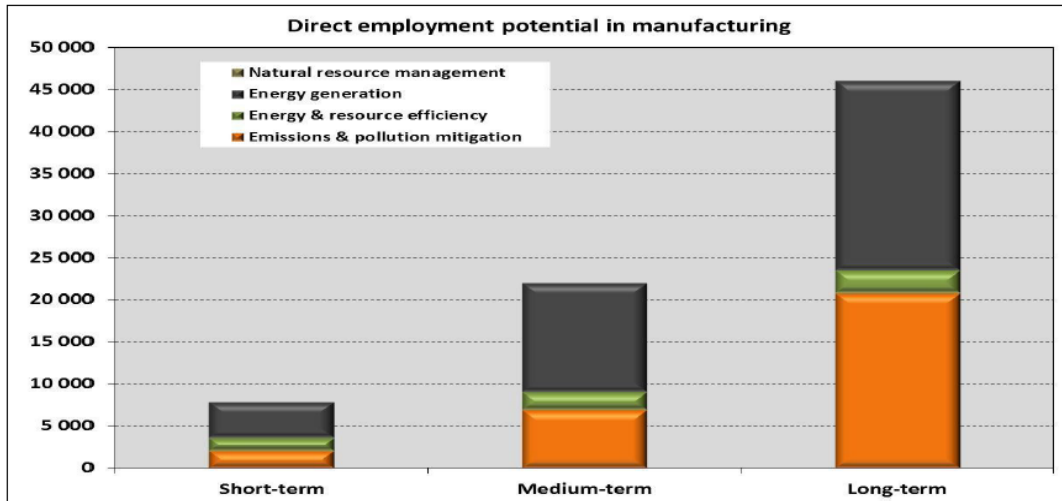
In the long term, almost 50 % of this job creation potential stems from natural resource management, i.e. activities associated with biodiversity conservation and ecosystem restoration, as well as soil and land management. Energy generation comes second with more than 130 000 employment opportunities (28% of the total), growing rapidly from 13,500 (14%) in the short term. Job creation in energy and resource efficiency is expected to double from 31 500 in the short term to 68 000 in the long term, accounting for fewer than 15% of the total. The potential of emission and pollution mitigation is more limited. The sector should still result in about 32 000 jobs in the long run.

Employment potential is divided between building, construction and installation activities, operation and maintenance services, and manufacturing operations. As illustrated below, manufacturing and construction jobs each comprise only about 10% (46 000) of the total number of jobs, while the bulk of jobs were associated with operation and maintenance services.

Table 1: Net direct employment potential per type of employment activity over consecutive timeframes in i) building, construction and installation; ii) manufacturing; iii) operation and maintenance



⁸ Maia, J., Giordano, T., Kelder, N., Bardien, G., Bodibe, M., du Plooy, P., Jafta, X., Jarvis, D., Kruger-Cloete, E., Kuhn, G., Lepelle, R., Makaulule, L., Mosoma, K., Neoh, S., Netshitomboni, N., Ngozo, T., Swanepoel, J. (2011). Green Jobs: An Estimate of the Direct Employment Potential of a Greening South African Economy. Industrial Development Corporation, Development Bank of Southern Africa, Trade and Industrial Policy Strategies.



Source: Maia, J., Giordano, T., Kelder, N., Bardien, G., Bodibe, M., du Plooy, P., Jafta, X., Jarvis, D., Kruger-Cloete, E., Kuhn, G., Lepelle, R., Makaulule, L., Mosoma, K., Neoh, S., Netshitomboni, N., Ngozo, T., Swanepoel, J. (2011). *Green Jobs: An Estimate of the Direct Employment Potential of a Greening South African Economy*. Industrial Development Corporation, Development Bank of Southern Africa, Trade and Industrial Policy Strategies.

Table 2: Net direct green jobs potential estimated for the four broad types of activity and their respective segments in the long term, and an indication of the roll-out over three timeframes

Broad green economy category	Segment	Technology/product	Total net direct employment potential in the long-terms	Net direct manufacturing employment potential in the long-term
Energy Generation	Wind Power	Onshore wind power	5,156	2,105
		Offshore wind power		
	Solar power	Concentrated Solar Power (CSP)	3,014	608
		Photovoltaic Sector	13,541	8,463
	Marine Power	Marine Power	197	0
	Hydro Power	Large Hydro Power	272	111
		Micro/Small Hydro Power	100	0
	Waste-to-energy	Landfills	1,178	180
		Biomass Combustion	37,270	154
		Anaerobic Digestion	1,429	591
		Pyrolysis/Gasification	4,348	2,663
	Bio-fuels	Co-Generation	10,789	1,050
		Bio-ethanol	52,729	6,641
	Bio-diesel			
Energy Generation sub-total			130,023	22,566
Energy and resource efficiency	Green Buildings	Insulation, lighting, windows	7,340	838
		Solar water heaters	17,621	1,225
		Rain water harvesting	1,275	181
	Transportation	Bus Rapid Transportation	41,641	350
	Industrial	Energy efficient motors	-566	4
		Mechanical insulation	666	89
Energy and resource efficiency sub-total			67,977	2,686
Emissions and Pollution Mitigation	Pollution control	Air pollution control	900	166
		Electrical vehicles	11,428	10,642
		Clean stoves	2,783	973
		Acid mine water treatment	361	0
	Carbon Capture and Storage		251	0

Source: Maia, J., Giordano, T., Kelder, N., Bardiën, G., Bodibe, M., du Plooy, P., Jafta, X., Jarvis, D., Kruger-Cloete, E., Kuhn, G., Lepelle, R., Makaulule, L., Mosoma, K., Neoh, S., Netshitomboni, N., Ngozo, T., Swanepoel, J. (2011). *Green Jobs: An Estimate of the Direct*

Within formal sector, there is likely to be a net movement from primary to secondary and tertiary sectors. The IDC/DBSA/TIPS Green Jobs report estimates that an average number of 373 000 in the long-term (2017-2025) can be created in “operations and maintenance”, which is likely to match general conditions of employment, except for the large number of jobs (roughly 240 000) from natural resources management activities⁹

Another important report that should be mentioned in relation to the potential to create green jobs in South Africa is the One Million Climate Jobs Campaign¹⁰ report. Their assumptions to calculate this potential were the implementation of ambitious policies and supporting measures to reduce greenhouse gas emissions and adapt to climate change effects in the country.

According to this report, South Africa has the potential to create up to one million new jobs in the short run, in sectors such as renewable energies, construction and building industry, rainwater harvesting, transport, waste, health or tourism. The sector with highest potential is the agriculture sector, by shifting the South African food production through organic small-scale ecological agriculture. The impact of producing local food through this type of scheme in Gauteng alone is of 500 000 new jobs. The next sector with highest potential is the public transport with 160 000 new jobs as a result of expanding public transport. The third sector is linked to the protection of water, soil and biodiversity resources, with up to 400 000 new jobs that can be created in ecosystem restoration projects. Moving to zero waste would have similar employment impact, with a potential up to 400 000 new green jobs.

Table 3: Climate Jobs Creation Potential in South Africa

⁹ Maia, J., Giordano, T., Kelder, N., Bardien, G., Bodibe, M., du Plooy, P., Jafta, X., Jarvis, D., Kruger-Cloete, E., Kuhn, G., Lepelle, R., Makaulule, L., Mosoma, K., Neoh, S., Netshitomboni, N., Ngozo, T., Swanepoel, J. (2011). Green Jobs: An Estimate of the Direct Employment Potential of a Greening South African Economy. Industrial Development Corporation, Development Bank of Southern Africa, Trade and Industrial Policy Strategies.

¹⁰ The Million Climate Jobs Campaign is a research and advocacy project developed jointly by over 40 key components of the labour and social movements and other civil society formations which recognise the merit of simultaneously addressing unemployment and climate change. It is coordinated by the Alternative Information and Development Centre (AIDC), which initiated the project in March 2011. The project works from the premise that a just transition to a low carbon economy provides opportunities both to reduce global greenhouse gas emissions and enhance the quality of life of South Africans through reducing localised pollution and providing decent job and skills development opportunities. Such a transition provides extensive opportunities to create over a million jobs - if driven by the state and its agencies.

Initiative	Job Creation
Renewable energy	
South Africa supplying half its electricity from renewable energy within then years; 50% of households having installed solar water heating systems by 2020, construction of 150,000 residential digesters	Over 150,000
Ecological restoration	
Public Works programme such as Working for Water, Landcare, Working for Coast, Working for Wetlands, Working for Fire and Working for Waste	Up to 400,000
Construction and building industry	
Retrofitting regulation; inner city; municipal housing unit	Up to 70,000
Health	
Employment of community caregivers	Up to 1,300,000 (the majority part-time)
Rainwater harvesting (RWH)	
Introducing RWH to 10% of the South African population (jobs in design, building, installation, maintenance and education; link with small-scale agriculture, etc)	65,000
Transport	
Increasing use of public transport; expansion of rail general freight with 18%; promotion of a South African owned and controlled shipping industry;etc	460,000
Manufacturing (in relation to RE)	
Manufacturing of climate mitigation and adaptation products for domestic households; climate adaptation products in water reaching 50% of households; sales, maintenance and transport of the above products	38,000
Eco-housing and sanitation	
Construction of 200,000 RDP houses a year using eco-housing methods; and recycling of recovered materials for floors	8,700
Waste	
Zero waste economy	Over 400,000
Tourism	
Half of tourism lodges in South Africa sourcing their food through community agriculture projects; energy and water efficiency retro-fitting in hotels; waste management initiatives in the accommodation sector; and investment in programmes such as EPWP and projects undertaken by Open Africa	220,000
Total	3,111,700

Source: One Million Climate Jobs Campaign, 2011

Due to the lack of an agreed definition of green jobs and green sectors, the above studies show different results and apply different methodologies for calculation purposes. In addition, the above assessments assumed different time goals for job creation and different supporting efforts/policies that result in very diverse final figures.

Green Jobs by sector in South Africa

Based on the above-mentioned reports, the following section compiles information, when available, on how many jobs exist in green sectors and the potential of job creation in the future, provided supporting measures are implemented.

The sectors assessed are energy, agriculture, biodiversity, transport, construction and industry.

2.1.1. Energy

Energy supply is an important challenge for South Africa. South Africa's economy is structured around large-scale, energy-intensive mining and primary minerals beneficiation industries, pushing its "energy intensity" to above average, with only 10 other countries having higher commercial primary energy intensities. South Africa also uses coal, its major indigenous energy resource, to generate most of its electricity and a significant proportion of its liquid fuels. Because of this, South Africa is the 14th highest emitter of greenhouse gases¹¹.

Table 4: 2009 Energy Balance for South Africa. (In thousands tonnes of oil equivalent (ktoe) on a net calorific value basis)

Supply and Consumption	Coal and Peat	Crude Oil	Oil Products	Natural Gas	Nuclear	Hydro	Geothermal, Solar, etc	Biofuels and Waste	Electricity	Heat	Total
Production	141 681	150	0	851	3 337	125	64	14 429	0	0	160 637
Imports	1 354	24 234	6,298	2 858	0	0	0	0	1 057	0	35 801
Exports	-45 234	0	-2 701	0	0	0	0	-267	-1 208	0	-49 410
International Marine Bunkers	0	0	0	-2647	0	0	0	0	0	0	-2 647
International Aviation Bunkers	0	0	-947	0	0	0	0	0	0	0	-947
Stock changes	567	0	0	0	0	0	0	0	0	0	567

Source: International Energy Agency. South Africa data, 2009

¹¹ According to South Africa info:
<http://www.southafrica.info/business/economy/infrastructure/energy.htm#ixzz22mUFzoMA>

Blackouts in 2007 and 2008 had cost the economy between R50 billion and R119 billion. The power supply is short by 5 000 MW and the distribution infrastructure is poorly maintained causing important energy losses¹².

In order to address these challenges, different initiatives have been launched in the country. One of them is the South Africa New Growth Path that targets the creation of 300 000 additional direct jobs by 2020 including in the energy sector, renewable energy production and energy efficiency in particular.¹³

Furthermore, the Department of Trade and Industry (DTI) Industrial Policy and Action Plan (IPAP2)¹⁴ identifies green industries linked to clean energy production, in particular solar water heaters, wind energy, energy efficiency and waste management as key sectors for the development of the South African industrial capacity and to foster job creation. So does the New Growth Path that identifies the “green economy” as one of the key “jobs drivers” to address unemployment and raise equity.

The IPAP2 was revised in 2011 and included more detailed targets in six sub-sectors:¹⁵

- wind and solar energy;
- biomass energy;
- clean and multi-energy stoves;
- water and energy-efficient appliances and materials;
- efficient motors, variable-speed drives, energy metering and control and electricity storage; and
- waste and waste water treatment and (energy and material) recovery.

A new review of IPAP2 in April 2012 changed the priority sectors to solar and wind energy; renewable energy independent power producer procurement programme; energy efficiency; waste management and solar water heaters.

This Plan also highlights a growing importance of environmental protection in other countries, that could eventually evolve in increasing ‘eco-protectionism’ from advanced industrial countries in the form of tariff and non-tariff measures such as carbon taxes and restrictive standards. In addition, increasing energy costs pose a major threat to manufacturing and render South Africa historical capital and energy-intensive resource processing based industrial path unviable in the future.¹⁶

2.1.2. Jobs in renewable energies

Current employment: 3 600 jobs

Potential employment: 150 000 direct jobs (with a target of 50% renewables within 10 years) + 120 000 direct jobs in energy efficiency + additional 33 700 jobs in 2030 (to reach 182 700 jobs in total) in an “enhanced manufacturing” scenario.

¹² South Africa Independent Power Producers Association.

<http://www.sowetanlive.co.za/news/business/2012/10/09/power-shortages-stifle-economic-growth>

¹³ Economic Development Department (EDD) (2010). The New Growth Path: The Framework.

¹⁴ Department of Trade and Industry (DTI) (2010). 2010/11 – 2012/13 Industrial Policy Action Plan.

¹⁵ Department of Trade and Industry (DTI) (2011). Industrial Policy Action Plan 2011/12 – 2013/14.

¹⁶ van der Merwe, C. (2010), SA seeks to make virtue of necessity with green-industries plan, Engineering News, 12 March 2010.

South Africa has excellent potential to produce energy from wind and sun. Compared to coal, renewables have considerably less carbon emissions, few external costs, especially with regard to the environment and health, and result in significantly less air and water pollution. Compared to nuclear, it is significantly cheaper and safer and produces less waste. Renewable energy reduces both carbon emissions and the environmental social costs of electricity generation. If South Africa produces at least half our electricity from renewable energy within then years, we greenhouse gas emissions will be cut by at least a fifth and it is possible to produce all electricity from renewable sources by 2040. (One Million Climate Jobs Campaign, 2011)

Renewable energy creates more jobs than nuclear and coal-power stations put together. In the next ten years, many of the South African coal power plants will have reached the end of their lifespan. Replacing them by renewable energy plans could be a source of green jobs creation and pollution reduction. A number of studies show that there is strong potential for job creation in renewable energy. With a target of 50% renewables within ten years, more than 150 000 direct and permanent jobs would be created in manufacture and installation, maintenance and extending the electricity grid to link the renewable energy plants. If energy efficiency measures are implemented alongside renewable energy plants, electricity demand would reduce and up to 120 000 jobs could be created. (One Million Climate Jobs Campaign, 2011)

In relation to how this new renewable energy plans should be developed, the National Union of Metalworkers (NUMSA) has called for a publicly owned and community-controlled renewable energy sector made up largely of para-statal and cooperatives. (One Million Climate Jobs Campaign, 2011).

According to a 2010 Greenpeace study¹⁷, an alternative energy development scenario for South Africa focused on renewable energy and energy efficiency (the Energy [R]evolution Scenario) would lead to **27% more employment in the energy sector in 2030 than a business-as-usual scenario**. The South Africa energy sector would employ a total of 149 000 people in 2030 against 117 000 in the reference scenario. Renewable energy would be the main employer with 76 000 jobs (compared to 11 000 in the baseline scenario). 64 000 people would still work in the coal sector (including export), in decline from 72 000 in 2010, as opposite to an increase to 91 000 people in a business-as-usual path. Efforts in energy efficiency would result in greater employment in the sector. In 2030, 27 000 people (compared to 12 000 in the reference scenario) would work in the sector.

¹⁷ Rutovitz, J. 2010. South African energy sector jobs to 2030. Prepared for Greenpeace Africa by the Institute for Sustainable Futures, University of Technology, Sydney, Australia.

Table 5: Energy sector employment in 2010, 2020, 2030 according to three scenarios

Jobs	IAE Reference			Growth without constraints			Energy Revolution		
	2010	2020	2030	2010	2020	2030	2010	2020	2030
Coal	47 000	64 000	69 000	43 000	61 000	81 000	47 000	52 000	35 000
Gas, oil, diesel	1 100	1 200	1 900	1 100	400	200	1 100	2 500	4 300
Nuclear	1 200	1 200	1 200	1 200	5 700	37 000	1 200	900	-
Renewable	3 600	8 000	11 000	800	2 100	2 800	3 600	58 000	76 000
Electricity supply	53 000	74 000	83 000	46 000	70 000	121 000	53 000	113 000	116 000
Energy efficiency	-	-	-12 000	-	-	-	-	4 500	27 000
Coal exports	17 000	20 000	22 000	17 300	20 000	22 000	17 000	5 200	6 500
Total Jobs	71 000	94 000	117 000	63 000	90 000	142 000	71 000	123 000	149 000

Source: Rutovitz, 2010

A variant version of the [R]evolution scenario, further augmented by “enhanced manufacturing” which included greater localisation, would in an additional 33 700 jobs in 2030, including 25 000 associated with technology exports, to reach 182 700 jobs in total.

2.1.3. Renewable energies: Wind energy

South Africa’s production of wind turbines and components is still at an early, if not experimental, stage. There is however some production potential for existing local industries (foundries, steel and metal manufacturers, boat building and electrical industries) and also the entry of new players.

Recent estimates of the country’s aggregate wind power generation potential have shown promising results, notably in the Western Cape. Some wind farms are already at the production stage (5.2 MW Darling Wind Farm, Eskom’s experimental 3.2 MW farm in the Western Cape, 1.8 MW turbine at Coega) a few others are currently in the pipeline.

In the long run, the sector could generate more than 5 000 jobs, including 1 000 in construction, and 2 000 in O&M and 2 000 manufacturing. South Africa’s second-round Renewable Energy Independent Power Producers Program (REIPPP) auction resulted in 562.5 MW of wind power project out of a total 1 043.9 MW of renewable energy capacity. Denmark’s Vestas and India’s Suzlon are among the wind turbine manufacturers who will

play a big part in helping South Africa realize its renewable energy, as well as broader social, economic and environmental goals¹⁸.

2.1.4. Renewable energies: Solar energy

Current employment, unknown

Potential employment: 3 600 jobs in CSP; 8 500 in PV

South Africa has one of the best solar resources in the world, in the Northern Cape and North West provinces in particular. The country has almost 300 days of sunshine per year, which makes it ideal for any solar-based electricity generation technology.

Concentrated solar power (CSP) is a very promising renewable energy generation option in South Africa and has potential for development on a large scale. To date, only one CSP plant has been installed in South Africa – a small-scale solar dish stirling at the premises of the Development Bank of Southern Africa in Gauteng but was decommissioned in 2008. Two projects, a 100MW and 50MW one have been selected in the first renewables procurement round with plans for a 5 GW solar park in the Northern Cape.

Many components (mirrors, absorber tubes, steel structures, frames and pylons, control systems, turbines, generators, cooling systems, pipes, fire systems, heaters, pumps, storage tanks, water pipelines and transmission lines) could also be produced locally.

According to the IDC, the sector has the potential to create 3 000 employment opportunities, including 3 000 in O&M and 600 in manufacturing. The author believes that this is likely an underestimate, given the higher expected local content of CSP compared to PV.

Likewise, **photovoltaic power generation** is definitely relevant to South Africa, particularly in the Northern Cape and North West provinces, as the country offers both excellent solar radiation levels and land availability. Rooftop applications are also a solution for urban areas where land is scarcer.

South Africa has the ability to develop the local production of PV components (notably solar cells using photovoltaic grade silicon), owing to the relatively low cost of energy and the abundance of minerals. About 8 500 direct jobs could be created in the manufacturing sector in the long term.

Table 6: Direct employment generation potential in the photovoltaic sector in South Africa

¹⁸ You can read more at <http://cleantechnica.com/2012/05/24/two-wind-farms-433mw-vestas-suzlon-wind-turbines-south-africa/#V0AepA1Kku0IgMIm.99>

Activity	Short term			Medium term			Long term		
	Domestic	Export-related	Total	Domestic	Export-related	Total	Domestic	Export-related	Total
Construction	1 050	7	1 057	2 100	42	2 142	2 713	81	2 794
O&M	70	1	71	770	7	777	2 258	26	2 284
Manufacturing	2 520	168	2 688	5 040	1 008	6 048	6 510	1 953	8 463
Totals	3 640	176	3 816	7 910	1 057	8 967	11 481	2 060	13 541

Source: Maia *et al.*, 2011

2.1.5. Renewable energies: Solar water heating

Current employment: 700

Potential employment: 17 620 new jobs, 16 278 of which in installation and 1 225 in manufacturing

A big portion of electricity use in South Africa in households is for water heating. Solar water-heater installation can reduce domestic demand for electricity, reduce greenhouse gas emissions, provide water heating to poor communities, and provide employment through manufacturing and installation of systems. Thousands jobs could be created as a result. (One Million Climate Jobs Campaign, 2011).

Solar water heating (SWH) is a relatively labour-intensive form of energy generation. The entire supply chain creates employment, from manufacturing to maintenance. In South Africa, more than 50% of total employment is involved in the installation stage.¹⁹ Small local manufacturers (Ikhwezi Solar, Solar Beam) and importers (Solar Heat Exchangers, Solar Tech, Solarhart, Tasol Solar²⁰) are present on a yet limited South African market.²¹

Approximately 700 people are currently employed in the sector, with 200 on manufacturing and 400 as installers and the rest in administration. This excludes a large number of independent installers including plumbers that do not focus on SWH installation as a primary activity. The IPAP2 targets some 215 000 solar water heater systems have been installed nationally to date, as part of the South Africa SWH Strategy and Implementation Plan of 2009²²

Installation of SWH systems carries great potential in terms of job creation, due to both high volumes and labour intensity, and should generate more than 16 000 jobs in the long term. Despite progressive market growth, economies of scale should limit employment creation in manufacturing to 1 225 jobs in the long term. No job losses are nevertheless expected in electrical geyser production thanks to the reconversion of producers. Skills provision to meet

¹⁹ Department of Trade and Industry (DTI) (2010). 2010/11 – 2012/13 Industrial Policy Action Plan.

²⁰ Tasol recently set up a manufacturing plant in South Africa, but still imports to a limited extent

²¹ Maia, J., Giordano, T., Kelder, N., Bardien, G., Bodibe, M., du Plooy, P., Jafta, X., Jarvis, D., Kruger-Cloete, E., Kuhn, G., Lepelle, R., Makaulule, L., Mosoma, K., Neoh, S., Netshitomboni, N., Ngozo, T., Swanepoel, J. (2011). Green Jobs: An Estimate of the Direct Employment Potential of a Greening South African Economy. Industrial Development Corporation, Development Bank of Southern Africa, Trade and Industrial Policy Strategies.

²² Department of Trade and Industry (DTI) (2011). 2010/11 – 2012/13 Industrial Policy Action Plan (review).

the needs for new skills needed have been identified as an important bottleneck and should be part of the Just Transition Framework.

Table 7: Direct employment generation potential in the solar water heating sector in South Africa

Activity	Short term			Medium term			Long term		
	Domestic	Export related	Total	Domestic	Export related	Total	Domestic	Export related	Total
Installation	1 345	0	1 345	8 932	0	8 932	16 278	0	16 278
Distribution	6	0	6	20	0	20	119	0	119
Manufacturing	157	1	158	451	104	555	912	313	1 225
Totals	1 508	1	1 509	9 403	104	9 507	17 309	313	17 622

Source: *Maia et al.*, 2011

2.1.6. Waste-to-energy

Current employment: unknown

Potential employment: 37 270 new jobs in biomass energy and co-generation; 400 000 new jobs as a result of a zero waste policy

The biomass industry is well-developed in South Africa, with many local firms (BioTerm Energy, NuPlanet Clean Energy, Cape Advanced Engineering, PACE Centre, etc.) and international consultants and carbon funds active on the market.

The demand market is potentially very large in South Africa as various industrial sectors (basic metals, paper, cement, bricks, glass and synthetic fuels) would be serious clients. Ultimately, all industries relying on coal and gas as fuel would be interested in switching to biomass or co-firing (i.e. biomass/coal or biomass/gas) actions. In addition, Eskom could use biomass to satisfy at least part of the fuel needs of the country's coal-fired power stations.

As a consequence, while employment in the sector is currently limited, approximately 37 000 could be created in the long term, predominately in O&M.

According to the One Million Climate Jobs Campaign, implementing a zero waste²³ policy in South Africa would create at least 400 000 jobs and reduce carbon pollution by 35 Mt.

Table 8: Direct employment generation potential in the biomass sector in South Africa

Activity	Short term			Medium term			Long term		
	Domestic	Export related	Total	Domestic	Export related	Total	Domestic	Export related	Total
Construction	60	0	60	416	12	428	757	13	770
O&M	45	0	45	14 005	0	14 005	36 346	0	36 346
Manufacturing	10	0	10	69	2	71	151	3	154
Totals	115	0	115	14 490	14	14 504	37 254	16	37 270

²³ Zero waste is a cheap and effective strategy to combat climate change. It is a comprehensive programme of waste reduction, reuse, recycling and composting that offers dramatic potential for emissions reductions.

Source: Maia *et al.*, 2011

2.1.6.1. Cogeneration (combined Heat and Power)

Current employment: unknown

Potential employment: 10 000 jobs, mainly in O&M

Cogeneration (Combined Heat and Power) is widely used in the world, with a global installed electricity capacity estimated at 325 000 MW. Nonetheless, the technology is still at an early stage in South Africa with only a few companies (ArcelorMittal, Sappi, Mondi, Sasol and Ipsa) equipped with cogeneration facilities. “Cogeneration is likely to be one of the solutions to South Africa’s electricity capacity challenges, alleviating much of the pressure on the supply side as cogeneration plants are progressively installed across a number of industrial sectors.”²⁴

In total, the sector could provide more than 10 000 additional jobs, mainly in O&M (about 7,700), in the long term.

Table 9: Direct employment generation potential in the cogeneration sector in South Africa

Activity	Short term			Medium term			Long term		
	Domestic	Export related	Total	Domestic	Export related	Total	Domestic	Export related	Total
Construction	1 323	0	1 323	3 634	0	3 634	2 070	0	2 070
O & M	450	0	450	2 550	0	2 550	7 669	0	7 669
Manufacturing	575	0	575	1 580	120	1 700	900	150	1 050
Totals	2 348	0	2 348	7 764	120	7 884	10 639	150	10 789

Source: Maia *et al.*, 2011

2.1.7. Biofuels (bioethanol and biodiesel)

Current employment: unknown

Potential employment: 50 000 mostly agricultural jobs

A number of South African companies, including Illovo and NCP Alcohol, have been producing small volumes of potable alcohol for applications other than fuels. Some ethanol projects based on sugar cane or beet sugar are currently in the pipeline and are expected to start production in 2014. Stellenbosch Biomass Technologies is developing local technologies for the production of bioethanol from cellulosic materials. Some biodiesel projects are also envisaged by the DTI (canola-based project in the Easter Cape) and various companies (Sasol, CEF, LG Biodiesel, SA Biodiesel and the National Biofuels Group). First In Spec is also planning a biodiesel project using waste vegetable oil. Most

²⁴ Maia, J., Giordano, T., Kelder, N., Bardien, G., Bodibe, M., du Plooy, P., Jafta, X., Jarvis, D., Kruger-Cloete, E., Kuhn, G., Lepelle, R., Makaulule, L., Mosoma, K., Neoh, S., Netshitomboni, N., Ngozo, T., Swanepoel, J. (2011). Green Jobs: An Estimate of the Direct Employment Potential of a Greening South African Economy. Industrial Development Corporation, Development Bank of Southern Africa, Trade and Industrial Policy Strategies.

current bioethanol projects rely on grain, sorghum, sugar cane or beet sugar. The use of maize, a staple food crop in the country, is subsequently limited.

South Africa has potential to establish or expand energy production crops (maize, grain, sorghum, sugar cane, sugar beet and barley for bioethanol production, and sunflower, canola and groundnuts for biodiesel) thanks to favourable agricultural conditions and land availability (3 million ha of commercially utilised land are currently under-utilised in South Africa).

The industry would benefit from a proposal to mandate a 2% blend target for national fuel supply by 2013 (and up to 10% in the future), though this would require substantial capital investment costs for refineries.

Biofuels production is expected to generate more than 50 000 direct jobs in the long term, mostly from the growing of crops for raw material supply.

Table 10: Direct employment generation potential in the biofuel sector in South Africa

Activity	Short term			Medium term			Long term		
	Domestic	Export related	Total	Domestic	Export related	Total	Domestic	Export related	Total
Construction	750	0	750	1 125	200	1 325	1 391	328	1 719
O&M	4 650	0	4 650	16 430	0	16 430	44 369	0	44 369
Manufacturing	298	0	298	2 148	17	2 165	6 602	39	6 641
Totals	5 698	0	5 698	19 703	217	19 920	52 362	367	52 729

Source: Maia et al., 2011

2.1.8. Recycling

Current employment: 36,960 – 131,130 jobs (2007), 40 000 in plastic recycling, 10 000 in scrap metal, 35 000 in metal beverage cans

Potential future employment: 165,134 – 351,314 jobs in construction, operation and manufacturing; .If 10% of South African households implemented RWH at least 65 000 jobs could be created

The recycling industry in South Africa is relatively young. Since 2000, the industry has, however, witnessed impressive growth rates. Due to the rapid increase of South Africa's solid waste, particularly in urban areas and the decreasing landfill space availability, high environmental impact and rising waste management costs, recycling is expected to thrive in the next decades.²⁵

Waste management, including recycling, is by far the largest green economy sub-sector by value. The Department of Trade and Industry (DTI) estimates that the recycling industry

²⁵ Maia, J., Giordano, T., Kelder, N., Bardien, G., Bodibe, M., du Plooy, P., Jafta, X., Jarvis, D., Kruger-Cloete, E., Kuhn, G., Lepelle, R., Makaulule, L., Mosoma, K., Neoh, S., Netshitomboni, N., Ngozo, T., Swanepoel, J. (2011). Green Jobs: An Estimate of the Direct Employment Potential of a Greening South African Economy. Industrial Development Corporation, Development Bank of Southern Africa, Trade and Industrial Policy Strategies.

employed directly between 36 960 and 131 130 people in 2007. More than 90% of the sector labour force is employed in the unskilled collecting segment. Skilled and semi-skilled labour each account for 2% and 5%.²⁶

About 52% of recyclable paper and board is currently processed (mainly by three major paper-making companies: Sappi, Mondi and Nampak) while 26% of all non-returnable glass containers produced annually are being recycled (by Consol and Nampak essentially).

The recycled plastic chain, which employs over 40 000 people in South Africa, reprocesses about 18% of the 1.25 million tonnes manufactured annually in the country.

Metal beverage cans have the highest rate, with around 70% of the production been recycled by Collect-a-Can²⁷. The Collect-a-Can initiative, driven by the private sector, provides employment (or rather, lifeline incomes) for 35 000 people.

The Metal Recyclers Association estimates that the South African scrap recycling industry sustain about 10 000 direct jobs (including collectors). E-waste remains a challenge with only 8% of the total being recycled.²⁸

In addition to alleviating landfill space challenges, reducing damage to the environment and improving resource efficiency, a structured and productive recycling industry would increase numerous job opportunities for collectors. The DTI estimates that the South African recycling industry operating at full capacity could employ between 165,134 and 351,314 people. Similar to the current situation, more than 90% of the employment would be unskilled labour.²⁹The employment potential in recycling is developed in the following sectors:

- construction: in order to build the new recycling plants that are required in the short, medium and long terms.
- operations and maintenance (O&M) strong job creation in the long term in pyrolysis and gasification plants.
- Manufacturing – Although most of the equipment utilised in recycling plants is imported, there should be employment opportunities in the manufacture of structural steel products, wiring etc.

Landfill gas, anaerobic digestion (already used by SABMiller for example) and pyrolysis/gasification³⁰ sectors, could add up to 7 000 jobs.

²⁶ DTI (2009) Proposed Road Map For The Recycling Industry: A Recycling Industry Body (RIB) With Relevant Working Groups.

²⁷ Collect-a-Can was established in 1993 to pro-actively addresses the steel beverage can industry's share of responsibility pertaining to the ever increasing environmental needs of the region. Collect-a-Can is dedicated to ensure that used metal cans and consequently tinsplate, exist in harmony with the environment. Collect-a-Can's shareholders are ArcelorMittal South Africa (Africa's major steel producer and producer of tinsplate for steel cans) and Nampak (Africa's largest packaging company and beverage can manufacturer).

²⁸ Maia, J., Giordano, T., Kelder, N., Bardien, G., Bodibe, M., du Plooy, P., Jafta, X., Jarvis, D., Kruger-Cloete, E., Kuhn, G., Lepelle, R., Makaulule, L., Mosoma, K., Neoh, S., Netshitomboni, N., Ngozo, T., Swanepoel, J. (2011). Green Jobs: An Estimate of the Direct Employment Potential of a Greening South African Economy. Industrial Development Corporation, Development Bank of Southern Africa, Trade and Industrial Policy Strategies.

²⁹ DTI (2009) Proposed Road Map For The Recycling Industry: A Recycling Industry Body (RIB) With Relevant Working Groups

³⁰ The municipality of Hessequa, in the Western Cape, is planning the construction of a plant that will treat the municipal solid waste.

2.1.9. Biodiversity and natural resource management

Current employment: Biodiversity-related sectors employ a total of 1,158,264 people (directly or indirectly) out of the, 73,392 jobs are biodiversity-specific.

400 000 jobs in water-infrastructure provision

Potential future employment: The 'Working for Water' programme could create 110 000 additional direct jobs in the long run.

Land degradation is a growing concern in South Africa. Land degradation is most prevalent in communal and rural districts, which means that it both impacts the poor the worst and that the poor are in the best position to address it. According to the DEA State of Environment Report: "Although the true costs of land degradation are poorly understood, it has considerable effects on the economy. In South Africa, about 35% of the country's net agricultural income is overstated because the environmental costs are not currently included in the accounts. Soil degradation alone costs South Africa an average of nearly R2 billion annually in dam sedimentation and increased water treatment costs, for example. The costs associated with neutralizing the effects of acid rain (caused by energy generation) on soils in Mpumalanga are estimated at R25 million per year, while the loss of soil nutrients through degradation costs R1.5 billion per year."³¹

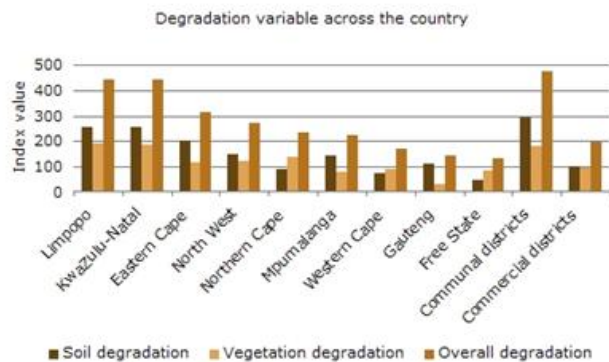
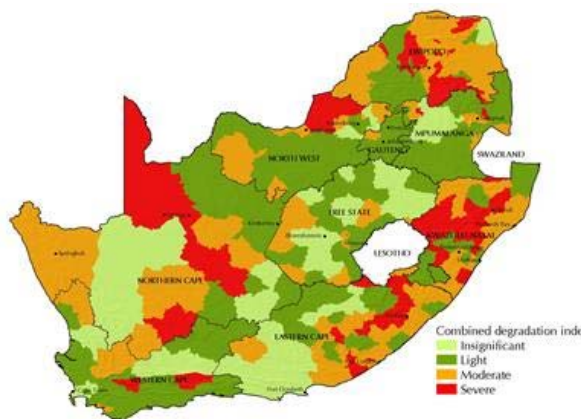
Soil and land management is generally a non-commercial exercise, implemented by farmers or rural communities. However, it can involve multiple stakeholders, including in the public and private sectors and amount to very large sums of money.

Only 3% of South Africa's surface area is high potential land. The result is a tendency towards overexploitation in an effort to meet food growing requirements, with associated challenges such as wind and water erosion, soil compaction from intensive mechanized agriculture; soil crusting from overhead irrigation systems; acidification from incorrect fertilizer applications, and declining levels of soil fertility."

The distribution of land degradation in South Africa as represented by the Combined Degradation Index

Levels of soil, vegetation, and overall degradation in South Africa

³¹ Department of Environmental Affairs and Tourism (2006) South Africa Environment Outlook. A report on the state of the environment 2006.



Sources: Department of Environmental Affairs and Tourism (2006) South Africa Environment Outlook. A report on the state of the environment 2006. Originally from Hoffman, M.T., Todd, S., Ntshona, Z., and Turner, S. (1999). Land degradation in South Africa. National Botanical Institute, Cape Town. <http://www.nbi.ac.za/landdeg>.

Given the prevalence of poverty in South Africa's rural areas, payments for ecosystem services (PES) has been identified by the Second Economy Strategy Framework as having the potential to generate lifeline incomes through subsidies which pay for themselves through deferred environmental costs.

Addressing land degradation and protecting natural resources are two of the sectors with highest potential to create green jobs. Based on a very broad definition (which includes mining, agriculture and local government), the HSRC (Human Science Research Council) estimates, based on Labour Force Survey data that biodiversity-related sectors employ a total of 1 158 264 people (directly or indirectly).

However, of these only 73 392 are biodiversity-specific personnel³² (i.e. 6.3% of the sector employment). Out of them 26 427 (i.e. 36.0%) are managers, professionals and associate professionals. At the manager level, the proportion of biodiversity-specific employees goes up to 20%. Craft workers, operators and labourers account for the bulk of the sector employment (58.2%). Non-biodiversity-specific managers, professionals and associate professionals, and clerks, service and sales workers respectively represent 18.1% and 17.4%.

More than half of biodiversity personnel work outside of the public sector, which accounted for 47.3% of employment in 2000-2007. The private sector and NGOs respectively employs 29.3% and 23.4% of biodiversity staff.³³

³² Biodiversity-specific personnel are comprised of employees whose functional roles are related to the core business of biodiversity conservation. For example, among the core professionals are zoologists, botanists and the like; core managers were those involved in R&D and so on with applicable qualifications.

³³ Vass, J.R., Roodt, J., Wildschut, A., Bantwini, B. & Reddy, V. (2009) Guidelines for a human capital development strategy in the biodiversity conservation sector. HSRC: Pretoria, and South African National Biodiversity Institute and The Lewis Foundation (2010) A Human Capital Development Strategy for the Biodiversity Sector (2010-2030).

Table 11: Average annual number of biodiversity-related employment (2000-2007)

Occupations		R&D: Natural Sciences	Higher Education	Libraries, Museums, Botanical & Zoological Gardens & Nature Reserve	Provincial Admin.	Central Gov.	Game, Agriculture, Forestry & Fishing	Local Gov.	Mining	Total
Other: managers, professionals & associate professionals	n	16266	37618	4478	9430	53225	9345	38526	40616	209503
Biodiversity: Core Managers	n	1659		520		1427	1447	1939	667	7658
	%	21.7	0.0	6.8	0.0	18.6	18.9	25.3	8.7	100
Biodiversity: Core professionals	n	2208	4317	960	833	1608	1606	1190	0	12722
	%	17.4	33.9	7.5	6.5	12.6	12.6	9.4	0.0	100
Biodiversity: Core associate professionals	n	1222		811		1808		993	214	998
	%	20.2	0.0	13.4	0.0	29.9		16.4	3.5	16.5
Biodiversity: Total: Managers, professionals & associate professionals	n	5090	4317	2291	833	4843	4046	3343	1665	26427
	%	19.3	16.3	8.7	3.2	18.3	15.3	12.6	6.3	100
Biodiversity related work (less than NQF 5)	n	266	0	2139	549	1812	36638	3758	1801	46964
	%	0.6	0.0	4.6	1.2	3.9	78.0	8.0	3.8	100
Biodiversity related: Total	n	5356	4317	4430	1382	6655	40685	7101	3466	73392
	%	7.3	5.9	6.0	1.9	9.1	55.4	9.7	4.7	100
Clerks, service & sales workers	n	5908	0	10619	11105	69146	9702	58944	36399	201823
Craft workers, operators & labourers	n	4648	0	7549	5747	26223	92291	100943	436146	673546
Total	n	32178	41935	27076	27662	155249	152023	205514	516626	1158264

Source: LFS 2000–2007, Quantec (2008)

Source: Vass, J.R., Roodt, J., Wildschut, A., Bantwini, B. & Reddy, V. (2009) *Guidelines for a human capital development strategy in the biodiversity conservation sector*. HSRC: Pretoria, and South African National Biodiversity Institute and The Lewis Foundation (2010) *A Human Capital Development Strategy for the Biodiversity Sector (2010-2030) based on LFS 2000-2007*, Quantec (2008)

Table 12: Biodiversity-related jobs – broad definition (by 3-digit SIC code)

Biodiversity-related jobs by 3-digit SIC code
Agriculture, Hunting, Forestry and Fishing
<ul style="list-style-type: none"> ■ 113 Growing of other horticultural specialities and nursery products ■ 141 Forestry and related services ■ 151 Ocean and coastal fishing ■ 152 Rivers and dams (i.e. Inland fishing) ■ 171 Animal boarding activities without health care ■ 176 Landscaping gardening and maintenance ■ 181 Game propagation ■ 183 Game breeding
871 Research and experimental development on natural sciences
911 Central government activities
913 Local authority activities
914 Provincial administration
963 Botanical and Zoological Gardens and Nature reserve Activities
Higher Education
Mining

Source: Vass, J.R., Roodt, J., Wildschut, A., Bantwini, B. & Reddy, V. (2009) *Guidelines for a human capital development strategy in the biodiversity conservation sector*. HSRC: Pretoria.

Table 13: Biodiversity-related jobs – narrow definition, professional and managerial (by 4-digit SOC)

Core Professionals and Associates Professionals
Core Professionals
2121 Climatologist
2124 Geochemist, Paleontologist, hydrologists and related
2210 Scientist
2211 Botanist, Zoologist, Bacteriologist and related
2223 Biological sciences
2213 Veterinarian
2310 Lecturers: Life Sciences and Nature Conservation
Core Associate Professionals
3211 Life Science technicians
3212 Horticulture, Floriculture, Soil Sciences, Agronomy and forestry technicians
3213 Farming and forestry advisers and consultants
3227 Assistant, veterinary
Generic Professionals and associate professionals
Generic Professional
2122 Statistician
213 Computing professionals
2411 Accountants and related accounting occupations
2412 Personnel and careers professionals
2419 Business professionals
2431 Archivists and curators
2432 Documentalist
2441 Economists
2442 Anthropologist
Generic Associate Professionals
312 Computer associate professionals
3152 Safety, health and quality inspectors
3411 Advisor, financial
3416 Agent, procurement

Source: Vass, J.R., Roodt, J., Wildschut, A., Bantwini, B. & Reddy, V. (2009) *Guidelines for a human capital development strategy in the biodiversity conservation sector*. HSRC: Pretoria.

Over the 2000-2007 period, core employment in the biodiversity sector (managers, professionals and associate professionals only) has contracted on average by 1.9% annually. Trends however vary from sector to sector. On the one hand, mining (-49.0% on average per year), local government (-19.3%) and central government (-18.6%) have significantly reduced employment. In addition to a strong decline, there have been huge fluctuations in employment on national government. On the other hand, botanical and zoological gardens and nature reserves (+23.0%), game, agriculture, forestry and fishing (+3.7%), and R&D and higher education (+2.3%) have created employment.

Employment trends in the public sector result from a negative average annual growth of -3.1% in the combined core managerial and professional component over the five-year period, counterbalanced by a 10.3% average annual growth in the core associate professional category (technicians).

The biodiversity sector is impacted by high vacancy levels, in the public sector in particular. In 2007/2008, the public biodiversity sector had a vacancy rate of 23.2% across the board, with for example peaks to 51.5% for nature conservation and oceanographical-related technicians, and 44.5% for geologists, geophysicists, hydrologists and related professionals. In addition, in line with South African employment statistics, vacancy rates are higher for management and highly skilled positions than for less qualified jobs.³⁴

Working for Water programme

The fight against invasive alien plants is spearheaded by the Working for Water (WfW) programme, launched in 1995 and administered through the then-Department of Water Affairs and Forestry. This programme works in partnership with local communities, to whom it provides jobs, and also with Government departments including the then-Departments of Environmental Affairs and Tourism, Agriculture, and Trade and Industry, provincial departments of agriculture, conservation and environment, research foundations and private companies.

Since its inception in 1995, the programme has cleared more than one million hectares of invasive alien plants providing jobs and training to approximately 20 000 people from among the most marginalized sectors of society per annum. Of these, 52% were women. WfW currently runs over 300 projects in all nine of South Africa's provinces. Scientists and field workers use a range of methods to control invasive alien plants. The programme is globally recognised as one of the most outstanding environmental conservation initiatives on the

³⁴ Vass, J.R., Roodt, J., Wildschut, A., Bantwini, B. & Reddy, V. (2009) *Guidelines for a human capital development strategy in the biodiversity conservation sector*. HSRC: Pretoria, and South African National Biodiversity Institute and The Lewis Foundation (2010) *A Human Capital Development Strategy for the Biodiversity Sector (2010-2030)*.

continent. It enjoys sustained political support for its job creation efforts and the fight against poverty.

In terms of ecosystem restoration, the 'Working for Water' programme, which is considered an international model for public-benefit job creation, provides 23 000 FTE/person-years employment to low-skilled workers.³⁵ Based on calculation of the IDC-DBSA-TIPS report, the 'Working for Water' programme could create 110 000 additional direct jobs in the long run.

Very close to biodiversity protection are jobs in the water sector. According to the One Million Climate Jobs Campaign, addressing the current water security challenges, aggravated by climate change, and providing water infrastructure to the millions of South Africans that have no access to piped water could create as many as 400 000 new green jobs. Activities to achieve it include restoring damaged water resources such as rivers and wetlands, ecosystem restoration projects, fixing municipal leaks. A good example of this type of initiatives took place in Ethekewini (Durban) municipality, where a leaks programme was undertaken. The programme saved 73 million litres of water a day and resulted in an energy cost saving of R5 million per annum. If similar programmes were implemented in South Africa's municipalities, over 150 000 new jobs could be created.

Furthermore, rainwater harvesting (RWH) saves water and energy is other option for water management. If only 10% of South African households implemented RWH at least 65 000 jobs could be created.

2.1.10. Organic climate-friendly agriculture and food production

Current employment: unknown

Potential future employment: 20 000 jobs in a 10 years period

Employment agriculture has seen a massive decline in recent years. Employment in the agriculture sector has declined by a third in the last decade, from 969 000 jobs in March 2001 to 650 000 jobs in March 2010. This decline is not due to environmental reforms associated with a green economy, but rather to increased cost pressures and mechanisation in the sector.

Industrial farms, which are dominated by large corporations, are highly mechanised and use high levels of ecologically and socially costly chemicals such as oil-based fertilisers, herbicides and pesticides. Industrial agriculture is responsible for 11% of South Africa's GHG emissions. In addition, the country is experiencing deepening food insecurity. Almost half (40%) of South Africans are food insecure; even in Johannesburg 42% of households are classified as food insecure and this increases to 70% in the poorest areas. South Africa has experienced a 66% increase in the price of bread in the last years, due to partially to commodity speculation of wheat import³⁶. In addition, this sector's contribution to climate

³⁵ Peter, C. (co-lead author), Swilling, M. (co-lead author), du Plooy, P., de Wit, M., Wakeford, J., Lanz, J., Haysom, G., Kelly, C., Turton, A., Brent, A., Mason-Jones, K., Hansen, Y., Cohen, B. Greening the South African Growth Path: Challenges, Prospects and Trajectories. Policy Report commissioned by the Development Bank of Southern Africa, 2010.

³⁶ One Million Climate Jobs, 2011

change is much greater when we include carbon emissions from transporting food –not only from one of the country to another but also between countries.

A study released in 2006 by Britain’s Soil Association concludes that organic farming provides 32% more jobs per farm in the United Kingdom than conventional agriculture does. According to the study, 93 000 new jobs could be created if all of Britain’s farms were to switch to organic practices (currently only 4% of farms use organic practices).³⁷

Switching to organic farming is typically a profitable option and can lead to 20–90% increases in production, due to the reduction in cost of chemical agricultural products.³⁸

IPAP2 identifies organic agriculture as an industry with the potential to create 20 000 jobs over a ten year period. It also contains plans for growing organic cotton as a market differentiator in export markets, to stem the decline of the local industry. It also targets the retention of 5 000 jobs in the Rooibos and Honeybush industries through improved marketing.³⁹

Small-scale family farmers and peasants use farming techniques that protect natural resources, are more labour intensive, more productive per hectare, and driven by meeting social needs rather than profits. Shifting to agro-ecosystems will halve greenhouse gas emissions, preserve natural resource such as water and soil, reduce workers’ health risks due to a reduction in chemical-based products and boost economic activities in rural areas. In Gauteng alone, it is possible to create nearly half a million new jobs in local food production in urban areas. About 1,3 million households, between 5,2 and 7.8 million people, live in rural areas in South Africa. It is possible to create hundreds of thoughts of jobs and livelihoods for them by promoting organic agriculture. (One Million Climate Jobs Campaign, 2011).

2.1.11. Sustainable/public transport

Current employment: 148 000 related to the construction of the fast-train Gautrain⁴⁰

Potential employment: 41,642 in Bus Rapid Transit (BRT); 70 000 new jobs (direct and indirect) in public transport by encouraging 10% of car commuters to use taxis, buses and trains.

There is a clear need to improve public transportation systems in South Africa. According to the National Household Travel Survey undertaken in 2003, 38 million people lived in household that did not have access to a car and about 14 million people relied on a form of

³⁷ Soil Association (2006). Organic Works: Providing more jobs through organic farming and local food supply. Bristol House, Bristol.

³⁸ Worldwatch Institute (2006) Organic Farms Provide Jobs, High Yields.

³⁹ Department of Trade and Industry (DTI) (2010).2010/11 – 2012/13 Industrial Policy Action Plan.

⁴⁰ Gautrain is an 80-km mass rapid transit railway system in Gauteng Province, South Africa, which links Johannesburg, Pretoria, and OR Tambo International Airport. It was built to relieve the traffic congestion in the Johannesburg–Pretoria traffic corridor and offer commuters a viable alternative to road transport, as Johannesburg has limited public transport infrastructure. The project was completed with the opening of the final in June 2012. More information <http://www.gautrain.co.za/>

public transport on weekly basis. Besides, more than half of bus, taxi and train users declared to be unhappy with current facilities. In addition, transport is a significant contributor to carbon emissions, with enormous social and ecological costs. Transport currently accounts for more than 10% of South Africa's GHG emissions, of this, 85% is from road transport, and half of this from private cars (One Million Climate Jobs Campaign, 2011).

In South Africa only 12% of general freight volumes are moved by rail and only tiny percentages of people use trains.

On the other hand, public transport is one of the most important contributors to improving peoples' lives and overcoming inequalities, especially for women.

In South Africa, the 2007 National Transport Strategy and Action Plan paved the way for the implementation of rail and bus rapid transport systems over a 20-year period. The municipality of Johannesburg and Cape Town have recently set up a BRT system and Tshwane and Rustenburg started the construction in mid- 2020.

Table 14: Direct employment generation potential in the BRT sector in South Africa

Activity	Short term			Medium term			Long term		
	Domestic	Export related	Total	Domestic	Export related	Total	Domestic	Export related	Total
Construction	14 618	0	14 618	23 388	0	23 388	3 824	0	3 824
O&M	12 424	0	12 424	31 609	0	31 609	37 468	0	37 468
Manufacturing	1 038	0	1 038	898	0	898	350	0	350
Totals	28 080	0	28 080	55 896	0	55 896	41 642	0	41 642

Source: *Maia et al., 2011*

Despite the potential job destruction in the existing bus and minibus industries as a result of the above measures, a net direct job creation is expected mainly in O&M activities (central operations, station management and bus operating functions).

Construction of trunk corridor and accompanying stations should also generation employment in the short and medium term. Therefore, there is a clear need for a just transition to those workers negatively affected.

According to the One Million Climate Jobs Campaign, by 2040 it would be possible to have zero emissions transport and create new green jobs by:

- Shifting to public transport for commuting (In order to maximise the job-creation benefits, all public transport vehicles must be produced locally)
- Develop and use forms of transport based on non-carbon-based fuels
- Design the city and urban spaces to reduce the need for transport
- Greatly expand the rail passenger and freight network
- Manufacture rail-rolling stock, buses and taxis
- Maintain or adapt existing fleets to more clean and efficient fuels
- Construct bus rapid transit lanes
- Promote coastal shipping and make operation intervention to reduce shipping emissions
- Manufacture bicycles and construct cycle lanes

- Construct safe pedestrian walk-ways and green spaces to promote pedestrian mobility

In addition, encouraging 10% of car commuters to use taxis, buses and trains about 70 000 new jobs would be created (direct and indirect) (One Million Climate Jobs Campaign, 2011)

2.1.12. Buildings and housing energy efficiency

Current employment: unknown

Potential employment: 6,500 direct jobs in the long term. 250 000 jobs could be created by providing energy-efficient, good-quality low-cost housing.

Technologies to increase buildings and housing energy efficiency are not yet widely used in South Africa. The country has however developed norms and standards for new construction and is progressively strengthened them. The potential for improvement is still massive as current regulations are far from ensuring optimal results (i.e. a zero net energy mark). The South African government is particularly active on the two fronts: solar radiation for heating, natural space heating and cooling, and energy-efficient lighting.

Housing and construction are key areas for both mitigation and adaptation to climate change. While new houses will increase GHG emission, the provision of safe, robust housing must be part of a strategy for enhancing climate change resilience, as a basic part of alleviating poverty. Up to 250 000 jobs could be created by providing energy-efficient, good-quality low-cost housing, provided with solar water-heaters and cost-effective public transport. Moreover, climate friendly construction is about 25% more labour intensive than conventional construction methods. This type of construction would include a maximisation and training of local labour, no machines on site unless absolutely necessary, maximum use of on-site and/or recycled materials, roofs designed to capture rain water, biogas digesters and finally energy efficiency in design. (One Million Climate Jobs Campaign, 2011).

The main opportunity for employment creation is in building, construction and installation with about 6,500 potential direct jobs in the long term. There is an opportunity to develop, and create jobs in, the production of insulation products.

Table 15: Direct employment generation potential in the housing energy efficiency sector in South Africa

Activity	Short term			Medium term			Long term		
	Domestic	Export related	Total	Domestic	Export related	Total	Domestic	Export related	Total
Construction	1 559	0	1 559	3 856	0	3 856	6 502	0	6 502
O&M	0	0	0	0	0	0	0	0	0
Manufacturing	302	0	302	588	0	588	838	0	838
Totals	1 861	0	1 861	4 444	0	4 444	7 340	0	7 340

Source: Maia et al., 2011

2.1.13. Mechanical insulation

Current employment: 3 000

Potential employment: unknown

Mechanical insulation⁴¹ is extensively used in South Africa and the world, notably in very large industrial plants in power generation, chemicals, steel and smelting, pulp, paper and cement industries, and small- to medium-size processing plants. The current value of total installed mechanical insulation is conservatively estimated to be around R20 billion and the annual domestic market is projected to a minimum of R2 billion.

There is currently no policy related to mechanical insulation in South Africa. Current employment in the mechanical insulation sector is estimated at approximately 3 000 people, including 400 jobs in manufacturing, 600 in O&M and 2 000 contract personnel for installation activities. The employment creation capacity of the sector is therefore heavily dependent on the future inclusion of such technologies in Eskom's Demand Side Management programme.⁴²

2.1.14. Air pollution control equipment

Current employment: 5 000. 3 500 of which in manufacturing

Potential employment: 900 new jobs

The Air Quality Act of 2004 paved the way for the development of the industry. Total employment in the industry is estimated at about 5 000 full-time people, including 3,500 jobs in manufacturing and 1 500 in O&M. Additional 2 000 construction staff is employed on-site by engineering firms.⁴³

There is still scope in South Africa to reinforce standards and develop more efficient technologies, and thus generate new employment (about 900 jobs in the long term).

2.1.15. Automotive sector

Current employment: <100

Potential employment: 10 000 in manufacturing

⁴¹ MECHANICAL INSULATION is defined to encompass all thermal, acoustical, and personnel safety requirements in: a. Mechanical piping and equipment, hot and cold applications; b. Heating, Ventilating, and Air Conditioning (HVAC) applications; c. Refrigeration and other low-temperature piping and equipment applications. <http://www.insulation.org/io/article.cfm?id=IO120201>

⁴² Maia, J., Giordano, T., Kelder, N., Bardien, G., Bodibe, M., du Plooy, P., Jafta, X., Jarvis, D., Kruger-Cloete, E., Kuhn, G., Lepelle, R., Makaulule, L., Mosoma, K., Neoh, S., Netshitomboni, N., Ngozo, T., Swanepoel, J. (2011). Green Jobs: An Estimate of the Direct Employment Potential of a Greening South African Economy. Industrial Development Corporation, Development Bank of Southern Africa, Trade and Industrial Policy Strategies.

⁴³ Maia, J., Giordano, T., Kelder, N., Bardien, G., Bodibe, M., du Plooy, P., Jafta, X., Jarvis, D., Kruger-Cloete, E., Kuhn, G., Lepelle, R., Makaulule, L., Mosoma, K., Neoh, S., Netshitomboni, N., Ngozo, T., Swanepoel, J. (2011). Green Jobs: An Estimate of the Direct Employment Potential of a Greening South African Economy. Industrial Development Corporation, Development Bank of Southern Africa, Trade and Industrial Policy Strategies.

This sector despite the tremendous employment potential is expected to be very low in South Africa. South Africa has developed initiatives to commercialise a domestically-produced electric car, the Joule electric passenger car, but has unfortunately failed to secure funding. The country has however the potential to host an electric vehicle plant and a lithium-ion battery manufacturing factory. Jobs devoted to recycle these batteries will be needed as well.

If policies to support the electric vehicles sector, it has the potential to generate more than 10 000 manufacturing jobs in the long term.

South Africa's biggest green industry by value is the manufacturing of catalytic converters for automobiles, accounting for exports of the order of R24 billion in 2008 and R20 billion in 2011. Catalytic converters account for more than half of the global demand for platinum – an industry in which South Africa has an 80% global market share and which employs more than 180 000⁴⁴ people in South Africa (more than any other mining sector and more than all other non-gold mining combined).

The biggest potential threat to these jobs and the demand for platinum lies in an evolution of catalytic converter technology away from the use of platinum or of automotive technology away from the use of combustion engines to electric drive-trains. In an effort to hedge against this change, the South African government is supporting a significant research programme on the use of platinum in fuel cells – an energy storage technology that could power electric transport.

⁴⁴ Facts & Figures 2010, Chamber of Mines

2. Impacts on South Africa labour market

3.1. Jobs at risk? The need for a Just Transition

Climate change effects, water scarcity, increasing soil degradation will very seriously impact existing jobs in South Africa, in particular in sectors directly related to natural resources such as agriculture and food production. In addition, jobs in other sectors such as mining, might be impacted due to climate change policies taken by other countries.

At the same time, the green economy presents new mining opportunities:

- Renewable energy technologies in general use more iron ore than fossil fuelled technologies
- Light-weight materials for improved energy efficiency in vehicles and other technologies require specialist minerals like titanium.
- Clean energy technologies from wind turbines to electric vehicles require the mining of so-called rare earth elements, for which South Africa was once (in the 1950s) the world's leading producer, but for which production has moved almost entirely to China.

The need to deal with the impacts of jobs resulted of climate changes policies is as well acknowledge at the NCCRP (National Climate Change Response Policy White Paper). Among their objectives, the Policy paper aimed to “limit jobs contraction to those areas of the economy where excessive carbon intensity is unsustainable, whilst promoting and expanding the green economy sectors”. In order to do so, government considered promoting conditions that will increase mobility of labour and capital out of carbon-intensive sectors to greener productive sectors. Accurate assessments (through National Employment Vulnerability Assessment and Sector Jobs Resilience Plans) of the capacity of various sectors to adapt to a lower-carbon environment will inform practical interventions, including incentives to investors to reallocate capital and labour to green economy sectors. However, to the knowledge of the author, these assessments have not been undertaken.

Job creation and loss

Implementing low-carbon solutions will not be an overnight process. Jobs in the coal industry and high-carbon sectors will be sustained for many years to come. But it is important to start engaging with industry and government about the transition. This must ensure that workers in “job loss” industries do not carry the burden of climate mitigation, and that workers in “job gain” sectors look forward to a more secure future.

Engage government and management on “sunrise” and “sunset” strategies for jobs.

- Investigate how many and what kinds of climate jobs can be created in your sector/s, push for these, and to get workers, school leavers and the unemployed prepared.
- Strategies to ensure that jobs created are decent, and advance gender parity.
- Establish workers co-operatives to take advantage of new opportunities.

3.2. Skills for green jobs

Skill shortages have been identified as a critical issue in both the biodiversity and renewable energy industries. Almost all sectors are affected, with hydropower, biogas, biomass and wind industries experiencing particularly acute shortages. Generally, manufacturing and development, due to the demand for engineers and highly qualified staff, are the most affected activities.⁴⁵

The Human Sciences Research Council (HSRC) has done an assessment for the South African National Biodiversity Institute (SANBI) of the skills requirements and gaps in the biodiversity and related sectors⁴⁶ as well as for the Department of Labour on the skills requirements and gaps in the electricity sector. This particular assessment included consideration of renewable energy and considered skills demand and supply up to 2012.⁴⁷ It is clear from both studies that a significant shortfall in professional, managerial and technical (engineering and artisan) skills has the potential of acting as a “bottle-neck” for the growth of green industries.

A 2010 report on *Skills for Green Jobs in South Africa* finds that “the lack of coordination in training and development. Whilst an effort has been made to gather information about green jobs, green skills and training programmes, this can only be done where such programmes exist, and in many cases they do not.”

3.3. The Decent Work Agenda and the green economy

South Africa is one of the countries that have institutionalized social dialogue. As a member state of the ILO, South Africa, through the National Economic Development and Labour Council (NEDLAC) developed the Decent Work Country Programme (DWCP) to complement efforts by government to address its developmental objectives and achieve decent work imperatives.

“Decent work” is encapsulated in four pillars:

- The promotion of fundamental principles and rights at work;
- The promotion of employment and income opportunities;
- The expansion and improvement of social protection coverage, and;
- The promotion of social dialogue and tripartism.⁴⁸

The issue of green jobs crosses cut through the four pillars:

⁴⁵ ILO (2011). Promoting Decent Work in a Green Economy. ILO Background Note to: *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*, UNEP, 2011.

⁴⁶ Vass, J.R., Roodt, J., Wildschut, A., Bantwini, B. & Reddy, V. (2009) Guidelines for a human capital development strategy in the biodiversity conservation sector. HSRC: Pretoria, and South African National Biodiversity Institute and The Lewis Foundation (2010) A Human Capital Development Strategy for the Biodiversity Sector (2010-2030).

⁴⁷ HSRC, DPRU and SWOP (2008). Projected Skills Demand And Supply For The Electrical Energy Sector. Department of Labour South Africa.

⁴⁸ ILO and NEDLAC (2010). Republic of South Africa Decent Work Country Programme 2010 to 2014.

- *New employment and income opportunities*: the Green Economy is likely not only to create more new work opportunities (formal and informal) than the work that it would replace. In addition, it is expected and intended to play a role in safeguarding existing jobs from the impacts of environmentally-related pressures, like rising commodity prices (especially for food and energy).
- Social Protection, Initiatives like the roll-out of energy efficiency measures (including ceilings and solar water heaters) to low-income households augments the existing social protection provided by free basic services. This – and/or other kinds of social protection (or the “social wage”) – can be expanded through judicious “recycling” of the revenues from environmental taxes.

Social protection

According to NALEDI research, 91% Africans do not have access to medical aid, and rely on the poor public healthcare system. In sectors like construction, 84.9 workers do not have access to a health care plan, along with 66% in transport and 27.4 being the average in utilities like water and energy . This means that in order to ensure jobs created comply with the definition of decent work, it is key to broaden the implementation of a National Health Insurance Plan which would facilitate the health coverage of workers in this and other sectors.

Equally when it comes to retirement and saving schemes, a majority of South African workers are excluded from them. Many workers in the construction (74.3%) and transport (52.1%) sectors do not contribute towards any retirement fund. Workers in the energy and water sectors (82%) show better access to a retirement fund, though significant numbers in these sectors continue to lag behind their worker colleagues.

On one side, this raises the need to implement a universal and compulsory retirement fund, while taking into consideration low income workers and avoid any significant impact on household income required to meet food and other basic needs.

On the other, it highlights again the relatively comfortable position regarding access to pensions for jobs created in energy, water and public transit through the investments promoted in this study.

Source: ITUC Green Jobs Report- South Africa, 2012

- *Social dialogue and tripartism*: while a variety of prior initiatives have addressed part of the Green Economy agenda, it was only really formalized through NEDLAC-mediated collective action by government, business and labour in the country’s response to the 2008/9 Global Financial Crisis. Government’s policy and regulatory response to the Green Economy has also been characterized by greater public-private partnership (for example in the procurement of renewable energy and energy efficiency) than has been the norm in traditionally state-monopolized “brown” industries, like electricity generation. In addition, government, the business community and trade unions signed in 2011 South Africa “Green Economy Accord” where they committed to support the creation of green jobs through eleven specific proposals.

3. OVERVIEW OF EMPLOYMENT QUALITY

3.4. Changes in employment quality

A Green Economy does not always lead to better working conditions or quality of employment. In most sectors, targeted policies to this aim are needed.

Women are poorly represented in green jobs potential sectors and will require gender-active policies

The current representation of women in the energy, construction, water and transport sectors is low:

3.7% of the workforce is female in the electricity and water utilities, 4.8% in construction and 8.7% in transport.

Targeted policies include the upgrade of anti-discrimination laws and family-friendly programs (including a process to facilitate the certification of employment equity so that this becomes a condition of awarding tenders), the use of quotas and targeted schemes, specialised apprenticeship and training initiatives, and the increase of women union membership in the studied sectors .

Source: Green Jobs and Women Workers, Sustainlabour, 2009

In some sectors, such as organic agriculture, there is a direct reduction of occupational health risk, due to the reduction of chemical products use. However, other dimensions of employment quality such as working hours, wages or equal opportunities for men and women are not necessarily improved. Other examples can be found in the large number of the jobs that would be created through ecosystem restoration (e.g. invasive alien clearing) or waste management. These jobs may well be informal, providing a source of additional income, but little skills development and a short-term job rather than a career.

In other words, specific efforts in terms of policies and programmes will be needed to ensure that these new green jobs are also decent.

There is very little information about quality of green jobs in South Africa. There is a need to increase research and compile information about how green jobs are being developed in the country. Areas such as wages, working hours, occupational health and safety, equal opportunities, social dialogue and participation and to what extent these new sectors are covered by collective bargaining should be assessed.

Jobs in the renewable energy sector and in water utilities have not been well studied in their OSH conditions. Ground research assessing different working condition aspects is key to start identifying concrete interventions to secure safe and healthy workplaces.

Information available from other regions of the world suggests that green jobs face additional difficulties to those jobs in the sectors that they replace. Lack of unionization and business organization, jobs in the informal economy together with unknown occupational risks are two good examples of these challenges.

3.4.1. Construction/Building

Two sectors that have today the second and third worst position when it comes to number of fatalities per 100 000 workers: transport and construction.

This means that unless deliberate policies are taken to ensure better OSH working conditions in these two sectors, workers might be exposed, in particular in construction, to a job in which it could risk his or her life.

According to the ILO⁴⁹, the construction industry in South Africa has been characterized by precarious and short-term work arrangements. The sector also heavily depends on a system of 'specialist subcontractors' who in turn make use of smaller subcontractors from either the formal or informal sectors, exposing workers to vulnerable and insecure employment as well as a low wages, worse working conditions and less training. According to the Labour Research Service, minimum wages in the construction industry is around R2613, 28 % less than the manufacturing industry that has a minimum monthly wage for 2010 was around R3636.⁵⁰

However, green construction presents an opportunity to address some of the issues and problems that affect construction workers, such as the promotion for Social dialogue in decision-making, providing equal access to opportunities and retraining of workers.⁵¹

3.4.2. Water sector

Health, safety and training are important employment issues that are often marginalized in the existing water sector. Workers are subject to poor conditions in dangerous environments that often include pollutants, working underground or in confined spaces together with the traditional hazards of industrial plants.⁵²

3.4.3. Waste Management

Waste management is one of the most important green economy sectors in terms of employment creation. Besides, recycling could play a key role in poverty alleviation as the sector has the potential to provide an income for a large amount of unskilled people.

Nevertheless, many of the waste management related jobs cannot be considered green as they do not match the basic requirements of decent work. Child labour, occupational health and safety, social protection and freedom of association (such as unions, local associations, cooperatives, etc.) are the priority issues to be addressed while increasing employment in the recycling industry. In addition to environment- and health-harmful practices, the existing

⁴⁹ ILO (2003) *Organizing in the Informal Economy: A Case Study of the Building Industry in South Africa*, Geneva, International Labour Office

⁵⁰ Labour Research Service (2011). *Bargaining Indicators for 2011*.

⁵¹ ILO (2011). *Promoting Decent Work in a Green Economy*. ILO Background Note to: *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*, UNEP, 2011.

⁵² ILO (2011). *Promoting Decent Work in a Green Economy*. ILO Background Note to: *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*, UNEP, 2011.

recycling sector mostly offers low-end, informal jobs with small and unstable earnings, thus keeping many in poverty. From a sustainable development and poverty reduction perspective, the opportunity to upgrade jobs in the recycling sector has actually much more impact than additional employment.⁵³ The example of Brazil demonstrates that upgrading is both possible and a good illustration of synergy between the pillars of sustainable development.⁵⁴

The recycling industry plays a critical role in terms of climate change mitigation and pollution prevention. The labour force of the sector, whether formal and informal, is instrumental for both environmental and economic development policies and should be considered “agents of change.” “There is an unaddressed need to reassess those jobs in the recycling sector and to provide dignity and recognition to millions of workers who, de facto, contribute to solving an urgent global problem.”⁵⁵ A progressive formalisation as well as the upgrade of employment should be targeted by the industry.

Potential actions towards more decent employment in the recycling sector include:

- the creation of contracting services, collective organizations, skills development programmes to come to terms with the type of material that is handled by workers and enterprises;
- the use of environmentally sound technologies for waste management; and
- the introduction of targeted Occupational Health and Safety (OHS) programmes to apply national labour laws and OSH legislation to the informal economy.⁵⁶

3.4.4. Fisheries

While healthy fisheries support the wellbeing of nations, through direct employment in fishing, processing, and ancillary services, as well as through subsistence-based activities, overcapacity is a critical issue that needs to be addressed in urgency, as the collapse of the sector would be devastating for development.

Sustainable fisheries will only come through responding to the issue of overcapacity. The potential human cost which could result from the implementation of green policies cannot be ignored. The shift to green fisheries should be complemented with mechanisms to protect fishermen and their families, as well as the whole value chain, from the loss of income and/or employment. (Re)training, associated with the creation of alternative employment opportunities (through local economic development), is key to ensure a sustainable transition. The impact of new policies on safety, decent working conditions and sustainability of communities should also be considered.⁵⁷

⁵³ UNEP 2011, *Towards a Green Economy. Pathways to Sustainable Development and Poverty Eradication*.

⁵⁴ ILO (2011). *Promoting Decent Work in a Green Economy*. ILO Background Note to: *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*, UNEP, 2011, p. 18.

⁵⁵ *Ibid.*, p.19.

⁵⁶ *Ibid.*

⁵⁷ *Ibid.*

Wages: Jobs in energy, water & transport to provide decent wages, challenges for construction.

In order to ensure jobs created contribute to sustainable development, progress must be made on fixing a living wage in South Africa. Researchers suggest that in South Africa, a living wage would require at least a wage of R2,428.69 for the year 2011, to be supplemented by the so called 'social wage' demands (a series of social policies aimed at complementing income with social services for the poorest households).

Using this calculation as a benchmark, employment opportunities in the sectors identified tend to respond to the living wage requirements. For example, workers covered by bargaining council's agreements in the electricity sector, earn around R 4,980 (or more if skills are recognised). This would require rapid action by trade unions to ensure workers in the renewable energy sector are covered by these agreements.

Equally, taxi operators are covered by the worst-paying wage mechanisms in South Africa - sectoral bargaining-, with R1600 a month (well below the living wage). Jobs created in the public transit sector opens the way for jobs in this precarious sector to move to far better wage conditions: the minimum wage in the formal bus industry varies between R2225 and R2500 and in the rail sector between R2750 and R7800 (for train drivers).

The case is slightly different for workers in the construction sector. Construction workers recognised by the bargaining council only indicate earnings of R1,722.48 when unskilled, but which could go up to R4,012.94 when considered semi-skilled. Efforts in the sense of the skilling of workers to do retrofitting or insulating works could contribute to these jobs being 'upgraded' into better wages benchmarks.

Finally, workers in the utilities sector, managed at the municipal level, count with an average minimum wage calculated to the end of September 2011 on R4 905. By bringing workers in the water conservation programmes to municipal contracts, this could certainly contribute to strengthening the public service of water, as well as to jobs which tend to be consistent with the living wage proposal.

Source: ITUC Green Jobs Report – South Africa, 2012

4. STRATEGIES OF MAJOR SOCIAL ACTORS ON GREEN JOBS AND JUST TRANSITION: EMPLOYERS' ORGANIZATION AND TRADE UNIONS

4.1. Strategies of trade unions

Overall, while organized labour has stressed the need for green jobs that are also decent jobs, its main concern is generally with the protection of existing jobs and ensuring a just transition for workers in those sectors that might be most affected. Green Jobs potential by sector as well as quality of green jobs are among union's concerns. COSATU (Congress of South African Trade Unions), FEDUSA (Federation of Unions of South Africa) and NACTU (National Council of Trade Unions) signed in November 2011 the "Green Economy Accord"

together with business organizations and different departments of the government. The Accord geared to create 300 000 jobs within the next 10 years

COSATU is committed to making a just transition to a low carbon economy that preserves our planet for future generations. This means putting the needs of working and poor people first in the social and economic changes ahead. COSATU recognises "the opportunities in industries that combat the negative effects of climate change and believes that South Africa should develop strong capacity in these green technologies and industries".

COSATU proposals: How can affiliates take climate change forward?

In the workplace:

- Include climate change demands in your collective bargaining agenda. For example, where a workplace adopts energy saving initiatives, the cost savings should be passed on to the workers as additional income.
- Negotiate for education and training for workers in new technologies and processes, and in skills that will be needed.
- Use workplace and bargaining forums to make sure management keeps workers informed about envisaged changes to machinery, processes and work organizations, and that workers have a say about all this.

In the industry

- Do research to understand the contributions of your sector/s to climate change, the changes that are needed, and the impacts on your industry.
- Push employers in your sector/s to engage collectively to draw up sectoral carbon budgets and set ambitious targets for carbon emissions reductions.
- Participate in processes about a carbon budget for the sector/s, and interrogate what business puts forward.
- Devise adaptation responses within the sector/s. For example, changing production to reduce water use.
- Push for training so workers can actively participate in making decisions, and will be ready to take on changes in work. Skills levy funds and SETAs (Skills Education Training Authorities) can be used for this.
- Think about what trade union investments should go into; where pension funds should be invested; public or collective control.

Building the union

- Educate leadership and members so that they develop and understanding of the issues and can meaningfully participate in leading change and creating solutions, especially as these relate to sector/s and to their communities.
- Develop its affiliate policies on climate change in relation to each sector.
- Adopt initiatives which reduce carbon emissions at union offices, and in members' own practices at their workplaces. Shopstewards can also promote that companies adopt these practices as a policy.
- Ensure behaviour change of members and leaders, in terms of reducing wasteful and extravagant consumption that worsens climate change.

COSATU has developed a number of awareness raising activities in relation to the opportunities and challenges that climate change present for workers. At Conference of Parties COP 17 of the Convention of Climate Change (UNFCCC), COSATU was to be part of the fight against climate change by pressurising governments to take ambitious decisions at the meeting, mobilising with wider civil society and developing a coordinated response from the African continent. As means of preparations of COP 17 different meetings were organised with other unions confederations to discuss climate change, green economy and its effects on employment. Furthermore, NALEDI (The National Labour and Economic Development Institute) is undertaking research on these issues.

Moreover, COSATU set up a climate change reference group, to further advance on the organization position on the issue as well as defining campaign and other specific activities to carry out but the trade union to raise awareness and build capacity of their affiliates.

Several COSATU affiliates are active on the issue of green jobs promotion. For example the National Union of Mineworkers (NUM) believes that although coal will continue to have a role as a national source of primary energy, in a green economy transition, supports the promotion of renewable energy, since they believe is a sector with a very important potential to create new green jobs.

On the other hand, the National Union of Metalworkers of South Africa (NUMSA) has shown their support for an ambitious development of renewable energies in South Africa under the condition that these new plants should be publicly owned and community-controlled⁵⁸.

The Food and Allied Workers Union (FAWU)⁵⁹ supports the One Million Climate Jobs Campaign, acknowledging the potential overall devastating effects of climate change and on the population, and the fact that the increasing floods and drought that will lead to reduced food production that would affect the poorest of the poor as competition over resources would be on the increase. They understand that reducing GHG emissions and addressing climate change impacts are powerful drivers of job creation, including in the food and agriculture sector and they support policy development in this direction.

Other trade union confederation such as the Federation of Unions of South Africa (FEDUSA) and NACTU share similar views about the need for the country to take ambitious GHG emissions reduction measures and ensure all workers are appropriately assisted in the transition towards a low-carbon sustainable economy. FEDUSA has shown their strong support to better deal with the issue of water treatment and water quality and accessibility, in particular in relation to acid mine drainage and has promoted together with other civil society organizations the Protest Action against Acid Mine Drainage (AMD)⁶⁰.

⁵⁸ More information about NUMSA position can be seen here: <http://numsa.org.za/article/motivations-for-a-socially-owned-renewable-energy-sector-2012-10-15>

⁵⁹ See more information here: <http://www.fawu.org.za/show.php?ID=309&categ=campaigns>

⁶⁰ See more information about the Campaign here: <http://www.greenpeace.org/africa/en/News/news/Acid-Mine-Drainage/>

4.2. STRATEGIES OF BUSINESS

Business broadly supports green economy initiatives, recognizing the links between environmental and economic sustainability. The main concern for business lies in the potential cost and effort involved in complying with new regulations and taxes.

Back in 2010 BUSA recognized in their discussion paper on Higher Job Rich Growth Path that the emergence of green economy and the global resource challenges (energy consumption, oil demand, climate change, fresh water availability, food security) were two of the driving forces shaping growth and employment and the need of retooling the energy, carbon, transport and waste infrastructure as key areas. They further acknowledged that green jobs mean a new employment opportunity for the future, reaching into solar and other new forms of energy, recycling, and water conservation. (BUSA, 2010).

Regarding climate change, BUSA⁶¹ recognises the imperative for climate change negotiations to succeed. However greater recognition should be given to the positive role that business can play in creating a new agreement that is sustainable and more successful than the Kyoto Protocol and believes a successful agreement needs to be built on the following principles:

- Climate change is a fundamental issue for South Africa and will have major impacts on the South African society;
- Action is required urgently at a global level
- Business as usual is not an option for any country
- Actions on climate change can distort competition across country borders
- Both market mechanisms and sound regulation will be required to achieve a low carbon economy scenario in practice
- Climate change must be solved in an integrated manner with other key issues in society such as: economic development to alleviate poverty; energy security; and affordable access to energy, job creation as well as protection of biodiversity
- All sectors of society and Government have a role to play in moving to a low carbon economy
- A mix of policy instruments will be required
- Developing countries suffer the effects of climate change most acutely
- There has to be a fair balance between what historical large emitters should do and what emerging emitters like South Africa should be expected to do

⁶¹ More information about BUSA position on climate change here:
<http://www.busa.org.za/docs/BUSA%20recognises%20the%20importance%20of%20Climate%20Change.pdf>

BUSA believes that key areas in South Africa for transition to a low-carbon economy centres on: energy efficiency, more effective deployment of existing technologies like solar water heating; technology innovation such as carbon capture and storage; technology transfer through foreign investment; and credible and more effective carbon trading credit markets (BUSA, 2011). From their point of view, the three key issues for mitigating climate policy are: global trading market, technology transfer and measurement, reporting and verification.

Furthermore, BUSA believes that is necessary to critically assess the impact of 'greenness' on jobs and ensure that regulations to promote 'greenness' and the managing of climate change commitments take account of economic realities in South Africa.

5. INSTITUTIONAL AND POLICY FRAMEWORK FOR GREEN JOBS CREATION IN SOUTH AFRICA

The following table provides a chronological overview of the policies and frameworks which guide the development of a green economy and, as a result, green jobs in South Africa. For each policy or framework it summarizes the relevant goals, current (mid-2012) progress on those goals and the nature and level of civil society involvement in establishing the policy/framework:

Table 16: Summary of green jobs-related policies and frameworks in South Africa

Policy/Framework	Goals	Progress	Civil society involvement
Policy mandate			
SA Constitution (1996)	Defending human rights	Sustainable Development recognized as a human right	The Constitution is the result of massive social reform enabled by a sustained and broad civil movement led by the ANC, the present government
Millennium Development Goals (2000) ¹	Improving human welfare globally	Mixed	The MDGs is an inter-governmental agreement
National Policies and Frameworks			
Framework for Environmental Fiscal Reform (2006)	Provides principles and guidelines for fair and effective environmental taxes.	Taxes or levies have been implemented on plastic bags, incandescent lightbulbs, ecosystem restoration costs related to water use, liquid fuel, non-renewable electricity and new vehicle CO2 emissions performance	A paper on carbon tax was published for public consultation
State of the Nation Addresses (2008-2012)	Most goals in the SONA derive from other departments or documents	Mixed	Limited
10-Year Innovation Plan (2008)	Includes “safe, clean, affordable and reliable energy supply” and climate change as priorities	Support for innovation in electric vehicles, fuel cells and carbon capture and storage, but cancellation of the country’s biggest clean energy R&D programme (the PBMR) and delay in public utilities (Eskom) implementation of renewable energy demonstration projects (e.g. solar tower)	Limited
Framework for South Africa’s Response to the International Economic Crisis (Feb 2009)	The first mention of green jobs in an economic policy document , helping to link long-term economic growth and environmental sustainability	Green investment, particularly in renewable energy (to the value of R120 billion) and transport (including rail in the order of R100 billion) is contributing to economic growth.	The document is the result of the combined effort of government, business and labour facilitated by the National Economic Development and Labour Council (NEDLAC)
Policy/Framework			
Medium-Term Strategic Framework 2009-2014 (Jul 2009)	The MTSF notes the need for sustainable livelihoods and sustainable resource management and relates these to various other policy	Various policy responses have been implemented in line with the MTSF	Limited

¹ See progress in MDG 1 and 7 (<http://www.undp.org.za/millennium-development-goals/mdgs-in-south-africa>)

The rest of this chapter will discuss these policies and frameworks in further detail, focusing on their intent, rather than detailing progress.

5.1. Policy mandate

Since 1994, South Africa has achieved far-reaching political, economic and social changes, and has shown an increasing commitment to sustainable development. Along with its involvement in international negotiations, it has developed its own national framework for a shift to a green economy.

South Africa recognizes sustainable development as a human right in the Bill of Rights of its 1996 Constitution.

Bill of Rights- 1996 Constitutions

24. Environment.-Everyone has the right-

(a) to an environment that is not harmful to their health or well-being; and

(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-

(i) prevent pollution and ecological degradation;

(ii) promote conservation; and

(iii) secure ecologically sustainable development and use of natural resources

while promoting justifiable economic and social development

27. Health care, food, water and social security.- (1) Everyone has the right to have access to -

[...]

(b) sufficient food and water; [...]

Source: RSA (1996). Constitution, Chapter 2, Bill of Rights, Sections 24 and 27.

South Africa also committed to achieving Millennium Development Goals (MDGs), which include environmental sustainability as a target.

MDG 7. Ensure environmental sustainability

- Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources.

- Reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation.

- Achieve significant improvement in lives of at least 100 million slum dwellers, by 2020.

Source: Millennium Development Goals (MDGs)

International Environmental Commitments

The country is a Party to both the Kyoto Protocol and the United Nations Framework Convention on Climate Change (UNFCCC) and has made commitments under the Cancun Agreement for its greenhouse gas emissions to “peak, plateau and decline”, with reductions in emissions compared to a “business as usual” scenario of 34% in 2020 and 42% in 2025.

Regarding biodiversity issues, South Africa is Party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). South Africa participated in the 1973 Washington Conference during which the convention was drafted, and ratified the convention in 1975. South Africa also ratified the Convention on Biological Diversity (CBD) in November 1995 and the country is a major partner in the Bonn Convention on the Conservation of Migratory Species of Wild Animals (CMS) as it is the terminus for many of the migratory species, including the Palaeoartic (birds) and the Antarctic species (whales and birds).

South Africa is one of the founders of the International Convention for the Regulation of Whaling (IWC), which took effect in November 1948, and is a member to the United Nations Convention on the Law of the Sea of 10 December 1982 (UNCLOS) and related agreements since August 1997, the Antarctic Treaty and related agreements (ratified in June 1960 by South Africa), which regulate relations between countries involved in research in Antarctica, the World Heritage Convention Concerning the Protection of the World Cultural and Natural Heritage (ratified in July 1997) and the Ramsar Convention on Wetlands of International Importance, especially as Waterfowl Habitat (March 1975). As of 16 April 2012, South Africa has designated 20 sites to the List of Wetlands of International Importance.

In addition, South Africa is Party to numerous international conventions and agreements on pollution issues, including the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal, the Convention on Prior Information Consent (PIC), which sets procedures for international trade in certain hazardous chemicals and pesticides, the Stockholm Convention on Persistent Organic Pollutants and the Montreal Protocol for the Protection of the Ozone Layer (ratified in January 1990).

5.2. INSTITUTIONAL STRUCTURE FOR GREEN ECONOMY

In many ways, South Africa’s institutional arrangements with respect to the Green Economy reflect the challenges faced internationally of complex interconnections between different institutions.

On one side, the National Strategy for Sustainable Development is the responsibility of the Department of Environmental Affairs (DEA), but the National Planning Commission (NPC) resides in the Presidency, but has advisory powers only.

The Economic Development Department (EDD) includes the Green Economy under its formulation of a New Growth Path for the country, with two main state-owned development

finance institutions linked to the department: the Development Bank of Southern Africa (DBSA) and the Industrial Development Corporation (IDC).

Support for green industry falls under the Department of Trade and Industry (DTI). Measures taken by DTI or other departments to promote green industries include:

- Environmental fiscal reform (green taxes and subsidies which supports both green industries and the greening of the economy as a whole) is under the mandate of the National Treasury (NT)
- The DEA is responsible for the protection and restoration of ecosystems and the setting of environmental standards (e.g. for pollution or emissions).
- The Department of Energy (DoE) is responsible for issues relating to fossil fuels and renewable energy – a central component of all green economy reforms
- The Department of Water Affairs (which falls under the same ministry as the DEA) is responsible for issues relating to water – another central component of greening
- The Department of Science is responsible for technology policy and research and development.
- The DTI and DTI-appointed entities have developed supporting programmes for solar water heaters.

Other departments (including for mining, agriculture, forestry, fisheries, transport, housing and local government) all contribute to green economy activities and thereby to green jobs, but are not discussed in detail here. The Ministry of Labour has not developed specific initiatives in regards with the promotion of green jobs

5.3. NATIONAL FRAMEWORK

5.3.1. Presidency (State of the Nation Address)

Successive South African Presidents have stressed the importance of sustainable development and the potential of shifting to a green economy in their yearly State of Nation Addresses (SONA).

In the 2008 SONA, President Thabo Mbeki reflected on the electricity crisis experienced in the previous months and stressed energy efficiency, energy savings and the development of alternative power supplies as key elements of the country's energy security. He announced several campaigns to foster the rollout of efficient lighting, solar water heating and geyser load management in households, including housing standards for all new houses and developments.

In the pre-election 2009 SONA, President Kgalema Motlanthe linked action on the environment to job creation; and energy savings and alternative energy sources to climate

action and energy security. As part of the government's Programme of Action, he pledged to pay particular attention to energy savings campaign, alternative energy sources and the research on the Second Economy, which included proposals to introduce Payment for Ecosystem Services as a source of income for the rural poor. He acknowledged that "in addition to the consequences of climate change, resources such as fossil fuels and water are declining in the same measure as demand is increasing."

In the post-election 2009 SONA, newly-elected President Jacob Zuma established as "the main goal of government for the medium term" that South Africa's foreign relations contribute to "the creation of an environment conducive to sustainable economic growth and development." He quoted the Medium Term Strategic Framework to commit to "speed[ing] up economic growth and transform[ing] the economy to create decent work and sustainable livelihoods" as well as "ensur[ing] sustainable resource management and use." He also stressed the importance of protecting our water resource (through, for example, the Water for Growth and Development Strategy) and improving energy efficiency and reliance on renewable energy.

President Zuma heralded in 2010 a new focus on green jobs in industrial policy, announced wide-ranging reforms in the electricity sector, recommitted South Africa to international and domestic action on climate change and to saving water. In 2011, he identified the green economy as one of six priority areas for job creation. He highlighted again the critical importance of energy security for economic development and job creation and the role of energy savings in this regard.

In 2012, President Zuma reflected on the organization of the United Nations COP17 in Durban, South Africa, qualifying the final outcome as "historic and precedent setting". He heralded the implementation of the Green Economy Accord and stressed again the need to save electricity and the continual pursuit of renewable energy sources, especially solar power and biofuels. For example, the government targets the installation of one million solar geysers by 2014-2015. President Zuma also stressed again the green economy as one of South Africa's key job drivers (as part of the New Growth Path).

5.3.2. Medium Term Strategic Framework 2009-2014

The MTSF 2009-2014, a rolling five-year plan which paved the way for the adoption of the 20-year *National Development Plan - Vision for 2030*, looks to "minimise the impact of the economic downturn on the country's productive capacity as well as jobs and poverty reduction measures, to identify opportunities for new areas of growth and economic participation, and progressively to set the country on a new growth and development path". The MTSF stresses as a priority, *inter alia*, the need to speed up growth and transform the economy to create decent work and sustainable livelihoods and the sustainable management and use of resources.

As part of its "Strategic Priority 1: Speeding up growth and transforming the economy to create decent work and sustainable livelihoods," the MTSF calls for the development of cleaner, lower-energy technologies and green jobs thanks notably to support to innovation and technological research and development (R&D). It also encourages support the

expansion of alternative energy (Strategic Priority 2: Massive programme to build economic and social infrastructure).

The MTSF also identifies “sustainable resource management and use” as Strategic Priority 9. The framework highlights various interventions including the diversification of the energy mix in pursuit of renewable energy alternatives and the promotion of energy efficiency; adopting waste reduction practices by encouraging the re-use of waste outputs as productive inputs; enforcing a zero tolerance approach to illegal and unsustainable exploitation of resources; improving air and atmospheric quality for health and well-being of citizens; supporting local and sustainable food production; sustainable water use and preserving quality of drinking water and enhancing biodiversity and the preservation of natural habitats.

In this regard, the MTSF calls for the implementation of many key programmes in climate change mitigation and adaptation (national framework response), environmental impact management, water management (the Water for Growth and Development Strategy, Mokolo River Augmentation Project, Lower Sunday’s River Project), environmental protection and biodiversity conservation (including through the use of market-based instruments), sustainable development (establishing a national framework), alternative production of resources and energy efficiency (promotion of innovation and diversification, creation of an enabling environment for renewable energy), and green jobs (marine aquaculture development, wildlife management, waste services and ecosystems rehabilitation programmes in particular).

5.3.3. National Development Plan – Vision for 2030

Building on the MTSF 2009-2014 and a new diagnostic of the South African economy, which qualifies South Africa’s growth path as highly resource-intensive and unsustainable, the National Planning Commission published a National Development Plan (NDP) – Vision for 2030 in November 2011. The final National Development Plan report was released in August 2012 and approved by the South African Cabinet in September 2012. Chapter 5 of the NDP is focused on “an equitable transition to a low-carbon economy” to a low-carbon economy.”

The NPC acknowledges that “with a realistic strategy and global partnerships, South Africa can manage the transition to a low-carbon economy at a pace consistent with government’s public pledges, without harming jobs and competitiveness.”

With the goal to move away from the unsustainable use of natural resources (energy, water and soil in particular) while increasing the ability of the economy to employ more labor productively, the NPC makes some key proposals to foster the shift to a green economy:

- achieve the peak, plateau and decline trajectory for greenhouse gas emissions, with the peak being reached around 2025.
- support for a carbon budgeting approach, linking social and economic considerations to carbon reduction targets, notably for renewable energy, waste recycling and retrofitting of buildings.

- introducing by 2030 an economy-wide price for carbon complemented by a range of programmes and incentives to raise energy efficiency and manage waste better.
- a target of 5 million solar water heaters by 2030.
- vehicle emission standards, zero-emission building standards that promote energy efficiency by 2030
- simplifying the regulatory regime to encourage renewable energy, regional hydroelectric initiatives and independent power producers with the goal of contracting about 20 000 MW of renewable energy by 2030

A specific section on “the green economy in the context of a new and growing sector within the South African economy” tackles the need to leverage the “green economy agenda” to promote deeper industrialization, energy efficiency and employment and recalls South Africa’s imperative to dramatically expand renewable energy sources and to promote energy saving.

In Chapter 5 on economic infrastructure, the National Development Plan sets clear objectives in terms of clean energy with about 20 000 MW of renewable electricity by 2030 (broadly in line with plans detailed in the national electricity plan), the decommissioning of 11 000 MW of aging coal-fired power stations and accelerated investments in demand-side savings, including technologies such as solar water heating. Securing adequate, sustainable and efficient supplies of water and food, in the context of climate change, is also one of the challenges mentioned by the NPC.

In Chapter 8 on human settlement, the NPC also proposes to support “green economy zones”, i.e. “zones with proven potential to create ‘green jobs’, where short-term state intervention could leverage significant private development.” The potential of the Northern Cape for solar and wind energy is underlined. Saldanha Bay, in the Western Cape, which is currently the subject of a feasibility study, could be the first Special Economic Zone (SEZ) with a specific goal to attract *inter alia* green industries.

This chapter also includes a section on supporting the transition to environmental sustainability. It is advised *inter alia* that “all spheres of government [...] introduce common sustainability criteria for decisions on infrastructure investment to give priority to ‘green infrastructure’, sustainable mobility and to encourage more sustainable development practices.” Sustainability criteria are to be developed urgently and collaboratively across the spheres of government.

The Commission calls for government to support zero- (walking and cycling) and low-emissions forms of transport (trains, buses and minibuses), and to introduce incentive structures to promote the reduction of electricity and water demand, water leakages, eliminate waste going to landfill and discourage high-consumption lifestyles. In addition, “[a]ll spheres of government should aim for a zero-carbon building standard by 2030, by ensuring that all new buildings meet the energy-efficiency criteria set out in the South African National Standard 204 dealing with energy efficiency in buildings. These regulations would be progressively strengthened until the 2030 target is met.”

5.3.4. Assessment framework: Performance Management and Evaluation

The South African government's monitoring system for its Programme of Action (PoA) was developed by the Department of Performance Monitoring and Evaluation (DPME), a dedicated department created in 2010 in the Presidency. This system has been formalized in the elaboration of a new assessment framework, the 12 Outcomes framework. This approach identifies the goals to reach, the means to achieve them, and the tools to assess progress. It aims at mainstreaming a results-oriented approach across all spheres of national, provincial and local government and is based on a logic model linking inputs, activities, outputs, outcomes (system-wide results) and impacts.

The framework starts with the identification of 12 outcomes covering all spheres of sustainable development (education, health, safety and security, employment, skills, infrastructure, rural development, human settlement, local government, environment, international relations, and public service) and reflecting the desired development impacts that the government seeks to achieve. Each outcome is clearly articulated with key activities and measurable outputs and sub-outputs⁶². A large set of specific indicators, (overlapping the development indicators published annually by the Presidency), associated with targets for 2014/2015, is used to measure the progress towards the completion of outcomes.

The twelve key outcomes that have been identified and agreed are:

1. Improved quality of basic education
2. A long and healthy life for all South Africans
3. All people in South Africa are and feel safe
4. Decent employment through inclusive economic growth
5. A skilled and capable workforce to support and inclusive growth path
6. An efficient, competitive and responsive economic infrastructure network
7. Vibrant, equitable and sustainable rural communities with food security for all
8. Sustainable human settlements and improved quality of household life
9. A responsive, accountable, effective and efficient local governments system
10. Environmental assets and natural resources that are well protected and continually enhanced
11. Create a better South African and contribute to a better and safer Africa and World
12. An efficient, effective and development oriented public service and an empowered, fair and inclusive citizenship

⁶² See Appendix A, Figure 1 and Table 1 for more details.

The green economy is reflected throughout the framework. In addition, the employment outcome (outcome 4) contains a specific sub-output (sub-output 5) on the green economy. The framework aims at putting in place “an appropriate regulatory framework to enable the development of sector action plans and related green markets and industries” as well as an implementation plan.”

Outcome 10, which aims at ensuring that “environmental assets and natural resources [are] protected and continually enhanced,” specifically deals with the ecological side of the economy. Targets include the compliance of 80% of waste water treatment works with enforcement measures to meet effluent standards; the reduction of CO₂ emissions by 34% below business as usual by 2020 and 42% by 2025; the country’s 100% compliance with national ambient air quality standards by 2020; an improvement by 12% of energy efficiency by 2015; 75% households with basic waste collection by 2014; and 9% landmass under conservation by 2014.

5.3.5. Framework for South Africa’s Response to the International Economic Crisis

In 2009 developed as a multi-stakeholder (government, business and labour, facilitated by NEDLAC, the National Economic Development and Labour Council) initiative the *Framework for South Africa’s Response to the International Economic Crisis* includes a focus on “green jobs” as a counter to the impacts of the global recession on South Africa. It recognizes “the opportunities in industries that combat the negative effects of climate change and believe that South Africa should develop strong capacity in these green technologies and industries.” The South African government also paves the way for incentives for investment in “green jobs”.

Under the Framework, the South African government has:

- identified ‘green jobs’ opportunities in **energy, manufacturing and services** and incorporated a green jobs component into the Industrial Policy Action Plan.
- committed to the roll-out of **one million solar water heating panels** to households, with opportunities to create jobs in the manufacture and installation of the units, and the development of an action plan with clearly identified roles and responsibilities and funding sources
- revised building regulations to require the installation of **energy efficiency equipment** like solar water heaters and efficiency lighting in new buildings
- developed an energy efficiency measurement standard to support **the tax rebate for energy efficiency** incorporated into the Income Tax Act.⁶³

⁶³ Republic of South Africa (2009). Progress Report to the President of the Republic of South Africa on the Implementation of the Framework For South Africa’s Response To The International Economic Crisis.

5.3.6. New Growth Path: 5 million new Jobs by 2020.

The New Growth Path (NGP), developed by the Economic Development Department (EDD), created in 2009, provides strategies to create five million new jobs in South Africa by 2020. It lays out the vision to achieve a more developed, democratic, cohesive and equitable economy and society over the medium term, in the context of sustained growth. The strategy sets out critical markers for employment creation and growth and identifies where viable changes in the structure and character of production can generate a more inclusive and greener economy over the medium to long run. The NGP sees the “green economy” as of the key “Jobs drivers”, particularly by realising the potential unleashed as the ‘greening’ of the economy progresses, including: energy generation through renewable sources; the introduction of cleaner and more energy- and resource-efficient production methods and practices; the adoption of emissions’ mitigation and pollution control measures; as well as improved natural resource management. These will not only reduce the country’s carbon footprint and reverse environmental damage, but also provide a multitude of supply opportunities for existing and new enterprises

The New Growth Path recognizes the need to consider trade-offs between “the present costs and future benefits of a green economy.” It targets the green economy as one of the key sectors for job creation in South Africa and aims at creating 300 000 additional direct jobs by 2020 (and more than 400 000 by 2030), including 80 000 in manufacturing and the rest in construction, operations and maintenance.

The New Growth Path recommends the following **key actions to support the green economy sector**:

- identifying options for **renewable energy generation** and increased energy efficiency, with appropriate regulatory changes;
- developing **green industrial support** package and special measures for SMEs to encourage domestic production of inputs (e.g. solar-water heaters);
- setting codes for commercial **buildings** to reduce energy use and waste;
- striking a **social pact** to support greening the economy;
- targeting **skills development** with the introduction of new kinds of education and training, greater R&D support as well as the establishment of learning organisations in enterprises and state agencies;
- enhancing **public works** to drive environmental programmes, including recycling and community cleaning;
- developing technology and fiscal policies to support **diffusion of green technologies** for households and enterprises.

▪ A Green Economy Accord

As part of a set of multi-stakeholder initiatives in support of the New Growth Path, the South African government and social partners⁶⁴ signed a **Green Economy Accord** in November 2011. The Accord highlights 12 commitments which cover the following aspects:

- rollout of **one million solar-water systems by 2014/2015**;
- increasing **investments in the green economy**, including through the Industrial Development Corporation (IDC), private investors and retirement funds; It is important to highlight the role of the IDC in mobilising funding for the green economy as stated by President Zuma, as well as a catalytic financier of the “green industrial economy”. In fact, the IDC has allocated ZAR25 billion in funding for this purpose over a 5-year period.
- procurement of **renewable energy** as part of the energy generation plan;
- promotion of **biofuels for vehicles**;
- launching **clean-coal initiatives** to reduce the emission from the use of coal-based technologies;
- promoting **energy efficiency** across the country;
- retrofitting of domestic, industrial and commercial **buildings to promote energy efficiency**;
- **waste-recycling**;
- reducing carbon-emissions on the roads, including through **improved mass transport system** and a shift to rail for freight transport;
- **electrification of poor communities** and reduction of fossil-fuel open-dire cooking and heating;
- **economic development** in the green economy through promotion of localization, youth employment, cooperatives and skills development; and
- cooperation around the United Nations COP 17 and its follow-up.

The Accord identifies points of agreement as well as specific tasks to be carried out by each constituency for every commitment. For example, on energy efficiency, all parties agreed to pursue proposals for including green awareness issues in future curriculum development in the education system. Government has inter alia committed to developing an Energy Efficiency Campaign to build public awareness. In this process, government should consult with NEDLAC through their various constituencies. Business committed to work with the Department of Energy to develop benchmarks for sector and subsector energy efficiency and company energy-management plans, and to further developed the Business Network for Leadership in Energy Efficiency. Labour committed to establishing joint workplace committees to discuss and implement energy efficiency plans. Aspirational sectoral energy efficiency targets (e.g. 15% in residential and 10% in transport by 2015) have also been identified and will be reviewed within a 5-year period.

As part of monitoring and evaluation, all Parties should meet on a regular basis (at least twice a year) to review progress and to assess what changes and additions are required.

⁶⁴ Social partners consisted in: organised labour (COSATU, FEDUSA and NACTU), business (Business Unity South Africa, NAFCOC and FABCOS) and community constituents at NEDLAC, comprising of organisations of women, civic structures, youth, people with disabilities, cooperatives and the financial sector campaign).

5.3.7. Department of Environmental Affairs: National Strategy for Sustainable Development

A National Framework for Sustainable Development (NFSD) was adopted in 2008 and built on it a National Strategy for Sustainable Development and Action Plan 2011 – 2014 (NSSD), was published as government policy in November 2011.

The NSSD provides an integrated framework to shift South Africa's development path to sustainability. It conceptualizes the three spheres of sustainable development – the economy, society and the environment – as embedded within each other, and underpinned by systems of governance. In addition, it identifies key trends and areas of intervention for every of the four constituents (governance, economy, socio-political systems and ecosystem services).

The NSSD works towards the following vision: "South Africa aspires to be a sustainable, economically prosperous and self-reliant nation state that safeguards its democracy by meeting the fundamental human needs of its people, by managing its limited ecological resources responsibly for current and future generations, and by advancing efficient and effective integrated planning and governance through national, regional and global collaboration."

Proper governance has been critical at different levels in the NSSD. First, consultation with the private sector and civil society has been central in the process of drafting the strategy. Second, although there are a number of sectors that have incorporated sustainability criteria into some or all of their policies and strategies, in many cases, implementation does not seem to be effective due to inadequate resources, lack of management and institutional capacity, and the absence of technical capacity among other reasons.

The strategy identifies five goals as well as five strategic priorities, each associated with objectives and key interventions.

Five Goals

- Develop and promote new social and economic goals based on ecological sustainability and build a culture that recognises that socioeconomic systems are dependent on and embedded in ecosystems. In other words, the NSSD looks at increasing awareness of and understanding of the important role that ecosystems and natural resources play in human wellbeing. It also calls for the introduction of incentives or disincentives to encourage environmentally responsible behaviour;
- Increase awareness and understanding of the importance of ecosystem services (water, living marine and biodiversity resources, air and water quality, arable land) to human wellbeing;
- Ensure effective integration of sustainability principles into all policies, planning and decision-making at national, provincial and local levels through *inter alia* the establishment of a National Committee on Sustainable Development (NCSD) involving Government, the National Planning Commission, the private sector, civil society and academia;

- Ensure effective system-wide integration and collaboration across all functions and sectors; and
- Monitor, evaluate and report performance and progress in respect of ecological sustainability in relation to socioeconomic goals, through the development and integration of sustainability indicators into government wide strategic plans and private sector strategic plans.

5.3.8. Climate Change Mitigation: National Climate Change Response Policy

In 2011 the Long-Term Mitigation Scenarios (LTMS), that took place in 2007, was a multi-stakeholder exercise in mapping potential greenhouse gas pathways for the South African economy up to 2050. It established that the country cannot continue with “business as usual” and had to adopt a greenhouse gas emissions trajectory in line with what is “required by science”.

Based on the findings, Cabinet committed for South Africa’s emissions to peak between 2020 and 2025. The LTMS also informed South Africa’s international commitment under the Copenhagen Accord to reduce emissions growth to a level that is 34% lower in 2020 than under a “business as usual” scenario.

The LTMS identified the biggest mitigation options as an escalating carbon tax; renewable energy (electricity, heat and liquid fuel); nuclear energy; industrial energy efficiency; and transport energy efficiency (vehicle efficiency, electric and hybrid vehicles). Some of these are available at negative costs (e.g. efficiency) or near-zero costs (e.g. renewable energy with learning).

Building on the LTMS, the National Climate Change Response Policy White Paper (NCCRP) presents the South African Government’s vision for an effective climate change response and the long-term, just transition to a climate-resilient and lower-carbon economy and society. They two main objectives are to:

- effectively manage inevitable climate change impacts through interventions that build and sustain South Africa’s social, economic and environmental resilience and emergency response capacity, and
- make a fair contribution to the global effort to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

It also includes a set of Near-Term Priority Flagship Programmes, consisting of both new initiatives and the scaling up of existing programmes, in public works, water conservation and demand management, renewable energy, energy efficiency and energy demand management, transport, waste management, carbon capture and sequestration, and adaptation research.

5.3.9. Energy: Integrated Resource Plan 2011 and other energy-related policies

The Integrated Resource Plan for Electricity 2010-2030 (IRP) for South Africa, developed by the Department of Energy (DoE), was promulgated in its revised version on 6 May 2011 after two rounds of public participation in 2010. The second round of public hearings held in November and December 2011 saw more than 80 different stakeholders (private sector, NGOs, academia, civil society, labour, local government, etc.) providing comments on the Plan.

It lays out the proposed generation new build fleet for South Africa for the period 2010-2030, based on the cost-optimal solution for new build options. The Department of Energy's Renewable Energy Procurement Programme (REPP) was launched in August 2011 to administer 5 procurement rounds that aim to see a total of 3,625 MW of renewable energy generation capacity being created by 2013.

The IRP represents an appropriate balance between the expectations of different South African priorities considering a number of key constraints and risks, for example:

- reducing carbon emissions;
- new technology uncertainties such as costs, operability, lead time to build, etc;
- water usage;
- localisation and job creation;
- southern African regional development and integration; and
- security of supply.

The IRP was adjusted from a cost-optimised scenario developed under a carbon emission constraint of 275 million tons per year from 2025, incorporating localisation objectives⁶⁵ and bringing forward the renewable roll-out.

In addition to all existing and committed power plants (including 10 GW committed coal), the plan includes: 9.6 GW of nuclear; 6.3 GW of coal; 17.8 GW of renewables (8.4 GW of solar photovoltaic, 8.4 GW of wind and 1 GW of concentrated solar power); and 8.9 GW of other generation sources. The IRP also takes into account a total of 3 420 MW saved thanks to Energy Efficiency Demand-Side Management (EEDSM).

5.3.9.1. Energy Efficiency Strategy for South Africa 2005

The Energy Efficiency Strategy of the Republic of South Africa, first published in March 2005 (and reviewed in 2008) by the then-Department of Minerals and Energy, is the first

⁶⁵ Economic localisation is a process which reverses the trend of globalisation by ensuring that all goods and services that can reasonably be provided locally are. It is critical in developing a local industry and building skills in the country. The localisation potential of every technology has been taken into account (through various scenarios) in the development of the IRP.

consolidated governmental document geared towards the development and implementation of energy efficiency practices in the country. The strategy takes its mandate from the White Paper on Energy Policy published in 1998 and sets a national target for an energy efficiency improvement of 12% by 2015 (with differentiated targets by sector).

Based on the targets outlined in the Energy Efficiency Strategy for South Africa, South African National Standards 204 (SANS 204) for energy efficiency in buildings provide a national code of acceptable practice for energy and environmentally-effective building design, construction, operation and maintenance, products, systems and professional services.

They require that all **new buildings**, whether it is homes, industrial buildings, hotels and schools meet minimum energy efficiency requirements. New buildings must have solar water heaters, heat pumps, or similar technologies, and ceilings, walls, windows, have to meet minimum requirements for preventing heat loss (in winter) or heat gain (in summer) in order to meet the energy efficient targets. Buildings must also be fitted with energy efficient heating, air conditioning and mechanical ventilation systems.

SANS 204 are aligned with the objective of performance standards for buildings in the national Energy Efficiency Strategy. They were published in October 2008 as voluntary standards and became mandatory in November 2011.

5.3.9.2. Solar Water Heating Strategic Framework

The DoE targets the installation of **one million solar water heaters** in households and commercial buildings by 2014. It is anticipated that this goal will be increased to 5.6 million SWHs by 2020.

The government's solar water heating (SWH) programme, started in December 2009, is managed by Eskom, as the "SWH Rebate Programme". Furthermore, a budget-funded SWH programme is currently being rolled out in various municipalities (e.g. Tshwane). By 2012, 160 000 SWHs will have been installed through Eskom's programme. The 2012 budget also allocated an additional R4.7 billion towards SWH roll-out.

The SWH incentive compliments other Eskom "Integrated Demand Management" initiatives which provide companies with an incentive at a fixed rate for every verified unit (kWh) of electricity saved through investment in energy-efficient equipment.

5.3.9.3. Independent Power Producer Procurement Programme

South Africa's National Energy Regulator (NERSA) announced in March (Phase I) and October (Phase II) 2009 **the introduction of guidelines for renewable energy feed-in tariffs**. The tariffs, differentiated by renewable energy technology, were expected to be paid for a period of 20 years. Revised in 2011, they are based on the 'cost of generation plus a reasonable profit'.

The **feed-in tariff was complemented with a competitive bidding process** launched in August 2011. The Renewable Energy Independent Power Producer Procurement Programme is based on South Africa's potential for RE production and presently has in place a target of 10 000 GWh of Renewable Energy. This IPP Procurement Programme has been designed so as to contribute towards the target of 3 725 megawatts and towards socio-economic and environmentally sustainable growth, and to start and stimulate the renewable industry in South Africa.

The following technologies shall be considered as qualifying technologies for selection under this IPP Procurement Programme: onshore wind, concentrated solar thermal, solar photovoltaic, biomass solid, biogas, landfill gas and small hydro. In terms of this IPP Procurement Programme, the Bidders will be required to bid on tariff and the identified socio-economic development objectives of the Department⁶⁶.

Under this procurement programme, the South African government planned to procure 3,750 MW of renewable energy generation consisting of 1,850 MW of onshore wind, 1,450 MW of solar photovoltaic, 200 MW of concentrated solar power (CSP), 75 MW of small hydro, 25 MW of landfill gas, 12.5 MW of biogas, 12.5 MW of biomass, and 100 MW of small projects.

The first round of bids closed in November 2011 and the South African government announced the initial 28 preferred bidders along with solar and wind projects collectively representing 1,416 MW of potential capacity in December 2011. The announcements of preferred bidders of the second round of bids took place in May 2012 and the PPAs will be signed in March 2013. Projects should be commissioned by mid-2014, except CSP projects which are expected by 2016.

A third round of bidding is planned for 2013, if the full allocation is not subscribed by the end of the current window periods.

Both the participating and winning bidders in the first round consisted of companies from around the world, including developed and developing countries and usually in a consortium with a South African company in order to satisfy economic development (local ownership and content) requirements.

5.3.10. Industrial policy: Industrial Policy Action Plan

The 2010/11 – 2012/13 Industrial Policy Action Plan (IPAP2) builds on the National Industrial Policy Framework (NIPF) and the 2007/2008 IPAP. A review of the IPAP for the period 2012/13 to 2014/15 was launched by the DTI in April 2012. Key action programmes (with specific milestones) include: development of local wind and solar industry through the REP and designation of solar water heaters. It represents a significant step forward in scaling up South Africa's efforts to promote long-term industrialisation and industrial diversification beyond the current reliance on traditional commodities and non-tradable services. Its

⁶⁶ More information about the IPP Programme can be found here:
<http://www.ipprenewables.co.za/#page/303>

purpose is to expand production in value-added sectors⁶⁷ **with high employment and growth multipliers that compete in export markets as well as in the domestic market against imports.** In so doing, the action plan also places emphasis on more labour absorbing production and services sectors, the increased participation of historically disadvantaged people and regions in our economy and will facilitate, in the medium term, South Africa's contribution to industrial development in the African region.

The IPAP2 identifies "green and energy-saving industries" as a new area of focus of industrial policy. In particular, **the IPAP2 calls for increased investment in solar water heating, concentrated solar thermal energy, industrial energy efficiency, water efficiency, wind, biomass and waste management, and energy efficient vehicles.**

The IPAP2 sets numerous key action programmes to support the development of green industries, including:

- a **subsidy programme for solar water heating** combined with product financing, a streamlined claim procedure, improved marketing and new National Building Regulations to make it compulsory for new buildings and upgrades to homes to install solar water heaters and other energy-efficient building requirements;
- procurement arrangements for a **Renewable Energy** Feed-in Tariff, leading to REFIT Call for Tenders and power purchase agreements;
- an Industrial Energy-Efficiency Programme, including energy-efficient motors and scaling up of the **National Cleaner Production Centre**;
- strengthened building and commercialisation water efficiency standards, and a mandatory **national labelling scheme** for fridges and air conditioners.

5.3.11. National Treasury's Framework for Environmental Fiscal Reform and Budgets

Environmental fiscal reform – considered a key component of a green economy - involves changes to taxes and subsidies that apply to natural resources. **A "Draft Policy Paper - A Framework for Considering Market-Based Instruments to Support Environmental Fiscal Reform in South Africa"** was released by the National Treasury in 2006. It has since informed many of the environmental fiscal reforms introduced in subsequent budgets.

The policy paper aims at outlining the role that market-based instruments, specifically environmentally-related taxes and charges, *could* play in supporting sustainable development in South Africa, and suggests a framework for considering their potential application. It focuses on the options for environmental fiscal reform and the policies and measures capable of contributing to both revenue requirements and environmental objectives. The report discusses a number of tax reform options that could contribute

⁶⁷ See Appendix A Figure 2 for the matrix used to identify value-added sectors.

towards meeting both fiscal and environmental objectives. It primarily looks at reforms to revenue-raising instruments, particularly environmentally related taxes and charges and their role in wider fiscal policy. The report calls for the reform of some existing environmentally-related taxes and charges, notably in the transport (general fuel levy, vehicle customs and excise duties, provincial vehicle license fees) and waste sectors (product taxes on certain goods such as batteries or packaging, deposit-refund systems, disposal taxes, differential tariffs for waste related services). It also suggests options for new environmentally-related taxes in the electricity and water waste sectors (Waste Water Discharge Charge System). The report elaborates on options for reforming legal aspects of non-environmentally-related taxes with perverse environmental incentives, such as certain deductions under the Income Tax Act and the VAT zero-rating of farming inputs like pesticides and fertilisers.

Finally, it investigates the role of (fiscal) incentives to improve environmental outcomes, such as environmental funds; partial or soft earmarking of environmentally-related tax revenues; rehabilitation funds / guarantees; accelerated depreciation allowances; and review of specific tax provisions. Although direct subsidies are not promoted due to their non-compliance with the polluter pays principle, the important role that these incentive mechanisms can play in encouraging better responses to environmentally-related taxes is recognised.

The nature, type and design of taxes send signals that potentially impact on the decisions made by taxpayers and, therefore, can support or discourage certain values. Environmentally-related taxes can play an important role in helping to ensure that economic growth and development are sustainable and discourage activities that impose high social costs in environmental terms. In some cases, it may be difficult for consumers or producers to alter their behaviour in response to an environmentally-related tax, particularly where there is a lack of *alternatives*. Supporting expenditure reforms may therefore be required.

South Africa has a number of environmentally-related taxes already in place (e.g. general fuel levy, aviation fuel levy, plastic shopping bags levy, water resource management charge, etc.). In 2005/2006, when the framework was published, these tax instruments **together accounted for approximately 2% of GDP and just fewer than 10% of total tax revenue**. Environmentally-related tax revenue trends are heavily influenced by the general fuel levy, which accounted for over 70% of the revenue collected from this group of instruments. The general fuel levy is paid by motorists at the pump on fuel, predominantly processed fossils fuels like petrol and diesel. The fuel levy goes to the general budget and not specifically allocated. For the 2012/13 financial year, the National Treasury expects to collect only R42.8bn in revenue from the levy.

Table 17: overview of main environmentally-related taxes and charges in South Africa in 2012

Sector	Levy (charge)	Level	Application	Tax rate
Transport	General Fuel Levy	National	Petrol Diesel Biodiesel	197.5c/l 182.5c/l 87.5c/l
	Road Accident Fund Levy	National	Petrol, Diesel, Biodiesel	88c/l
	Customs and Excise Levy	National	Petrol, Diesel, Biodiesel	4c/l
Vehicle taxation	Ad valorem Customs and Excise Duty	National	All passenger and light commercial vehicles	Graduated rate based on the vehicle price with an upper ceiling of 25%
	Carbon Dioxide Emissions of Motor Vehicles	National	All passenger and light commercial vehicles	R75 per g/km CO ² emissions exceeding 120g/km and R100 per g/km CO ² emissions exceeding 175g/km
	Road Licensing Fees	Provincial	All registered vehicles	Fees vary between different provinces – usually based on weight
Aviation taxes	Aviation Fuel Levy	National	Aviation fuel sales	12.2c/l
	Airport charges	National	Landing, parking and passenger service charge	Charges imposed to fund the operation of the South Africa Civil Aviation Authority (SACAA)
	Air Passenger Departure Tax	National	International air travel from South Africa	R190 per passenger; R10 per passenger to SACU countries
Product taxes	Plastic shopping bags levy	National	All plastic shopping bags	4c per bag
	Environmental Levy on Electric Filament Lamps	National	All electric filament lamps	R3 per lamp
	NER Electricity Levy	National	All electricity generated	A levy per kWh is implemented on all electricity generated to fund the National Electricity Regulator
Electricity	Environmental Levy on Electricity Generated in the Republic	National	All electricity generated from non-renewable energy sources	2.5 c/kWh and 3.5c/kWh from 1 July 2012
	Local Government Electricity Surplus	Local	Electricity distributed to end-users by municipalities	Implicit tax rates vary between different municipalities
	Water Resource Management Charge	National	All registered water use from DWAF water schemes	Charge rates vary according to different users. The aim is to recover costs associated with water supply and abstraction
Water supply	Water resource development and use of water works charge	National	All registered water use from DWAF water schemes	Charge rates vary according to different users. The aim is to recover costs associated with the construction, operation and maintenance of water schemes
	Water Research Fund	National	All registered water users	The levy is earmarked to fund the operations of the Water Research Commission

Source: TIPS

Budgets

Successive budgets have underlined the longer-term positive aspects for employment creation of the shift towards a more energy-efficient economy. They have been marked by the South African government's intent to implement many of the reforms contemplated in the *Framework for Environmental Fiscal Reform*.

A 2c/kWh levy on electricity from non-renewable sources was introduced in the 2008 budget, and has later increased to 2.5c/kWh in 2011 and 3.5c/kWh in 2012⁶⁸. The general fuel levy, the Road Accident Fund levy, the plastic shopping bags levy, the international air passenger departure tax have also been progressively scaled up over the years. Besides, the 2009 budget announced an *ad valorem* carbon emissions tax on new passenger cars. This came in addition to an *ad valorem* excise duty on new vehicles, which increased in 2011 from a maximum nominal percentage of 20% to a maximum nominal percentage of 25%, depending on the value of the car *of the vehicle*. In 2011, the maximum rate, which increases as the price of the vehicle increases, has then been brought up from 20% to 25% for vehicle above R900 000.

Large budget envelopes have also been allocated to support programmes aimed at encouraging more efficient use of electricity, generation from renewable sources, installation of electricity-saving devices and co-generation projects. For example, in the 2009 budget, R1 billion was added for electricity demand management, together with tax incentives for investment in energy efficient technologies. An additional R4.7 billion is allocated to complete the installation of one million solar water geysers. R600 million goes to municipalities to install low-energy lighting and equipment. R300 million is provided for the electrification of informal settlements.

It is worth noting that the subsidies provided directly or indirectly to energy savings, solar water heaters and renewable energy by Eskom, are technically not part of "fiscal" reform, as they rely on transfers provided for through the electricity tariff rather than the general fiscal.

The ruling party (the African National Congress) released its policy proposals for a "Second Transition" in 2012. These include a proposal for a resource rent tax (RRT) and the excess profits by companies from the sale of South Africa's mineral resources. This tax could potentially replace current taxes and royalties on mineral resource extraction and could also potentially incorporate the carbon tax (for example by using the carbon content of fossil fuels extracted in or imported to the country as a proxy for the emissions associated with its use).⁶⁹

The carbon and resource rent taxes would potentially generate around R40 billion in taxes each. These revenues could be "recycled" as tax breaks (on VAT, personal or company

⁶⁸ The Environmental Levy on Electricity Generated in the Republic of South Africa is paid by the electricity producer, i.e. essentially Eskom, and therefore affects all electricity consumers in South Africa.

⁶⁹ African National Congress (ANC) (2012). The Second Transition? Building a national democratic society and the balance of forces in 2012. A discussion document towards the National Policy Conference, Version 6.0 as amended by the Special NEC 27 February 2012.

income), through social transfers or through investment. “Social transfers” could include contributing to free basic services (including electricity, public transport, education or health insurance).

Modelling research by the UN-WIDER for National Treasury shows that a tax for which the revenues are employed for tax breaks and social transfers has a small negative impact on GDP, while using the revenues for investment would result a significant positive impact on GDP in the range of 0.5% for a R100/tCO₂ tax, more for a higher tax and less for a lower tax.⁷⁰

The ideal combination of tax offsets would aim to achieve a “triple dividend” (i.e. a positive outcome for the environment, the economy and for social equality) by providing for sufficient social transfers to ensure the tax is progressive (pro poor) and directing the balance of new/additional revenues towards strategic green investment.

Because the poor spend a disproportionate share of their income on energy (electricity, coal and paraffin) and transport (especially busses and taxis) compared to the wealthy, taxes, levies and tariffs which affect the cost of energy and transport tend to be regressive (i.e. disproportionately impacting the poor) if measures are not taken to offsetting these costs on the poor. Existing measures to achieve this include public transport subsidies (not applicable to the main form of transport for the poor, namely taxis) and free basic electricity allowances.

In order to avoid a regressive social effect from environmental taxes, effective subsidies to the poor (also called a “social wage”) in the areas affected by environmental reform must be expanded or added to, for example through the expansion of the free basic electricity allocation.

A failure to address free basic access and the negative impact of rising administered prices or taxes has been a source of social unrest manifested in what has become known as “service delivery protests”. If environmental reforms lead to negative social outcomes, this would delegitimize such reforms.

5.3.12. Department of Science & Technology’s Ten-Year Innovation Plan

The Department of Science & Technology (DST) published in 2008 a Ten-Year Innovation Plan, a high-level presentation of the principal challenges identified by the DST for the 2008-2018 decade. It aims to help drive South Africa’s transformation towards a knowledge-based economy, in which the production and dissemination of knowledge leads to economic benefits and enriches all fields of human endeavour.

⁷⁰ Arndt, C., Davies, R., Makrelov, K. and Thurlow, J. (2011). Measuring the Carbon Intensity of the South African Economy, United Nations University World Institute for Development Economics Research (UNU-WIDER), Working Paper No. 2011/45.

The core projections for 2018, which are summarized as South Africa's five "grand challenges" in science and technology, include both energy security and climate change.

The Plan identifies the race for a "safe, clean, affordable and reliable energy supply" as one of South Africa's key challenges, and calls for meeting medium-term energy supply requirements while innovating for the long term in clean coal technologies, nuclear energy, renewable energy and the promise of the "hydrogen economy".

According to the DST, climate change also bears tremendous opportunities for the country, as South Africa's geographic position enables it to play a leading role in climate change science. South Africa is well positioned to lead research on the continent in terms of understanding and projecting changes to the physical system; the impact of these changes; and mitigation to limit their long-term effects. Mitigating climate change also provides an economic opportunity for South Africa; therefore, the country needs to develop a strategy to take advantage of the so-called "Green Economy".

5.3.13. Waste management

National Environmental Management Act 1998

The National Environmental Management Act (NEMA), originally gazetted in 1998, provides the legal framework for "co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state". The Act has been amended many times to cover a wide variety of environmental aspects, including air quality, waste management, impact assessment, biodiversity, protected areas and integrated coastal management. It provides a legislative driver for the uptake of Environmental Goods and Services (EGSs).

Under this act is included various subsidiary acts, like the National Environment Management Air Quality Act of 2004.

National Waste Management Strategy (2011)

The National Waste Management Strategy (NWMS) is a legislative requirement of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

The NWMS identifies eight goals, all associated with objectives, indicators and targets for 2016:

- promote waste minimisation, re-use, recycling and recovery of waste (25% of recyclables diverted from landfill sites);
- ensure the effective and efficient delivery of waste services (95% of urban households and 75% of rural households have access to adequate levels of waste collection services, and 80% of waste disposal sites have permits);
- grow the contribution of the waste sector to the green economy (69 000 new jobs created in the waste sector and 2,600 additional SMEs and cooperatives participating in waste service delivery and recycling);

- ensure that people are aware of the impact of waste on their health, wellbeing and the environment (80% of municipalities running local awareness campaigns and 80% of schools implementing waste awareness programmes);
- achieve integrated waste management planning (all municipalities have integrated their IWMPs with their integrated development plans, and have met the targets set in IWMPs and all waste management facilities required to report to the South African Waste Information System have waste quantification systems that report information to WIS);
- ensure sound budgeting and financial management for waste services (all municipalities that provide waste services have conducted full-cost accounting for waste services and have implemented cost reflective tariffs);
- provide measures to remediate contaminated land (assessment complete for 80% of sites reported to the contaminated land register, and remediation plans approved for 50% of confirmed contaminated sites); and
- establish effective compliance with and enforcement of the Waste Act (50% increase in the number of successful enforcement actions against noncompliant activities, and 800 Environmental Management Inspectors appointed in the three spheres of government to enforce the Waste Act).

The NWMS also provides the regulatory and economic instruments necessary to implement the strategy:

- a Waste Classification and Management System, which provides a methodology for the classification of waste and provides standards for the assessment and disposal of waste for landfill disposal;
- norms and standards, i.e. baseline regulatory standards for managing waste at each stage of the waste management hierarchy;
- licensing and the setting of licensing conditions;
- industry waste management plans enabling collective planning by industry to manage their products once they become waste and to collectively set targets for waste reduction, recycling and re-use;
- Extended Producer Responsibility for products that have toxic constituents or that pose waste management challenges;
- priority wastes – e.g. categories of waste that require special waste management measures due to the risks to human health and the environment; and
- economic instruments (such as deposit refund schemes, waste disposal taxes, products taxes, tax rebates and benefits, etc.) to encourage or discourage particular behaviour and augment other regulatory instruments.

5.3.14. National Biodiversity Strategy and Action Plan 2006

The National Biodiversity Strategy and Action Plan, launched in 2006 by the then-Department of Environment Affairs and Tourism (DEAT), aims to establish a framework and a plan of action for the conservation and sustainable use of South Africa's biodiversity and the equitable sharing of benefits derived from this use.

The Strategy sets out the strategic objectives, outcomes and activities needed to achieve the overarching goal of conservation, sustainable use and economic and social equity. An implementation plan sets out high priority activities which are needed to achieve the

objectives, including lead agents, partners, targets and indicators. In order to achieve the final goal of “conserv[ing] and manag[ing] terrestrial and aquatic biodiversity to ensure sustainable and equitable benefits to the people of South Africa, now and in the future,” five strategic objectives are set out in the Strategy. Long-term (15-year) targets have been set for the strategic objectives, while five-year objectives have been set at the outcome level (see Table 1 below).

Table 18: Strategic Objectives and 15-year targets of the National Biodiversity Strategy and Action Plan 2006

Strategic objectives		15-year targets
SO 1: Policy Framework for Biodiversity Management	An enabling policy and legislative framework integrates biodiversity management objectives into the economy.	<ul style="list-style-type: none"> • South Africa fully and consistently meets international obligations regarding biodiversity in the context of national priorities • Biodiversity values are fully integrated into the macro-economy, informing policy, planning, budgeting and decision-making processes at all levels and all sectors.
SO 2: Institutional Framework for Biodiversity Management	Enhanced institutional effectiveness and efficiency ensures good governance in the biodiversity sector.	<ul style="list-style-type: none"> • Biodiversity concerns occupy a significant place on the national agenda • All organs of state in all spheres of government, and all stakeholders and role players, co-operate and work effectively and efficiently to achieve biodiversity management objectives
SO 3: Integrated Management of Terrestrial and Aquatic Ecosystems	Integrated terrestrial and aquatic management minimises the impacts of threatening processes on biodiversity, enhances ecosystem services and improves social and economic security.	<ul style="list-style-type: none"> • Effective control of known priority invasive species is achieved, primarily through programmes focused on poverty relief • Catchment Management Agencies are established in all biodiversity priority areas, are effectively achieving integrated resource management and are meeting biodiversity objectives • Disaster prevention and management plans (including climate change impacts) incorporate wise ecosystem management principles and practices, especially for water, fire and coastal processes • No genetically modified organisms posing a threat to biodiversity are released into the environment • All sectors that impact on biodiversity are making a significant contribution towards biodiversity management and consider biodiversity in all decisions regarding resource use
SO 4: Sustainable Use of Biological Resources	Human development and well-being is enhanced through sustainable use of biological resources and equitable sharing of the benefits.	<ul style="list-style-type: none"> • Economies based on use of species and genetic resources are optimised and sustainably managed and contribute significantly to livelihoods and equity • Priority fish stocks recover to sustainable levels • No species status declines • Natural products sector contribution to GDP grows by 50% compared to 2005 baseline • Poverty is alleviated through more equitable and effective resource use
SO 5: Conservation Areas	A network of conservation areas conserves a representative sample of biodiversity and maintains key ecological processes across the landscape and seascape.	<ul style="list-style-type: none"> • Comprehensive biodiversity monitoring systems inform planning • The protected area network covers 12% of the terrestrial and 20% of the marine environment thereby contributing to representation targets in priority areas • There is no further loss of endangered and critically endangered ecosystems and no attrition of ecosystem functioning in priority areas • At least two entire 'watershed to coast' protected environments are established and effectively managed

Source: National Biodiversity Strategy and Action Plan 2006

5.3.15. Department of Agriculture, Forestry and Fisheries

The Strategic Plan 2012/2013-2016/2017 for the Department of Agriculture, Forestry and Fisheries (DAFF)

The mission of the South African government is to create a “leading, dynamic, united, prosperous and people-centred sector” that would contribute to and embrace economic growth (and development), job creation, rural development, the sustainable use of natural resources, and food security.

The Strategic Plan identifies six Strategic Goals, including the sustained management of natural resources (Strategic Goal 2) and the increased contribution of the sector to economic growth and development (Strategic Goal 5).

The Strategic Goal 2 comprises three Strategic Objectives as follow:

- Ensure the sustainable management and efficient use of natural resources;
- Ensure protection of indigenous genetic resources;
- Increase contribution to green jobs to improve livelihoods.

In order to fulfil those objectives, the Strategic Plan defines six programmes, of which “forestry and natural resources management” and “fisheries management”.

Table 19: Programmes deliverables related to the green economy for forestry and natural resources management

Strategic Goals	Strategic Objectives	Strategic Outcomes	Strategic Indicators	Strategic Interventions 2012/2013-2016/2017
SG 2: Sustainable management of natural resources	SO 1: Ensure the sustainable management and efficient use of natural resources	Reduced climate change (impact) and improved air/atmospheric quality	Climate change impact identified and adaptation plans developed	Coordinate the development, implementation and monitoring of Climate Change Adaptation Plants
		Sustainable environmental management	Number of ha degraded indigenous forests, woodlands and agriculture rehabilitated by 2017	Coordinate rehabilitation of 50 000 ha indigenous forests, woodlands and agricultural land.
SG 5: Increased contribution of agriculture, forestry and fisheries sector to economic growth and development	SO 2: Increase the level of public and private investment for agricultural, forestry and fisheries products	More labour-absorbing growth	Sector strategies to support growth of labour-intensive industries	Facilitate the implementation of the Forestry Sector Charter
				Facilitate the creation of 12 000 jobs through refurbishment of Category B&C plantations

Source: DAFF, 2012

Altogether 12 213 green jobs were created through the forestry livelihoods strategy and the Land-Care Programme in 2010/11. In terms of green jobs, over the 2012/2013-2016/2017 period, the Strategy Plan targets *inter alia* the creation of 454 full-time equivalent jobs in the Land-Care programme, 12 000 jobs in the refurbishment of Category B&C plantations (mainly silvicultural operations and fire protection) and 5 000 of job opportunities through Working for Fisheries Programme.

In the previous strategic plan, agro-ecological agriculture (roughly synonymous with 'conservation agriculture') was identified as an area for urgent attention; however, little progress was made. DAFF has since entered into discussions with the Food and Agriculture Organization, for assistance in developing a comprehensive approach to agro-ecological agriculture.

Table 20: Programmes deliverables related to the green economy for fisheries management

Strategic Goals	Strategic Objectives	Strategic Outcomes	Strategic Indicators	Strategic Interventions 2012/2013-2016/2017
Strategic goal 2: Sustained management of natural resources	SO 1: Ensure the sustainable management and efficient use of natural resources	Rebuild depleted fish stocks	Stock recovery on key fisheries (abalone, hake, West Coast rock lobster and linefish)	Facilitate and coordinate stock recovery on key fisheries through the implementation of stock enhancement guidelines
		Compliance with and enforcement of marine and coastal legislation	Increased number of enforcement efforts in five key fisheries (hake; abalone; squid; linefish and rock lobster) inspected and spot checks conducted in other sectors	Coordinate and improve enforcement efforts on hake, abalone, squid, West coast rock lobster and line fish sectors inspected through Integrated Fisheries
Strategic goal 5: Increased contribution of agriculture, forestry and fisheries sector to economic growth and development	SO 1: Increase growth, income and sustainable job opportunities in the value chain	More labour-absorbing growth	Sector strategies to support the growth of labour-intensive initiatives to create 8 343 jobs	Broaden access through empowerment of small producers, improving competitiveness and investment in fisheries infrastructure

Source: DAFF, 2012

5.3.16. Department of Water Affairs

National Water Conservation and Water Demand Management Strategy (2004)

The Department of Water Affairs (and then-Forestry) has the national responsibility for developing the necessary policies, regulations and programmes that ensure the effective and sustainable management of water resources. The delivery of effective and sustainable water services to all South Africans is also a primary concern.

The National Water Conservation and Water Demand Management Strategy (NWC/WDMS) is a fundamental step in promoting water use efficiency and is consistent with the National Water Act (Act 36 of 1998) which emphasizes effective management of the country's water resources. The NWC/WDMS motivates the need for water conservation and water demand management strategies for water resources and services at the very inception of the

planning process, as well as during the design, operation and decommissioning of relevant schemes and projects.

The eight generic objectives of the NWC/WDMS are to:

- facilitate and ensure the role of WC/WDM in achieving sustainable, efficient and affordable management of water resources and water services;
- contribute to the protection of the environment, ecology and water resources;
- create a culture of WC/WDM within all water management and water services institutions;
- create a culture of WC/WDM for all consumers and users;
- support water management and water services institutions to implement WC/WDM;
- promote the allocation of adequate capacity and resources by water institutions to WC/WDM;
- enable water management and water services institutions to adopt integrated planning; and
- promote international co-operation and participate with other Southern African countries, particularly basin-sharing countries, in developing joint WC/WDM strategies.

National Water Resource Strategy 2004

The National Water Resource Strategy (NWRS) sets out ways in which South Africa aims to achieve Integrated Water Resources Management (IWRM). **It describes policies, strategies, plans and procedures by which this will be undertaken.** It includes contributions received from a broad range of stakeholders across the country, within and outside the Department of Water Affairs and Forestry. In total, more than 2 300 comments from 600 stakeholders representing different sectors of society were gathered during the consultation process.

The challenge for South Africa is to manage these resources in a manner that promotes equity, sustainability and efficiency. In particular, the country must harness the water resources in the battle against the inequality, poverty and deprivation that continue to plague the nation. The Strategy sets out the country's plans to achieve this. The purposes of the NWRS as the national framework for managing water resources and the preparation of catchment management strategies are the provision of water-related information and the identification of development opportunities and constraints.

Water for Growth and Development

Water for Growth and Development (WfGD, 2008) is "a framework that will set in motion a course of action to ensure that there is sufficient water, in both quantitative and qualitative terms, to support South Africa's path of growth and development. There must be sufficient water for the country to achieve its 6% economic growth target. At the same time, every person in South Africa must have access to potable water. These two goals must be achieved by not compromising the ecological sustainability of the resource."

It is relevant to the green economy not only in highlighting the role of natural resources as a binding constraint on growth, but also in arguing for “balancing supply- and demand-side measures” for ensuring water security. This implies an increased focus away from the traditional large-scale building of dams and inter-basin transfer schemes toward better demand management (preventing losses) and addressing the maintenance backlog with respect to water treatment works.

5.3.17. Public transport: Department of Transport

Public Transport Strategy and Action Plan (2007)

The Public Transport Strategy and Action Plan of the Department of Transport consists in two pillars: **accelerated Modal Upgrading, which refers to initiatives to transform bus, taxi and rail service delivery, and Integrated Rapid Public Transport Networks**, which focuses on implementing high quality networks of Rail Priority Corridors and Bus Rapid Transit Corridors in especially the six metropolitan cities.

It sets a vision for 2020 which foresees operating systems in place in 12 cities and at least six rural districts by 2014, as well as over 85% of a metropolitan city’s population within 1km of an Integrated Rapid Public Transport Network trunk (road and rail) or feeder (road) corridor by 2020. A further goal for the metropolitan cities by 2020 is to achieve a mode shift of 20% of car work trips to public transport networks.

6. CONCLUSIONS

For the last decade, South Africa enjoyed relatively strong economic growth. As a result, overall economic expansion between 1994 and 2008 approached 4%, more or less the same as other upper-middle income countries. Despite improved growth, the economy remained one of the most inequitable in the world. When entering the new millennium, 40% of the South African national income was going to the richest 10% of households. Inequality is also associated with extraordinarily high levels of unemployment. In the late 00's, less than half of all working-age South Africans had income-earning employment, compared to an international average of almost two-thirds. The situation is even worst for young people, largely because too few jobs were created to absorb the large numbers of new entrants to the labour market. In the first quarter of 2010, the unemployment rate for young people aged 16 to 30 was 40%, compared to 16% for those aged 30 to 65.

Amongst the employed, many workers have poorly paid, insecure jobs. Over the last decade there has been an increase in the share of jobs in the retail, security and low-quality business services and housing construction sectors. The poorest 10% of the population earns R4,214 per year. In the period from 1995-2005, real monthly wage of workers declined by 23% from R3558 to R2744 per month or 2.6% per annum between 1995 and 2005. Moreover, one in five employed African women was a domestic worker, a well-known precarious job.

As stated in the South African government's Growth Path, in addition to high unemployment, the growth phase in the first decade of 2000 pointed to fundamental bottlenecks and imbalances in the economy, especially the dependence on the minerals value chain, including smelting and refining, which used huge amounts of electricity, leading to high carbon emissions intensity; weaknesses in the state's use of commodity-based revenue for economic diversification and skills development; limited energy capacity, resulted from weak investment in new generation capacity accompanied by increasing concerns over the cost of energy for the poorest households, among others.

In addition to the carbon/energy dimension, freshwater availability is also becoming a critical issue, with a 24% reduction in domestic freshwater capacity in less than two decades. South Africa faces a number of interconnected social and environmental challenges with important economic implications. Very often, the poorest are the most affected by them. They spend the highest share of their incomes on energy and food and are highly dependant on natural resources and ecosystems for food, fuel and income-generating activities. Climate change is aggravating this situation.

A major effort needs to be done to bridge these multiple objectives, all key for a sustainable development in South Africa: increase the amount of jobs available -in particular for young workers-, increase their quality and shift the economy from its energy-intensive growth model.

That's why the creation of green jobs has been identified by the South African government and the social partners as one of the main options to address these intertwined challenges.

Nonetheless current research on data on green jobs sectors is particularly scarce. Much more research is needed and social partners have to play its role improving this situation.

There is a glaring need to continuously monitor the growth of the green economy and to report green industries and jobs as a specific category within Statistics South Africa surveys. The most recent approximate data dates from 2006, while significant reforms have been implemented in especially 2008-2011.

In fact, the last years, a number of specific policies have been approved and implemented in the country in this regard. Supply of clean energy, in particular renewable energy production is one of the most developed areas. The fact that most of these policies have been decided in dialogue with workers, employers and other civil society stakeholders makes South Africa a unique country in terms of social dialogue. In fact, trade unions, business associations together with the government signed the so-called Green Economy Accord in 2011 and agreed with the goal of creating at least 300 000 green jobs by 2020 in a number of specific areas: installation of one million solar-water heating systems; promoting biofuels, promoting clean-coal activities, electrification of poor communities, promoting energy efficiency across the economy, through the promotion of cooperatives and youth employment.

South Africa already reports hundreds of thousands of green jobs, in wind and solar energy, biodiversity and ecosystems protection, public transport or waste management and recycling. However many more can be created. According to different estimations the potential for green jobs creation ranges from more than 400 000 in the formal economy by 2018 to more than 1 000 000 in the short term. The level of ambition in terms of policies and budget devoted will decide the final result.

At the same time, implementing green economy policies which deliver for South African people needs bold prioritization for real labour intensive projects that creates local jobs and local industries. Current renewable energy projects have to be reviewed in this sense.

Whether these new green jobs are of a generally better quality of the ones they replaced in the non environmentally friendly economy, would depend largely on improved enforcement of existing labour legislation. Green Jobs in construction for example will very likely face the same working conditions deficits: low wages, high accident rates, high level of subcontracting and high level of workers that are not covered by the social protection system.

There is a huge need for improving the quality of occupational health and safety data in these and other sectors, empowering and better resourcing OSH inspectorates, providing union representatives and workers in general training on occupational health and safety. The use of procurement could also bring on board OSH considerations to ensure the implementation of OSH rules and therefore the improvement in working conditions.

The current representation of women in some of the sectors to transform, such as, the energy, construction, water and transport sectors is low: 3.7% of the workforce is female in the electricity and water utilities, 4.8% in construction and 8.7% in transport.

Targeted policies include the upgrade of anti-discrimination laws and family-friendly programs (including a process to facilitate the certification of employment equity so that this becomes a condition of awarding tenders), the use of quotas and targeted schemes, specialised apprenticeship and training initiatives, and the increase of women union membership in the studied sectors .

According to NALEDI research, 91% Africans do not have access to medical aid, and rely on the poor public healthcare system. In sectors like construction, 84.9 workers do not have access to a health care plan, along with 66% in transport and 27.4 being the average in utilities like water and energy . This means that in order to ensure jobs created comply with the definition of decent work, it is key to broaden the implementation of a National Health Insurance Plan which would facilitate the health coverage of workers in this and other sectors.

The one area in which a decline in jobs might happen over the long term because it is driven by external factors (from global markets evolution to global demand in the context of a global response to climate change) is coal mining. Coal miners should therefore be targeted of just transition policies. Green Jobs opportunities should target there in particular along with social protection measures to ensure their protection at the transitional period.

Because most Green Economy reforms involve government, (national, provincial and local) government can use its leverage in procurement programmes and subsidies to insist on decent employment.

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