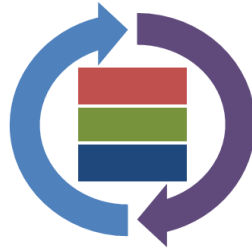


Towards a Green Investment Policy Framework - Case Study Series



FINANCING LOW-CARBON ENERGY FOR LOW-INCOME HOUSING:

The Case of Sassa's Low Pressure Solar Water Heater Clean Development Mechanism Programme, South Africa

*Prepared by Misuka Green Development and the Climate Finance
Hub*

This case study is part of the OECD project on Mobilising Private Investment in Low-Carbon, Climate-Resilient Infrastructure. The aim of the project is to assess and promote good practice policies that help countries encourage private sector investment in low-carbon climate-resilient infrastructure. The present case study, prepared by Misuka Green Development and the Climate Finance Hub, was developed for the OECD Roundtable Discussion on "Mobilising Private Investment in Low-Carbon, Climate-Resilient Infrastructure", 25 September 2012. It builds on the OECD paper "Towards a Green Investment Policy Framework: The Case of Low-Carbon, Climate-Resilient Infrastructure" ([COM/DAF/INV/ENV/EPOC\(2011\)4/REV2](#)).

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HOUSING:
THE CASE OF SASSA'S LOW PRESSURE SOLAR WATER
HEATER CLEAN DEVELOPMENT MECHANISM PROGRAMME,
SOUTH AFRICA**

November 2012

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LIST OF ABBREVIATIONS

BAU	Business as usual
BRICS	Brazil Russia India China and South Africa
CDM	Clean Development Mechanism
CEF	Central Energy Fund
CER	Certified Emission Reduction
CFL	Compact Fluorescent Lights
CO ₂ e	Carbon Dioxide Emissions
CoST	Construction Sector Transparency Initiative
CWP	Community Works Programme
DBSA	Development Bank of Southern Africa
DEA	Department of Environmental Affairs
DoE	Department of Energy
DWA	Department of Water Affairs
EE	Energy Efficiency
EPWP	Expanded Public Works Programme
ERPA	Emissions Reduction Purchase Agreement
FET	Further Education and Training (Colleges)
GDP	Gross Domestic Product
GEEF	Green Energy Efficiency Fund
GHG	Greenhouse gas
HDI	Human Development Index
IC	International Carbon
IDC	Industrial Development Cooperation
IEA	International Energy Agency
IPAP	Industrial Policy Action Plan
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
IRP 2010	Integrated Resource Plan for Electricity Generation 2010
ITC	Information, Communication and Telecommunications

JSE	Johannesburg Stock Exchange
LCR	Low-carbon climate resilient
MOU	Memorandum of Understanding
NAMAs	Nationally Appropriate Mitigation Actions
NBI	National Business Initiative
NCCR	National Climate Change Response
NCCR	National Climate Change Response White Paper
NDP	National Development Plan
NGO	Non-Governmental Organisation
NGP	New Growth Path
NMBM	Nelson Mandela Bay Municipality
NMMU	Nelson Mandela Metropolitan University
NRF	National Research Foundation
NSWHP	National Solar Water Heating Programme
OECD	Organisation for Economic Co-operation and Development
PICC	Presidential Infrastructure Coordinating Commission
PoA	Programme of Activities
PPP	Public Private Partnerships
RE	Renewable Energy
RTE	Real Time Energy
SABS	South African Bureau of Standards
SASSA	Solar Academy of Sub-Saharan Africa Pty (Ltd)
SB	Standard Bank
SESSA	Sustainable Energy Society of Southern Africa
SIPs	Strategic Infrastructure Projects
SWHs	Solar Water Heaters
UCT	University of Cape Town
UNFCCC	United Nations Framework Convention on Climate Change
VER	Voluntary Emissions Reductions
WEF	World Economic Forum

EXECUTIVE SUMMARY

South Africa's policy environment is moving through an especially dynamic period at present, with the publication of its first National Development Plan (NDP) providing a glimpse of the pathway to a new, low carbon, climate resilient economic future and a significant government commitment to funding a suite of large Strategic Infrastructure Projects (SIPs) on the immediate horizon.

This case study on South Africa contains within it a mini-case study that illustrates the potential for collaboration between the public and the private sector in the provision of low carbon, climate resilient infrastructure, namely the provision of renewable energy solutions to low income communities. Although first established under an energy security initiative, and subsequently driven predominantly by a social agenda, the public subsidy which underpins the project reviewed in the mini-case study resulted in effective delivery of solar water heaters (SWHs) to formal low income housing, thereby reducing the carbon profile of the sector. By supplementing the public subsidy stream for SWHs with climate finance – Certified Emission Reduction (CER) revenues generated through a Clean Development Mechanism (CDM) Programme of Activities (PoA) - the private sector was able to develop a rapid and extensive roll-out programme under which SWHs delivered are maintained for ten years.

Thus, the case study records an apparently successful and effective blending of public and private finance, with a high level of private participation in a low carbon infrastructure project with significant socio-economic co-benefits - the 800 jobs created as well as improved quality of life for over 80,000 households.

The issue of when, and to what extent, a public subsidy is justified, especially when it results in private profit-making, is a fundamentally important one. The initial assessment of the costs and benefits, including the evidence of local component and labour use, and of the income generation opportunities created for target communities, suggests that the public investment was largely justified - even if the direct carbon emission reductions achieved are modest when set against the overall emissions picture of South Africa's economy.

In addition, the case study shows the importance of political support, particularly from local municipalities under whose auspices the programme is rolled-out. Obtaining such backing at the initial scoping stages was critical in ensuring sufficient demand to justify investments in local manufacturing capacity.

The extent to which the private sector is attracted to low-carbon climate resilient (LCR) growth initiatives depends largely on the consistency and coherence in the policy framework (and of course, the right policy framework), and especially in the case of low income housing and other infrastructure initiatives, on the amount of capital government itself commits to LCR investments.

At the broader level, in spite of the raft of public policy initiatives and (new) attempts at national planning, a consolidated low carbon, climate resilient approach has not yet been built into the major strategies and priorities of the South African government, and much coordination and (re)prioritisation work must be done in order to transition to the environmentally sustainable, climate resilient, low carbon economy by 2030 as envisaged in the NDP.

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There is a residual, on-going inconsistency and fragmentation in the green economy agenda. The first NDP was developed after the key policies and strategies of government (such as the Integrated Resource Plan, the Industrial Policy Action Plan, the New Growth Path and the National Climate Change Response), which means that efforts to integrate sustainability issues across these different policies and strategies will be that much more difficult.

However, the South African government has indicated its commitment to long term infrastructure development with the establishment of the Presidential Infrastructure Co-ordinating Commission (PICC), the relatively large budget allocations (R845 billion) and the selection of the eighteen Strategic Infrastructure Projects. The creation of the PICC acknowledges the need to move away from a fractured way of dealing with infrastructure towards greater institutional coherence and collaboration, with a clear-sighted examination of barriers to efficiency and a greater commitment to monitoring, evaluation and accountability.

Looking ahead, and in terms of recommendations, the key considerations that should exercise the minds of policy-makers in South Africa include:

The South African government should provide a clearer, higher-level commitment to low -carbon climate-resilient infrastructure that should inform all public-led infrastructure projects from energy, to transport, to human settlements, to water, to agriculture and land use.

The South African government should also consolidate the disparate policies and initiatives into a green economy action plan that is managed and coordinated by the National Treasury or the Presidency and dealt with by a senior intergovernmental team.

The government should seek to sustain and replicate proven-to-be-successful projects, such as the Solar Academy of Sub-Saharan Africa Pty (Ltd) (SASSA) SWH project, at scale, and consider the implications for policy and strategy.

A key factor will be identifying climate finance opportunities at national and international level that could be accessed by like projects in the future. As the first CDM crediting period is set to close at the end of this year, attention has shifted to other potential climate finance mechanisms, notably Nationally Appropriate Mitigation Actions (NAMAs), which it is hoped will help to provide the support required by developing countries seeking a lower carbon development trajectory under the post-2012 climate finance regime.

Accordingly, the development of a national green financial architecture would contribute considerably in accelerating South Africa towards a green economy by attracting private and international development finance through some domestic public investment (such as the commitment to South Africa's new National Green Fund), thereby creating investor certainty, reducing barriers to scale and leveraging public procurement.

The government should also further develop regulatory schemes such as minimum energy efficiency standards for new and existing buildings in order to speed up the uptake of energy efficiency (EE) and renewable energy (RE) technologies and stimulate the associated domestic sectors.

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The government should also look to facilitate opportunities for public-private deliberation, collaboration and standard-setting, so that opportunities for private sector participation can be identified and barriers addressed. For example, South Africa should join the international Construction Sector Transparency Initiative (CoST) as soon as possible in order to diversify stakeholder engagement and to provide a new forum for standard-setting and consensus-finding.

Last, South Africa should implement a framework for carbon pricing, be it a carbon tax, a sectoral carbon-budgeting approach, or a combination of both. It is clear that National Treasury has now settled on its own view of the need to instigate a carbon tax, and plans to do so as soon as 2014. This will form a key part of the new policy environment going forward.

Ultimately, the key message to be taken from our analysis of South Africa's LCR infrastructure context and trajectory is that the country needs to de-link economic growth from its historical reliance on fossil fuels. Extension of the recently-initiated procurement programme of renewable energy in electricity generation, and political commitment to addressing the obstacles to achieving more efficient settlement patterns would contribute substantially to de-linking carbon and growth.

The first National Development Plan offers a glimpse of what such a future might look like, and the attendant trade-offs involved in such a transition, but there is much work to be done if the plan is to gather traction and provide a feasible blueprint for change. The case study points to some of the many policy and regulatory, as well as institutional, factors that will determine whether such a transition is achievable.

A deeper analysis of these factors is required to understand fully the opportunities and constraints that lie on the horizon, especially with regard to the substantial strategic infrastructure programme that South Africa is about to implement. Private sector participation in such programmes is essential, as the government recognises. Doing more to encourage such participation through concrete steps such as those outlined above, accompanied by a clear-sighted appreciation of how public investment can justifiably prompt private sector involvement, is essential if potential opportunities are to be grasped and obstacles to future initiatives overcome.

1. INTRODUCTION

This South African case study is part of a global look at the low-carbon climate-resilient (LCR) infrastructure environment, led by the OECD. The aim of the OECD project is to assess and promote good practice policies that help countries encourage private sector investment in LCR infrastructure. The work entails synthesis and analysis of policies and practices in OECD and non-OECD countries, with deeper insights drawn from case studies. This is one of a series of working papers and case studies that have been commissioned by the OECD which explore good practice in policymaking with a focus on implementation.

The case study touches on, and encompasses, three layers of South Africa's green economy 'onion': the outer layer is the over-arching macro policy and planning context and trajectory; the second layer is specific to infrastructure; the third, to energy provision in the low cost housing sector; and the inner layer, a specific project directed at providing low pressure solar water heaters (SWHs). This inner layer constitutes a mini-case study within the broader national case study; it provides an overview of the Solar Academy of Sub Saharan Africa's (SASSA) dedicated low pressure SWH Clean Development Mechanism (CDM) Programme of Activities (PoA).

SASSA's CDM programme was chosen because of its innovative business model, because it is driven by private sector actors in collaboration with municipalities, and because it has succeeded in rolling-out approximately half of the total number of low pressure SWHs delivered under South Africa's National Solar Water Heater Programme (NSWHP) to date.

From any perspective, it is a very good time to examine South Africa's position, as the country's policy environment is moving through an especially dynamic period at present, with the publication of its first National Development Plan (NDP) in 2012, which provides a glimpse of the pathway to a new, greener economic future and a significant government commitment to funding a suite of large Strategic Infrastructure Projects (SIPs) on the immediate horizon.

Accordingly, the paper seeks to contextualise the climate and infrastructure challenge in South Africa, which is intensified by such socio-economic factors as the country's fragile social contract and rising unrest from a largely unemployed and under skilled population.

This context, and the application of the OECD Policy Framework for LCR Infrastructure Investment to our findings from the mini-case study, allows the extraction of some important lessons about the strengths and weaknesses of South Africa's macro and micro policy environment, its institutional arrangements and the political economy of its decision-making.

A deeper analysis of these factors is required to fully understand the opportunities and constraints that lie on the horizon, especially with regard to the substantial strategic infrastructure build programme on which South Africa is embarking.

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What the case study as a whole suggests is that the climate agenda can be pursued as a co-benefit of other more prominent agendas – in this case, inclusive development and energy security (driven by power shortages). Those co-benefits helped overcome barriers created by fragmented regulations and lack of coordination.

The paper begins by setting out, in section 2, the broader climate and infrastructure challenge in South Africa. Section 3 contains the mini-case study on SASSA's low pressure solar water heater CDM programme, having first described the subsidy housing and electricity sector environment under which it was developed. Section 4 examines the range of institutional, policy, market, financial, strategic planning and policy alignment issues identified in the preceding sections in the context of the proposed OECD Policy Framework on LCR Infrastructure Investment. Section 5 seeks to address these issues with a set of analysis-based recommendations, which we hope will make a useful contribution both to South Africa's own policy and strategic planning deliberations and to the international debate. Section 6 sets out the paper's conclusions.

Earlier drafts of this paper were tabled at roundtable discussions which were convened in Cape Town, in partnership with the University of Cape Town's African Centre for Cities, and in Johannesburg in partnership with the Development Bank of Southern Africa (DBSA). In total these roundtables were attended by approximately sixty stakeholders ranging from government policy makers, to specialists from financial institutions, to civil society/think tank analysts, to representatives of the private sector - including a number of individuals involved in the CDM programme featured in the mini-case study.

2. THE CLIMATE AND INFRASTRUCTURE CHALLENGE IN SOUTH AFRICA

2.1 MOVING TOWARDS A LOW-CARBON, CLIMATE RESILIENT ECONOMY

South Africa is experiencing the effects of climate change similarly to other countries in the region and on the African continent. The existing and projected impacts include changing rainfall events and patterns with more frequent and longer periods of drought, heavy rainfall and floods, declining water resources, an increase in temperature that will also impact on agriculture, and an increase in frequency and severity of extreme weather events. Large parts of South Africa already have low and variable rainfall and a significant proportion of surface water resources are already fully allocated and so these changes could have enormous negative impacts on the economy which is structured largely around heavy water and energy users (mining and agriculture for example). Also, a large proportion of the population is poor with limited access to basic services and is thus exposed to disease, inadequate housing infrastructure and location, and the resilience of communities to respond to extreme climate events is low.¹

The National Climate Change Response White Paper (NCCR) was released in 2011, ahead of South Africa's hosting of COP17 in Durban in December 2011. The NCCR's twin 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

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Make a fair contribution to the global effort to stabilize 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.

The sectors targeted for particular attention in the NCCR are water, agriculture and forestry, health, biodiversity and human settlements with resilience to climate variability and climate change-related extreme weather events being the basis for South Africa's approach to disaster management².

2.2 THE SOCIO-ECONOMIC CONTEXT

South Africa is described as the powerhouse of Africa, being the most industrialised African country with a well-developed infrastructure. Industrialisation has relied heavily on South Africa's abundant supply of coal which provided a cheap source of energy with which to power the mining, manufacturing and agro-industries that form the backbone of the South African economy. While this has contributed largely to South Africa withstanding the various oil price shocks in the past few decades, assisted by an oil-from-coal programme by the domestic petrochemical giant, SASOL, it has also resulted in South Africa being on the top twenty list of carbon-emitting countries³. In fact, the electricity sector alone accounts for more than half of all South Africa's greenhouse gas (GHG) emissions. In addition, the above sectors are heavy water users in a country classified as water-stressed, and are particularly vulnerable to climate change.

In the eighteen years since democracy much progress has been made in dismantling the legacy of apartheid. The South African constitution is internationally benchmarked, socio-economic gains include increased access to housing and basic services such as electricity, water and sanitation, improved access to health care, a greater number of people in employment and a social security system that provides a safety net for the aged and most of the very poor.

However, these advances are matched by as many remaining challenges. Chief amongst them are increasing income inequality, very high levels of unemployment and very high levels of poverty. South Africa's unemployment rate is officially 25.3%⁴, with unemployment amongst youth being especially high at about 42 percent. While the Human Development Index (HDI) has steadily improved since 1995 and was at 0.60 in 2010 (ranked 110 out of 169 countries), income inequality is vast and increasing. In 2008 the gini coefficient was 0.70, indicating South Africa as the most unequal income distributions in the world. 42.9% of South Africans have less than \$2 a day to live on and can be considered to be poor, with the majority of the poor being black South Africans.⁵

South Africa's NDP, released in August 2012, was informed by a diagnostic report which indicates the nine primary development challenges as being:

1. High unemployment
2. Poor quality of school education for black people
3. Infrastructure is poorly located, inadequate and poorly maintained
4. Spatial patterns working against inclusivity
5. A resource intensive economy
6. A public health system that doesn't meet demand nor sustain quality

7. Public services are uneven and often of poor quality
8. High levels of corruption and
9. South Africa remains a divided society⁶.

South Africa is a signatory to many international environmental conventions and has committed to reducing carbon emissions by 34% below business as usual (BAU) by 2020 and 42% by 2025. It is difficult, however, to translate these commitments into a clear, coherent and core part of the country's growth and development strategy, especially when poverty, unemployment and income inequality are so stark. A major challenge therefore is the balancing of inclusive economic growth and development with a climate resilient, low carbon economy. Jobs and growth are the cornerstones of both the New Growth Path (NGP) and the recently published NDP, and most government policy and strategy reflects urgency in addressing these challenges as opposed to seeking an integrated 'green economy' approach to development. However, an inherent, fundamental tension exists between the objectives of transitioning to a low carbon economy, and the intense socio-economic pressures which are perceived to be more of a priority that should not be 'sacrificed' especially since the present carbon based economy necessitates higher levels of fossil fuel-based energy for higher levels of growth (and therefore a higher carbon foot print).

2.3 PLANS, PATHS AND INFRASTRUCTURE

The National Development Plan (NDP), launched in August 2012 is an attempt to advance a multi-dimensional approach to development, advocating strong leadership, active citizenry and effective government to improve the country's future. A whole chapter is dedicated to 'Environmental Sustainability – an equitable transition to a low-carbon economy', however there is an obvious struggle to balance the perceived trade-offs between environmental sustainability, growth and jobs, with the other chapters barely considering green growth or climate change issues.

The NDP asserts that: "South Africa needs to invest in a strong network of economic infrastructure designed to support the country's medium and long term economic and social objectives. This economic infrastructure is a precondition for providing basic services such as electricity, water, sanitation, telecommunications and public transport, and it needs to be robust and extensive enough to meet industrial, commercial and household needs."⁷ The plan makes recommendations to improve infrastructure regulation, lists the key energy policy and planning priorities and considers the trade-offs in planning South Africa's future energy mix.

Similarly, the New Growth Path (NGP) announced in 2010 sets out the goal of 5 million new jobs by 2020 and identifies a range of structural economic problems that need to be addressed. It also identifies various jobs drivers i.e. opportunities in specific sectors and markets, with infrastructure being the first jobs driver identified. This year the South African government adopted an infrastructure plan that sets out how government intends using infrastructure to create jobs, reduce unemployment and improve growth and the provision of basic services. An expansion in infrastructure investment continues to be a central plank of the government's budget, with infrastructure identified as the first of six levers of economic change.

The 2012 budget emphasises both the need to adequately fund infrastructure as well as improve the planning, implementation and monitoring of infrastructure projects. Over the three-year medium-

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term, about R845 billion has been allocated for infrastructure of which R300 billion is in the energy sector and R262 billion is for transport and logistics.⁸ Infrastructure initiatives are funded through direct fiscal allocations, through public entities such as the national state-owned electricity generating utility company Eskom, development finance institutions such as the Development Bank Southern Africa (DBSA) and the Industrial Development Cooperation (IDC), and private sector investment. In terms of private sector investment, the most notable include the recent procurement of 1200MW of renewable energy through independent power producers (IPPsⁱ), construction and operating concessions in industrial development zones, private airline operators and telecommunications.

In addition, the role of the private sector in the implementation of government's policies and strategies is acknowledged as critical. In his 2012 Budget Speech, the Minister of Finance, Pravin Gordhan, stated that: "...the private sector investment plays a substantial role in several sectors", listing the private sector as one of five ways to fund the identified major infrastructure projects.⁹ Despite a significant budget allocation, the challenges with infrastructure include inadequate investment levels and weak implementation capacity that cause significant delays and cost overruns, particularly at local government level. Other contributing factors are poor project planning, the misalignment of some strategic infrastructure projects with national priorities, poor coordination amongst government agencies and spheres of government (national-provincial-local) as well as insufficient communication and partnerships between government and the private sector.

As a response to the above set of issues, a high-level commission on infrastructure - the Presidential Infrastructure Coordinating Commission (PICC) - was formed with a mandate to ..."ensure systematic selection, planning and monitoring of large projects". A single, common infrastructure plan was developed, key players were identified in order to enable monitoring and accountability, and a twenty year planning framework was established to avoid the stop-start patterns associated with the electoral cycles. The objectives are articulated as:

- i. Identify five year priorities
- ii. Develop a twenty year pipeline of projects
- iii. Pursue the development objectives of skills, localisation, empowerment and research and development
- iv. Expand the maintenance of both new and existing infrastructure
- v. Address capacity constraints and improve coordination and integration
- vi. Improve infrastructure links especially in rural areas and the poorest provinces
- vii. Scale up investment in infrastructure
- viii. Address the impact of prices
- ix. Support African development and integration.

ⁱ The Aim of the IPP Programme is to procure MW3725 through 5 bidding rounds, with job creation and socio-economic and local content weighting ranking very high (30% of the total) in the evaluation of bids. In the first two rounds completed, round 1 procured MW1416 with 28 successful bidders and round 2 procured MW1043.9 with 19 successful bidders. Overall, the IPP Programme is expected to attract investments of around R100 billion between 2012 and 2016.

Following a spatial analysis of the country's needs, the PICC identified eighteen Strategic Infrastructure Projects (SIPs) covering a range of economic and social infrastructure across all nine provinces. These projects include sectors such as communication, regional, municipal, spatial corridors and urban space, and public transport. The energy, water, transport and information, communication and telecommunications (ICT) infrastructure have been identified in the NDP as the key sectors that should be targeted. As a key agency that would assist with implementation, the DBSA has prioritised supporting the implementation of national and regional infrastructure plans with priority areas identified as being renewable energy, industrial development zones, partnerships with state-owned enterprises and municipal infrastructure.

Although there is an explicit intention expressed to contribute to a green economy in the 'enabling socio-economic' projects, the infrastructure plan does not indicate GHG emissions reduction as a specific objective. With a myriad of priorities, reducing poverty and inequality ranks highest, and the LCR agenda struggles to move up the rankings. Cloete and Venter (2012), in their input paper to the NDP, state that "there is little evidence that government considers the risk of carbon lock-in, or broader sustainability issues, when making infrastructure investment decisions"¹⁰.

2.4 THE CLIMATE CHANGE AND INFRASTRUCTURE CONTEXT

South Africa's infrastructure roll-out to date was intended to shift large numbers of people out of poverty, but was planned and implemented without acknowledgement of the interdependencies amongst people, environment and infrastructure, thus resulting in poor alignment to the underlying social, ecological and financial context.

The links between climate change and infrastructure in South Africa began to slowly emerge in the run up to COP17 in Durban, December 2011, with the acknowledgement that both the existing and planned infrastructure will be impacted upon by climate change. Over and above the obvious impacts of extreme events on infrastructure, other uncertainties related to climate change include:

- "those related to the impacts of climate change on infrastructures, leading potentially to service disruptions and damage to infrastructure;
- uncertainties related to the carbon intensity (building and/or operation) of infrastructures, ultimately influenced by the price of fossil fuels and the price of carbon;
- those dealing with the technologies progressively developed to address both carbon emission reduction and adaptation challenges; and
- the socio economic determinants, like the amount of GHG emitted in the future or the capacity of societies to adapt".¹¹

Temperature variations and rainfall patterns and increased frequency and intensity of storms, for example, will have an impact on critical infrastructure such as roads and rail, as well as on water quality and quantity in reservoirs. Climate change impacts will push up maintenance costs and reduce the lifespan of existing infrastructure, as well as change how future infrastructure planning and management should be done. The predicted increased water shortages and increased energy and water costs will impact particularly hard on poor households, but also on the agriculture, energy, mining and manufacturing sectors; the core sectors driving the economy.

In an effort to promote inter-sectoral and multilevel coordination and move away from a piece-meal and sometimes contradictory approach within the public sector, different inter-governmental forums have been created - an inter-governmental green economy environmental team led by the Department of Economic Development, and two Department of Environment Affairs-led committees viz. (i) Intergovernmental Committee on Climate Change (IGCCC) which is made up of national, provincial and local government; and (ii) the National Committee on Climate Change (made up of government representatives, as well as civil society, NGOs, business, labour representatives). Two of these are government focussed and the DEA National Committee on Climate Change seeks to consult more broadly with the private sector, NGOs and other stakeholders. The forums all have the ultimate aim of finding ways to mainstream climate change and other environmental factors into policy and strategy.

3. CASE STUDY DETAILS: SUBSIDY HOUSING AND SASSA'S CDM POA

3.1 THE SUBSIDY HOUSING BACKGROUND

Two key thrusts of government policy aimed at protecting the poorest from severe deprivation in the context of intractably high unemployment levels are:

- a. the extension of social assistance or grant payments; and
- b. the provision - principally in urban areas - of free housing and basic services.

The proportion of government expenditure allocated to social spending in the 2012-13 National Budget is 58%; up from 49% a decade ago, and the number of social grant beneficiaries is estimated at 15.6 million (over 30% of the country's population)¹².

The level of rural-urban migration in South Africa has remained high, largely exceeding the substantial rate at which formal housing has been provided. This has resulted not only in the continuing growth of informal settlements, but has also entrenched the practice of erecting make-shift dwellings in the back yards of many of the formal subsidy housing units provided. Rapid extension of basic infrastructure services to informal settlements has resulted in comparatively high overall rates of utility provision: 97.7% of households have access to clean water, 82% have access to sanitation and 75.8% to electricity¹³.

Government's subsidised housing programme rests on the concept of home ownership rather than tenancy. Capacity constraints at municipal level (in terms of providing maintenance and the ability to collect payment for state-provided services from beneficiary communities) arguably militate against the provision of rented social accommodation - although renewed attention has been paid to this model of late. The ownership model was also informed by a strategic anti-poverty rationale: providing poor households with a dwelling as an initial urban asset base would position them to build on this base and escape poverty in the medium term¹⁴.

The aggregate number of state-subsidised houses completed since 1994 is thought to lie in the vicinity of 3 million, but several factors contribute to the difficulty of calculating this figureⁱⁱ. It is estimated that at present about 25% of the housing units listed at the deeds registry resulted from government's subsidy programme, but that if the subsidy units not yet registered are taken into account, this ratio would increase to about 40%¹⁵. This illustrates the scale of the state subsidy programme's contribution to the national housing stock, and hence the substantial opportunity it represents for incorporating energy efficiency and renewable energy into the nation's infrastructureⁱⁱⁱ.

A somewhat late increase in subsidy levels has made it possible to raise the average size of housing units from about 30m² to 40m² or more. The building specifications, however, remain very basic and result in poor thermal performance. With few exceptions, subsidy houses are erected on stands averaging 220 - 250m², in detached rows, and mostly located on peripheral urban land following a model first established under apartheid. As the NDP points out, this exacerbates social inequalities and economic inefficiencies.¹⁶

A more integrated higher density model would not only start to redress these problems, it would also reduce the resource intensity of building, operating and maintaining service infrastructure. Perpetuation of this model can be explained by a number of factors:

- The existing subsidy housing supply chain's preference for a continuation of business as usual - explainable in part by the capacity constraints it faces.
- The importance to recipients of obtaining a stand-alone structure on a plot of land large enough to not only build future extensions, but to erect one or more often make-shift backyard dwellings in the short term which will generate income or accommodate extended family members.
- The absence of mechanisms to release sufficient quantities of state and privately owned land closer to social and economic facilities.

3.2 ENERGY EFFICIENCY AND SOLAR WATER HEATERS

The exemplar Kuyasa Clean Development Mechanism (CDM) project involved retrofitting 2,309 low cost houses in Khayelitsha, Cape Town, with solar water heaters (SWHs), ceilings, compact fluorescent lamps (CFLs) and basic enhancements to their electrical and plumbing systems. It was Africa's first CDM, as well as the world's first CDM Gold Standard project^{iv}, and it contributed to the

ⁱⁱ SERI's (Socio-Economic Rights Institute) 2011 Resource Guide to Housing in SA 1994-2010 lists these as:

- Many of the houses built under the state's subsidy schemes are not yet recorded in the deeds registry.
- Housing subsidy approval data is incomplete and hard to correlate with house construction data
- Subsidies have also financed the transfer of existing units from the state to their occupants.

ⁱⁱⁱ It also highlights the fact that that approximately half of the programme's beneficiaries do not currently have full title to their homes.

^{iv} A standard developed in 2003 and open to any non-government community-based organization for projects which focus on RE or EE. It emphasizes the need to make a positive contribution to the economic, environmental and social welfare of target populations.

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establishment of suppressed demand as a methodology under the CDM^v. Kuyasa's mission was to establish a facility that would leverage and manage access to additional upfront financing which is required for the incremental capital costs of sustainable energy interventions in low income housing and the pilot proved the viability of the pay for service model to the installation of SWHs in low income housing¹⁷.

The project demonstrated that the benefits of its interventions were threefold:

- 1) environmental - reducing carbon emissions and raising awareness around energy efficiency and environment-energy linkages;
- 2) social welfare - improved respiratory health, access to hot water and household savings on energy; and
- 3) economic - local job creation through installation and maintenance of the technologies.¹⁸

A string of other subsidy house SWH and/or energy efficiency (EE) retrofitting initiatives were subsequently launched across a number of provinces. A retrofitting initiative in Cato Manor, Durban, which was launched ahead of COP17, is now selling voluntary emissions reductions (VERs). More recent pilot projects - such as Joe Slovo 3 in Cape Town - have sought to demonstrate the substantially greater impact achievable through integrating energy efficiency into the design of government's social housing build programme than that attainable through comprehensive retrofitting^{vi}. These initiatives have drawn attention to the potential contribution of the subsidy housing sector to achieving a low carbon development trajectory and to the social and economic benefits of such interventions.

3.3 THE 'ELECTRICITY CRISIS' AND THE NATIONAL SOLAR WATER HEATING PROGRAMME

In 2008, following a period during which electricity consumption increased substantially and no new generation capacity came on stream, power rationing and rolling blackouts became necessary to prevent the network from collapsing. This created greater impetus for the deployment of measures aimed at curtailing electricity use and resulted in a range of initiatives of which the National Solar Water Heating Programme (NSWHP) - initiated in 2008 – is one. The NSWHP divides households into a low, middle and high income segment and sets roll-out targets for each to achieve government's overall objective of 1 million SWH installations by 2014^{vii}. It is, though, more usefully viewed as a two-pronged programme – consisting of a low pressure subsidy scheme for low income households,

^v Whereby the baseline is calculated using an estimate of the increase above current levels of anthropogenic emissions which would arise were certain context-specific barriers to increased consumption removed

^{vi} Still others - such as the ABSA-sponsored Eric Molobi Housing Innovation Hub in Shoshanguve, Gauteng, or the DHS/NHBRC Legacy Project in Blue Downs, Cape Town – have sought to show-case accredited innovative and alternative building techniques and materials. Several of these demonstrate either structural, cost, ease of assembly, or thermal advantages relative to conventional methods.

^{vii} These segments are defined as follows:

- High-income (over R 16,000/month); ⁺/ 1.2 m households; 210,000 HP SWHs by 2014 and 560,000 by 2020.
- Middle-income (R 6,000 to 16,000/month) ⁺/ 3 m households; 450,000 HP SWHs by 2014 and 1,750,000 by 2020.
- Low-income (below R 6,000/month); ⁺/ 6.6 m households; 340,000 LP SWHs by 2014 and 2,690,000 by 2020.

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and a high pressure rebate scheme for mid to high income groups. The amount of subsidy provided under both schemes for the various SWH systems which have been approved is based on their thermal performance, and thus the amount of electricity demand which they are theoretically capable of replacing^{viii}.

Eskom was mandated to manage the subsidy schemes^{ix}, and although funding for both was until recently collected directly by Eskom as a levy on electricity sales, the low pressure SWH subsidy is now funded out of general government receipts and transferred to Eskom for disbursement^x. It can therefore be argued that the low-pressure subsidy scheme has become an extension of government's subsidised housing programme.

Although this aspect appears to have attracted limited attention, the large scale provision of SWHs to households which have not previously had conventional electric geysers does present an opportunity to leap-frog them onto a newer technology, making it a preferred option should they be faced with a choice in future. In this context, reliability of the units and job opportunities linked to their installation and maintenance take on added importance.

In aggregate, electricity use attributable to water heating represents the single largest component of domestic consumption. Although this component varies significantly seasonally and between income groups in South Africa, being lowest among the poor, government's massive residential electrification programme continues to provide grid connection to large numbers of low income households which presently have no electric geysers - thus creating a huge potential for future demand growth.

The Sustainable Energy Society of Southern Africa (SESSA), which through its SWH Division acts as the industry body, has cautioned that a subsidy system alone would not guarantee the achievement of government's SWH installation targets and argues for a comprehensive package of supportive measures, including the introduction of a carbon tax¹⁹.

Government has been slow to introduce regulatory incentives in support of the industry, but in November 2011 introduced energy efficiency standards for new buildings and extensions to existing buildings which stipulate that as of May 2012, 50% by volume of annual water heating requirements must be provided by sources other than electric resistance heating. Enforced effectively and followed up with the introduction of similar requirements for existing buildings, such regulatory

^{viii} High pressure systems are generally installed as replacements for electric resistance geysers, and low pressure systems predominantly where none was present; hence, the latter hold limited prospects for achieving actual electricity demand reductions in the near term - which may explain the relatively modest initial roll-out target set for this programme.

^{ix} Doubts have been expressed about the appropriateness of this choice in the longer term due to the conflict of interest which could arise from trying simultaneously to maximise revenue and reduce demand. It is broadly accepted as a shorter term solution in light of the generation capacity shortfalls it currently faces and the absence of a suitable extant alternative.

^x The Sustainable Energy Society of Southern Africa (SESSA), which through its SWH Division acts as the industry body, has cautioned that a subsidy system alone would not guarantee the achievement of government's SWH installation targets and argues for a comprehensive package of supportive measures, including the introduction of a carbon tax.

intervention may prove to be a key factor for achieving large scale SWH and other EE technology roll-out.

Figures released by the DoE²⁰ show that as of May 2012 a cumulative total of 281,000 SWHs had been installed – less than 30% of the 2014 target. Of these, the NSWHP had resulted in 27,950 high pressure units being installed (a paltry 4% of the combined middle and high income segment targets) and 138,095 low pressure units (just over 40% of the low income segment target).

In September 2012 Eskom revealed that it was working closely with government on reviewing the programme in order to achieve the sub-objectives of job creation, local manufacturing stimulation and a more equal geographical spread of the technology across the country. It also announced that it was in the process of introducing a preferential rebate for systems with higher local content. Given that no SWH on the South African market is 100% domestically manufactured, the level of local content required to qualify for this rebate must be determined. Eventually, SWHs not meeting this level would cease to be eligible for subsidies under the programme²¹. In parallel, Eskom is negotiating an initiative with the South African insurance industry to facilitate the replacement of burst conventional electric geysers with more energy efficient alternatives.

3.4 SASSA'S LOW PRESSURE SOLAR WATER HEATER CLEAN DEVELOPMENT MECHANISM PROGRAMME OF ACTIVITIES^{xi}

3.4.1 Background

The Solar Academy of Sub-Saharan Africa Pty (Ltd) (SASSA) was registered in South Africa in 2007 and is the sole distributor of the TASOL brand^{xii} in South Africa, trading under the name 'TASOL'. In 2008 SASSA funded an extension to the Nelson Mandela Metropolitan University's (NMMU) Renewable Energy Test Centre which focuses on product testing and development, and on establishing training programmes for the sector. SASSA was the first company in South Africa to obtain South African Bureau of Standards (SABS) approval for an evacuated tube SWH system and the first in the world to register a CDM Programme of Activities specifically for low pressure SWHs.

To date, SASSA has been awarded contracts to supply low-pressure SWHs to a number of municipal/provincial projects targeted at low income housing (in Nelson Mandela Bay, Ekurhuleni, City of Johannesburg, Cape Winelands and the Free State). SASSA has also provided high pressure systems for a range of other initiatives (in Ekurhuleni, Hesequa, Western Cape and to the Central Energy Fund's (CEF) SWH pilot roll-out programme). Its most innovative project to date has been registering the first ever dedicated low pressure SWH CDM PoA, which is the focus of the case study.

^{xi} Much of the data assembled during the information gathering phase of the mini-case study was sourced through desk top research as SASSA demonstrated reluctance to impart information. The company provided much of the information necessary to corroborate key aspects of the CDM programme identified through public documents during the final consultation phase. However, it should be noted that only limited information on the Emissions Reduction Purchase Agreement - which is an important element of the programme design – was disclosed on the basis that many aspects of the agreement were considered confidential.

^{xii} TAGEX - a German company which specialises in belt drives, chain drives and rubber tracks – launched a range of solar energy products under the brand name of TASOL in 2005

3.4.2 Objectives of the SASSA CDM Programme

The stated objectives of SASSA's CDM programme are to:

- Provide sustainable hot water solutions to communities by developing a maintainable programme
- Free capacity on the Eskom National Electricity Grid
- Provide alternative solutions to municipal service delivery
- Contribute to job creation through local manufacturing and community-driven projects
- Contribute to the socio-economic development of communities
- Support the roll-out of 1 million SWHs by 2014 as mandated by the Department of Energy
- Reduce greenhouse gas emissions and mitigate climate change.

3.4.3 Key features of SASSA's CDM programme

- **Business model:** The subsidy supplied by Eskom covers the unit cost of SWHs, their installation and some associated costs; whilst CER revenues cover community engagement, monitoring and verification (M&V) plus maintenance for 10 years and enhance project profitability. Crucially, the ten year CDM crediting period means that the private sector project owner has a contractual incentive, because of the ERPA, to provide maintenance over the same period.
- **Traction/scale:** Between its inception in July 2010 and May 2012 the programme succeeded in rolling-out over 80,000 units (on average close to 4,000 per month). The programme is envisaged to achieve the installation of 248,000 units within about 3 years across the country
- **Community job creation:** Since inception the programme has created employment opportunities for approximately 800 people.
- **Local Content:** Thanks to the establishment of an in house low pressure tank manufacturing facility which employs 44 workers, SASSA is now able to source all components for its low pressure SWHs locally, with the exception of the evacuated glass tubes which it imports from China.
- **Strong private sector participation:** SASSA as project owner, SWH manufacturer and supplier; Standard Bank (SB) as the ERPA counterpart/CER off-taker;

Timeline

August 2009	SASSA's LP SWH receives initial SABS approval
October 2009	Eskom notification that LP SWH subsidies based on thermal performance
March 2010	SASSA and IC agree to develop a CDM PoA + SASSA applies for Eskom subsidy
April 2010	MoU between SASSA and NMBM signed
May 2010	Term sheet on carbon/ ERPA + 1st CPA signed with SB + JCI appointed to perform PoA Validation
July 2010	SABS tests completed Agreement between SASSA and RTE signed + <u>Start of installations</u> + Onsite audit
July 2010	MoU between SASSA and Eskom signed.
Nov 2010	Letter of Approval
Dec 2010	Final Validation Report
Jan 2011	Registration request to UNFCCC
April 2011	UNFCCC Registration
May 2011	45,000 units installed
Sept 2011	2nd CPA design document prepared
Oct 2011	Start of validation of 2 nd CPA
March 2012	2nd CPA registered
Oct 2012	Validation of 2nd CPA starts + First verification commenced
ERPA: Emissions Reduction Purchase Agreement	
CPA: CDM Project Activates	

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International Carbon (IC) as CDM cycle manager; Real Time Energy (RTE) as data capture service provider; and a range of installation and maintenance service providers.

3.4.4 Stakeholder mapping

1. Key private sector project participants:
 - SASSA - managing entity/project owner
 - Standard Bank – ERPA counterpart/CER off-taker
 - International Carbon - CDM cycle manager
2. Operational private sector project participants:
 - Various installation and management companies
 - Real Time Energy (RTE) - data capturing company
3. Strategic project partners:
 - Nelson Mandela Bay Municipality (NMBM)– political support at various levels
 - Nelson Mandela Metro University (NMMU) – collaboration on product testing and establishment of training programmes
4. Government and state-owned entities
 - Department of Energy - Designated National Authority (DNA)
 - Eskom - administrator of the rebate scheme
 - Industrial Development Corporation (IDC) - bridging finance provider
 - Other municipalities and provincial departments – political support
 - South African Bureau of Standards (SABS) - SWH system tester and approver
5. Communities receiving TASOL SWHs :
 - Beneficiaries of energy service delivery, and/or
 - Beneficiaries of training and job/income generation opportunities.

3.4.5 Key success factors and barriers for achieving private sector participation

Six key success factors for SASSA's CDM programme appear to be:

1. The impetus provided for the introduction of electricity demand side management initiatives by the shortfall in electricity generation capacity, and the consequent provision of state subsidies for SWHs.
2. Awareness of the socio-economic benefits created by the provision of SWHs to South African low income households by a succession of demonstration projects over the past decade.
3. Application under Eskom's demand side management programme of subsidy levels for low pressure SWHs greater than those justified by the actual reduction in electricity demand they are anticipated to achieve.

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4. Political support in the form of a strategic partnership with NMBM, and the letter of approval obtained from the Department of Energy (the Designated National Authority).
5. The provision for a suppressed demand methodology under the CDM which enables energy efficiency projects aimed at the poor to generate more CERs than the actual energy demand they displace.
6. Protection of the project's CER revenues against the recent weakness in carbon markets by means of an Emissions Reduction Purchase Agreement (ERPA) which provides a floor and ceiling price for CERs.

The three main barriers to greater roll-out at scale were identified as follows:

1. Uncertainty about future domestic subsidy streams which will be available, both per unit and at programme level.
2. Closing of the first CDM crediting period at the end of the year, and a lack of clarity on whether it is to be revived in a revised format or replaced by other international finance mechanisms.
3. The poor build quality of a proportion of low cost houses, which means that the roof structure is not strong enough to support a SWH.

3.4.6 Costs and Benefits

Costs	Benefits
Seen solely from the viewpoint of reducing the load on the national grid, the relatively high per unit subsidy levels for LP SWHs do not appear to be justified. ^{xiii}	As the CDM PoA has a crediting period of 10 years, SWH maintenance will be assured over the same time span - twice as long as the warranty period stipulated by Eskom
As water heating becomes cost free and convenient, beneficiary households may use greater quantities of water than previously. However, such increases are likely to be limited by the fact that once they exceed the basic free quantity of water supplied by the state, households will have to pay for added consumption.	Poor households who receive SWHs under the project will be able to make use of more heated water than they were previously able to afford, improving their quality of life.
	To the extent that households heated water prior to being given a SWH, they will realise savings not only in electricity consumption, but also in terms of other fuels which may have been used to heat water. Although taken together these savings may be small in the national context, they can be significant in the context of the household's budget.
	Where biomass or paraffin were previously used to heat water, health benefits will also accrue to households from no longer breathing in the smoke such fuels generate.
	Jobs and income generation opportunities created for community members.

3.4.7 Replication

The economics of SASSA's low pressure SWH CDM PoA rely on the availability of a substantial grant funding stream and on higher carbon price levels than those which currently apply²². This implies that under current carbon market conditions, either a higher level of state funding, or an alternative source of climate finance would be required to make such a programme attractive to private sector

^{xiii} However, the immediate energy service delivery, health, safety and job creation benefits which are expected to accrue from their installation, coupled with their potential longer term contribution to reducing carbon intensity in the residential sector, arguably outweigh this concern.

players. Given that both are presently uncertain, immediate prospects for replication in South Africa appear limited.

As the window for registering new programmes under the first crediting period of the CDM closes at the end of 2012, attention is now shifting to other potential climate finance mechanisms - notably Nationally Appropriate Mitigation Actions (NAMAs). It is anticipated to provide the support required by developing countries committed to achieving a lower carbon development trajectory under the post-2012 climate finance regime.

4. TESTING (ELEMENTS OF) THE PROPOSED POLICY FRAMEWORK FOR LCR INFRASTRUCTURE INVESTMENT

4.1 STRATEGIC GOAL SETTING AND POLICY ALIGNMENT

South Africa now has a clear long-term vision for building infrastructure and responding to climate change, contained within the final draft NDP that was published by the National Planning Commission in August 2012 and the NCCR published in 2011. However, not only does the NDP still have to go through Cabinet, with uncertainty about the extent to which its proposals and recommendations will come to be part of government's future programme, but there are pre-existing policy and budgetary commitments which although containing a number of promising elements, are far from being fully aligned and indeed contain a number of contradictory implications.

Infrastructural development is now a high priority within South Africa's economic development strategy, perhaps *the* highest priority. There is no expressed commitment or prioritization in either the PICC's planning thus far, or within the eighteen SIPs towards building resilience for a transition to a low carbon economy. Two energy SIPs are directly related to LCR growth: green energy in support of the South African economy and electricity generation to support socio-economic development, in accordance with the IRP2010, which indicates a commitment to low carbon energy and electricity transmission and distribution for all respectively. These SIPs speak directly to both the NCCR white paper and the NDP, translating the intentions and commitments therein to implementable programs that are driven directly from the Presidency, with the requisite political and financial commitments – a significant opportunity to cement South Africa's intentions in this regard and to set new standards for the future.

The NCCR provides an overall clear framework for South Africa's response to climate change, and asserts that climate-resilient development will be mainstreamed across government within two years, requiring all government departments and agencies to review their policies and practices. However, there is no explicit over-arching strategic commitment to maximizing the low carbon potential for new infrastructure projects. Instead, there is piecemeal acknowledgement of how, for example, regulation of commercial and residential building standards can serve to encourage residential energy efficiency and a generalized statement of intent in relation to low carbon public transport.

Equally, neither the NDP nor the IRP, which defines South Africa's energy mix for the next twenty years, offers anything other than a modest glimpse of the transitional potential that low carbon infrastructure could provide while, moreover, both plans accept that much new infrastructure must be in service of the coal industry – both for export purposes and domestic use and/or beneficiation.

Carbon pricing of some sort is undoubtedly on the way, but it is not yet resolved as to whether this will be in the form of a carbon tax – as Treasury appears to favour – or by some other instrument, such as sector specific carbon budgeting.

Governmental attitudes have undoubtedly shifted markedly in the past year, partly prompted by COP17; a critical political mass is within reach. The government is now grappling with how to link the dots, as it struggles to balance the urgent need for inclusive economic growth and job creation with a perceived longer-term approach to low carbon resilience. But its attempts to do so are hampered by the contradictions between some of the key policy documents, and a major sequencing problem – in that many of the key strategic choices, such as on the energy mix and on demand assumptions, have already been made.

Stakeholder engagement with this intricate policy arena is complicated further by the political economy of decision-making in South Africa, whereby much of the key data is produced and controlled by vested-interest holders such as the state-owned electricity company, ESKOM. Accordingly, lobby groups such as the Energy Intensive Users Group (of industry players) can secure privileged access to decision-makers. The intensity of the socio-economic context, with high unemployment and growing political unrest from poverty-stricken communities, means that unless those in favour of a new path can present a compelling, data-backed transitional narrative, a risk adverse institutional culture within other key departments such as the DoE is likely to prevail. Currently, such a narrative is conspicuous by its absence, notwithstanding the NDP's elegant articulation of the trade-offs that must be wrestled with if South Africa is to escape its current dependency on coal.

In terms of the SIPs, there is widespread concern about corruption and the capture of state public procurement processes by politically well-connected 'tenderpreneurs'. There is, therefore, a need to take preventative steps, such as joining the international Construction Sector Transparency CoST, that would serve the goal of public accountability and which would also provide a new space for a wider range of stakeholders to advance fresh thinking on new standards of conduct, including low carbon targets in public infrastructure projects.

4.2 ENABLING POLICIES FOR COMPETITIVE AND OPEN MARKETS: INCENTIVES FOR GREEN INVESTMENT

A limited number of carbon-related taxes have already been introduced in South Africa, such as a departure tax for air passengers and a carbon emissions tax on passenger vehicles. Perhaps the most significant to date has been the levy on electricity generated from non-renewable sources, the revenue from which is used to fund a suite of electricity demand management initiatives among which is the NSWHP. This has enabled a significant subsidy stream to be directed at supporting energy efficiency investment in buildings.

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In its 2012 Budget the National Treasury announced that it would be publishing a paper for comment on the proposed introduction of a tax on CO₂e emissions. The tax would be based on emissions exceeding a percentage rather than an absolute emissions threshold, would be phased in incrementally, and would make allowances for those sectors with limited ability to reduce emissions in the short term as well as those deemed to be trade-exposed. Companies would be allowed to use offsets to reduce their carbon tax liability.^{xiv} The tax rate put forward is of R120 per ton of CO₂e produced above the applicable threshold and its introduction is proposed for the 2013/14 financial year. Annual increases of 10% would be applied until 2020. As a transitional measure, temporary exemptions are contemplated for certain sectors.²³

Another policy framework being considered as an alternative and/or complement to the proposed carbon tax is that of sharing the 'national carbon budget' (as determined by the commitments South Africa has made to the UNFCCC) among the various sectors of the economy, thus setting a budget for each. This would involve extensive consultation and negotiation with all the major players in order to set the budget for every sector by assessing the low carbon options open to each. The trajectory of such budgets would be determined by that of the overall national carbon budget, and thus provide a predictable framework within which economic actors can begin to examine life-cycle costs of infrastructure projects – just as would the proposed structure for introducing a carbon tax.

In both cases, monitoring and effective enforcement would necessitate establishing a body with the necessary authority and capacity.

The International Energy Agency (IEA) recently estimated that over USD 8 billion in subsidies were channelled to supporting fossil fuel-based consumption in South Africa – the primary beneficiary of which was national electricity generator, Eskom. Whilst it is important to recognise that the provision of free basic electricity to low-income households makes a significant contribution to this figure, the world-topping cost of Eskom's new-build coal generation programme and huge resultant electricity tariff increases look set to compound the problem. The NDP has questioned the wisdom of this new-build programme and observed that this further entrenchment of coal as the predominant energy source for electricity production reduces the country's options in the medium to long term.

The electricity generation and distribution sector remains heavily concentrated and highly regulated, making it difficult for smaller companies to enter the market save as sub-contractors for the established firms. The introduction of independent power producers means that new technologies will need to be incorporated into the national grid to track power movements and that grid management will have to be more flexible to accommodate a wider range and more geographically dispersed suppliers.

Recently introduced energy efficiency regulations for new buildings and extensions to buildings not only mandate that water and space heating installations include such technologies as SWHs or heat pumps, they also encourage the use of designs and materials which enhance thermal performance, which should promote the development of relevant domestic sectors.

^{xiv} A basic tax-free threshold of 60% and a maximum offset percentage of 5-10% up to 2020 are envisaged. A second phase covering 2020- 2025 would see tax-free thresholds reduced, and in the longer term these might be replaced with absolute thresholds.

On the positive side, an Energy Intensive Users Group^{xv} was formed in 1999, whose membership (comprised of large industry in the manufacturing and mining industries) accounts for about 44% of the electrical energy consumed in South Africa. This grouping engages with government and its agencies as well as organized business on issues related to the IRP and the medium term risk mitigation plan to prevent load shedding. While this is a positive initiative, the absence of a platform for private sector-government dialogue on low carbon, climate resilient growth and development means that these two major groupings are not yet aligned as to what the challenges are and what the responses could be. In addition, as mentioned above, there is great disparity in access to data and decision-making processes, with the larger industry players being in a position of advantage with regards to both.

The World Bank's 'Doing Business in South Africa' 2012²⁴ report ranks South Africa 35 out of 183 countries, with a one position improvement. The introduction of the new Companies Act in April 2012 made starting a business easier, as did a new reorganisation process to help rehabilitate financially distressed companies and reducing the number of procedures as well as time it took to start a business. The ease of registering property improved too, but interestingly from an infrastructure perspective:

- ... dealing with construction permits held its rank over the two years at 31... requiring 13 procedures, taking 127 days and costing 21.2% of income per capita."
- SA lapsed from 18 to 44 in the ease of paying taxes. "On average, firms make nine tax payments a year, spend 200 hours a year filing, preparing and paying taxes and pay total taxes amounting to 24.4%".
- Getting electricity for new buildings has become more difficult, ranking 124, worse than the sub-Saharan regional average ranking of 122.
- In contrast, South Africa ranked first, together with the United Kingdom, in the ease of getting credit.

These details reflect recognition that a more private-sector friendly environment is required, that this is being attempted, with some challenges still remaining that could impact particularly negatively on infrastructure.

4.3 FINANCIAL POLICIES AND INSTRUMENTS TO ATTRACT PRIVATE SECTOR INVESTMENT

A staggering amount of R3.2 trillion of expenditure is allocated towards 43 major infrastructure projects identified. Over the medium term expenditure period of 2012/2015, R845 billion has been approved and budgeted for infrastructure plans, of which almost R300 billion is in the energy sector and R262 billion in transport and logistics²⁵. This signals to the private sector that government is serious about its infrastructure roll-out.

^{xv} The Energy Users Group operates as a project based organisation to apply better focus on primary concerns around the ongoing shortfall of generation capacity, the security of supply crisis, the anticipated above inflation price rises and Energy Efficiency. The Group engages directly with Government, Eskom and NERSA as well as coordinating efforts with established groups such as BUSA, BLSA, NBI and the Chamber of Mines to address the concerns facing South African industry at large.

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The DBSA and the IDC are both managing large amounts of finance for green economy initiatives. Government's R800 million towards a new national Green Fund is being managed by the DBSA and the IDC has earmarked R25 billion over the five years to 2015/16 for the development of green industries. The Green Industries SBU will disburse the bulk of this funding with the objective being "...to develop, grow and invest in green industries by focusing on investments that enhance environmental protection and support the reduction of carbon emissions. Investments will further aim to establish and build a local green industry value chain."²⁶

The IDC's R500 million Green Energy Efficiency Fund²⁷ (GEEF) is aimed at stimulating investments by local entrepreneurs focusing on energy efficiency. Through this Fund, carbon finance and Eskom SWH rebates combined to make it attractive for the private sector to enter the market, and SASSA, the subject of this case study, was supported to conclude a successful CDM.

However, there are no direct financial policies and instruments to encourage private sector investment in LCR development. The carbon tax, if introduced would be an indirect incentive. While South Africa has a strong PPP framework and mixed results with PPPs, the PPP framework and criteria have not been geared to favour LCR PPPs, which is a significant missed opportunity seeing as all the infrastructure initiatives indicate private sector involvement as key to successful implementation.

As the first CDM crediting period is set to close at the end of this year, attention has shifted to other potential climate finance mechanisms, notably Nationally Appropriate Mitigation Actions (NAMAs), which it is hoped will help to provide the support required by developing countries seeking a lower carbon development trajectory under the post-2012 climate finance regime.

4.4 HARNESSING RESOURCES AND BUILDING CAPACITY FOR A LCR ECONOMY

According to the 2011 Mid-Year Population Estimates^{xvi}, South Africa has a population of just over 50 million. In the second quarter of 2012, 25% of the population was unemployed, with young people between the ages of 15 and 35 making up about 70% of the unemployed²⁸. Despite many interventions of the democratically elected government since 1994, for example, the creation of the Youth Commission, Further Education and Training (FET) Colleges, Learnerships and public employment programmes, unemployment in general and youth unemployment in particular remains a serious challenge in South Africa.

President Jacob Zuma declared 2011 as 'The Year of Job Creation' in his February 2011 State of the Nation address, where the Green Economy featured as one of the five priority sectors for accelerated growth and employment. (The others being infrastructure development, agriculture, mining and beneficiation, manufacturing, and tourism).

Endorsing this was the strong connection between youth employment and the Green Economy described by the Finance Minister in his 2011 Budget Speech:

^{xvi} For 2011, Statistics South Africa (Stats SA) estimates the mid-year population as 50, 59 million. <http://www.statssa.gov.za/publications/P0302/P03022011.pdf>

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“Inclusive growth means strenuous efforts to cut back poverty and shrink the inequality that continues to blight us. ...Inclusive growth also means addressing the climate change challenges that confront the long-term global outlook. This year South Africa will host the 17th United Nations Conference of the Parties (COP 17) on climate change. Our own efforts to green our economy will come under special scrutiny. Mitigation initiatives are not just about reducing the dangers associated with a hotter future, but they also offer significant opportunities to create jobs and reduce costs in our economy...”

According to the World Economic Forum^{xvii} (WEF) 2012/2013 Global Competitiveness Index, South Africa moved down two places to rank 52nd, but maintaining its position as the highest ranking country in sub-Saharan Africa and down one place to third placed amongst the BRICS economies. According to the WEF Report, South Africa benefits not only from strong research and academic institutions and strong research collaboration between the private sector and academic institutions in innovation, but also from strong institutions, intellectual property protection, the accountability of its private institutions (ranked 2nd) and its goods markets efficiency. Of particular note is its consistently high ranking in terms of financial market development (3rd).²⁹

Notable however, is the need to upgrade existing infrastructure, the high business costs associated with crime and security, the health of the workforce, labour market efficiency (113th), rigid hiring and firing practices, a lack of flexibility in wage determination by companies and ‘significant tensions in labour-employee relations’ (144th).

The following table shows South Africa’s ranking on selected WEF pillars of competitiveness:

PILLAR	RANKING
Basic Requirements	84
Institutions	43
Infrastructure	63
Macroeconomic environment	69
Health and primary education	132
Efficiency Enhancers	37
Higher education and training	84
Goods market efficiency	32
Labour market efficiency	113
Financial market development	3
Technological readiness	62
Market size	25
Innovation and Sophistication Factors	42
Business sophistication	38
Innovation	42

^{xvii} The [Global Competitiveness Report 2012-2013](http://www.weforum.org/issues/global-competitiveness) assesses the competitiveness landscape of 144 economies, providing insight into the drivers of their productivity and prosperity. The Report series remains the most comprehensive assessment of national competitiveness worldwide. <http://www.weforum.org/issues/global-competitiveness>

Although South Africa has had growth rates comparable with other economies in this stage of development, this growth could not sustain jobs created in most sectors. Acknowledging that the nature of the challenges require longer term responses, but that in the meantime people need to be lifted out of poverty, government's short to medium term responses are focused on creating large scale 'safety net' employment programmes that are short term in nature, supplements government's social grants programme, emphasises unskilled work opportunities (due to the fact that most of the unemployed are unskilled) and is intended to address poverty and unemployment through the injection of regular and predictable income into communities.

The main programme is the Expanded Public Works Programme (EPWP), of which the Community Works Programme (CWP) is a component. The EPWP targets work opportunities that increase the labour intensity of government-funded infrastructure projects, as well as in public environmental programmes, amongst others. Cutting across all departments and spheres of government, all of government and its agencies are compelled to increase the number of people drawn into the workforce. Increasingly, these programmes are targeted at addressing environmental issues such as clearing of invasive alien vegetation (which has the effect of improving water quantity and quality as well as reducing the risk of fire), working with already existing programmes such as the Working for Water and Working on Fire programmes.

The Green Accord³⁰, a social pact amongst government, labour, community organizations and business, was signed at COP17 in Durban in December 2011. This Accord is an ambitious attempt to create 300 000 new jobs by 2020 in green economic activities such as energy generation, with SWH being a large part of this component, eco-tourism and low carbon manufacturing. Together with the National System of Innovation which aims to foster technological innovation and build the human and institutional capacity in order to be able to do so, as well as other initiatives such as the infrastructure skills development grant to support 150 graduate interns in engineering and spatial planning and the larger National Tooling Initiative, there may be sufficient momentum created to shift towards LCR growth, despite not all of these initiatives being directly focused on same.

An added advantage is South Africa's largely under-resourced but very vocal NGO sector who contributes actively to policy options and critiques of government policy related to the green economy, some of them working with international development partners to produce policy alternatives and/or the data and on which government can base its decisions.

4.5 PROMOTING GREEN BUSINESS AND CONSUMER BEHAVIOURS

South Africa's vibrant civil society and (social) media arenas mean that there is reasonably vigorous public debate concerning the challenges of climate change, including corporate advertising and positioning, such as Nedbank's 'green bank' branding; the Mail & Guardian newspaper's special inserts and public debates on the green economy; the Carbon Disclosure Project which has had a significant impact on the corporate social responsibility debate and conduct; and government's electricity demand side management programme (although the latter probably has more to do with concern about generation capacity shortfalls).

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Despite this apparently dynamic scene, it is important to recognize that the shallowness of the social engagement with climate change – in terms of the relatively narrow demographic and class profile reached by such public information campaigns and debates – in that poor education, high illiteracy and the competing demands of ordinary daily life for the majority of South African residents mean that the issue is either unknown to them or a low priority. A 2007 opinion poll, for example revealed that only 18% of a representative sample knew 'a lot' or 'a fair amount' about climate change and that 27% had never heard of it at all before³¹.

The Department of Water and Environmental Affairs launched a 'Climate Action Now!' public awareness campaign at COP17 in Durban, which has included an extensive advertising campaign with well-produced billboards and other media with straightforward messages such as "Climate Change means more floods" and "Climate Change means less water", but there is no evidence yet to show how and whether the campaign has impacted on public awareness and behaviour.

In terms of corporate attitudes, the Carbon Disclosure Project³² has since 2008 requested information from the top 100 companies listed in the Johannesburg Stock Exchange (JSE), as its contribution to a global project. In South Africa it is run jointly by the National Business Initiative (NBI), who plays a leading role in encouraging corporate leaders to engage both with climate change and with government, and an environmental consultancy, Incite.

Eskom and local government have largely focused their awareness programmes on imparting practical information about electricity saving measures and technologies rather than on engendering a broader understanding of climate change.

5. MAIN LESSONS AND RECOMMENDATIONS

5.1 LESSONS FROM THE SASSA SWH CDM CASE STUDY

The SASSA case study describes a private sector driven project which, by combining a source of climate finance (CER revenues from a CDM PoA) with a public subsidy allocation (the NSWHP) has resulted in large scale roll-out of a renewable energy technology to formal low income housing that incorporates a maintenance programme spanning a much longer period than that required by the subsidy administrator. Though first established under an energy security agenda, and subsequently propelled chiefly by social considerations, the public subsidy stream channelled through the project has not only produced significant socio-economic co-benefits (improved quality of life for over 80,000 households and 800 employment opportunities generated since July 2010), it has also contributed to reducing the carbon profile of the low income housing sector.

The maintenance period and community job opportunities provided by this programme have been important to its rapid expansion for the following reasons:

The long maintenance period renders the project's offering more appealing to municipalities than that presented by most other private sector companies operating under the Eskom-managed subsidy scheme;

Support from a number of municipalities ensured that there was sufficient demand to justify investing in a low pressure tank manufacturing facility and to increase local content;

As the model for providing maintenance relies substantially on selected members of recipient communities, for whom employment opportunities should be available during the 10 year maintenance "contract" period, the project is also more appealing to target communities. However, whether the extent to which job opportunities can be sustained beyond the maintenance period remains unclear.

The case study suggests that the provision of a considerable public subsidy stream has resulted in some private capital being locked-in despite sub-optimal institutional co-ordination and significant misalignment in policies and strategies at a macro level. It is worth noting that what private capital has been locked-in has principally been invested in expanding domestic manufacturing, installation and maintenance capacity rather than applied to financing the capital cost of SWH roll-out. However, this is arguably essential to achieving government's national SWH targets.

The issue of when, and to what extent, a public subsidy is justified, especially when it results in private profit-making, is a fundamentally important one. The initial assessment of the costs and benefits, including the evidence of local component and labour use, and of the income generation opportunities created for target communities, suggests that the public investment was largely justified - even if the direct carbon emission reductions achieved are modest when set against the overall emissions picture of South Africa's economy. A full cost-benefit analysis is beyond the scope of this paper, but would be useful for informing the design of future government subsidy incentives aimed at the sector.

5.2 POLICY GOALS, ALIGNMENT AND STAKEHOLDER ENGAGEMENTS

The extent to which the private sector is attracted to LCR growth initiatives depends largely on the consistency and coherence in the policy framework (and of course, the right policy framework), keeping complications for private sector entry to a minimum,, and the amount of capital government itself commits to LCR investments. And while large-scale public investment in infrastructure is attractive to the private sector, the private sector will deploy their capabilities and capital only where there are predictable and stable policies (implying long-term planning beyond political terms of office), an enabling regulatory environment and where risk-adjusted returns are both positive and competitive³³.

This section assesses how South Africa fares in terms of these enabling factors and offers some recommendations on how to create a more enabling environment for private sector investment in LCR infrastructure in South Africa.

A consolidated low carbon, climate resilient approach has not yet been built into the major strategies and priorities of the South African government, and much coordination and (re) prioritisation work must be done in order to transition to the environmentally sustainable, climate resilient, low carbon economy by 2030 as envisaged in the NDP. In terms of the UNFCCC and the Kyoto Protocol which South Africa has ratified, it is committed to mainstreaming climate change considerations into social, economic and environmental policy, but even the NDP has a separate chapter on environmental sustainability with no reference to how to transition to green growth in any of the other chapters dealing with infrastructure, employment, human settlements and rural development for example.

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This reveals the fragmentation of the green economy agenda. The first National Development Plan (NDP) was developed after the key policies and strategies of government (such as the Integrated Resource Plan, the Industrial Policy Action Plan, the New Growth Path and the National Climate Change Response), which means that the efforts to integrate sustainability issues into all policy and strategy will be that much more difficult.

However, the South African government has indicated its commitment to long term infrastructure development with the establishment of the PICC, the relatively large budget allocations and the selection of the eighteen Strategic Infrastructure Projects. The creation of the PICC acknowledges the need to move away from a fractured way of dealing with infrastructure towards greater institutional coherence and collaboration, with a clear-sighted examination of barriers to efficiency and a greater commitment to monitoring, evaluation and accountability.

However, there may be limited scope to influence the design of the infrastructure programme because the imperative is to get it off the ground as speedily as possible, in pursuit of urgent job creation and given the precarious nature of South Africa's social contract. In addition, the eighteen SIPs are not embedded in a broader green economy plan or as part of an LCR infrastructure strategy. In terms of infrastructure, where the needs are vast and government has to be seen to be delivering fast, this will likely amount to a game of playing catch-up with the SIPs should there be political will and coordinated efforts to do so.

There are, however, specific 'windows of opportunity' to encourage a transition to LCR infrastructure and generate more traction at sector level. A prime example is the development of a long-term energy plan, the Integrated Resource Plan (IRP2010), which introduces renewables and the private sector into the energy mix for the first time by committing South Africa to a 42% target of electricity generation from renewable energy sources by 2030. On the implementation side, despite some hiccups, the first renewable energy IPP programme was successfully concluded with MW 2459.4 of renewable energy procured in the first two rounds of bidding. The IPP Procurement Programme is designed to procure MW 3725 and to contribute towards socio-economic and environmentally sustainable growth, job creation and to stimulate the renewable energy industry in South Africa. The SIPs that are energy, transport, human settlements and water related may similarly provide opportunities.

While acknowledging the importance of the private sector in infrastructure, the various policies are not clear about private sector participation; there is no visible clearly defined unifying strategy to guide and stimulate private sector investment and the South African government. While there have been engagements with the private sector on the infrastructure plan, and this will continue, there is no private sector engagement strategy and plan. While repeatedly acknowledging that government alone cannot deliver the necessary levels of finance required for the intended developmental outcomes, this is a notable absence. This contributes to the ad hoc nature of government's engagement with the private sector, thereby limiting the scope for depth and speed of investment by the private sector. Moreover, there is no compact between government, business and labour on infrastructure, nor even a formal government-business forum. Considering the size of government's investment, the scale of the challenge and the fact that the success of the programme is also determined by the extent of private sector commitments, future collaboration should be prioritised.

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Nor is there a compelling single narrative - except perhaps partly in the new NDP – that convincingly describes how to square the circle and how to transition to a new, climate resilient, low carbon economy. As the climate change impacts are being felt, it becomes increasingly clear that investment in new infrastructure also requires a consideration of projected weather patterns and climate impacts.

As in all other countries, as pointed out by Yawich and Nicholls³⁴, existing infrastructure in South Africa has been designed on assumptions about existing weather patterns that no longer hold true. For example, major insurance companies are investing in research on LCR housing along the eastern coastal towns of South Africa after recent huge losses suffered due to severe storms damaging coastal homes. The Western Cape Province is particularly vulnerable to fire outbreaks and storm damage. The IPCC's special report on extremes notes that a post-disaster emphasis on rapidly rebuilding houses, reconstructing infrastructure and rebuilding livelihoods often leads to recreating or increasing existing vulnerabilities, and preclude longer term planning and appropriate policy changes for climate resilience and sustainable development.³⁵

A more holistic approach to disaster prevention involving clearing of invasive alien vegetation, for example, is being explored as alternatives by NGOs such as the WWF working with organizations like the DBSA and certain municipalities in the province who are concerned about their infrastructure longevity, impacts and budgets, and the subsequent impact on local economies.

Looking ahead, and in terms of recommendations, the key considerations for policy-makers in South Africa include:

Provide a clearer, higher-level commitment to low carbon, climate resilient infrastructure that should inform all public-led infrastructure projects from energy, to transport, to human settlements, to water, to agriculture and land use. Starting with the eighteen Strategic Infrastructure Projects, it is recommended that new standards of low carbon, climate resilience should be inserted into all public-led construction projects.

Consolidate the disparate strategies and initiatives into a green economy action plan that is managed and coordinated by the National Treasury or the Presidency and dealt with by a senior intergovernmental team. This may help to break the silo approach to planning and implementation within government, avoid the relegating of climate and environment to the Department of Environmental Affairs only and provide much-needed impetus to the green economy initiatives that seem to be slow to gain momentum at the new and under-capacitated Economic Development Department.

Sustain and replicate proven-to-be-successful projects, such as the SASSA SWH project, at scale, and consider the implications for policy and strategy. The SASSA low pressure SWH CDM PoA model was based both on the availability of a substantial grant-funding stream and on higher carbon price levels than those which currently apply. The long term sustainability of this quantum of state funding cannot be taken for granted, and even assuming it could be maintained at present levels, the reduction in revenues which can be generated from certified or voluntary emission reductions under current carbon market conditions would appear to render the model uneconomic for a private sector project owner. There is a need, therefore, to identify climate finance opportunities at national and international level that could be accessed to close this gap in the future. In this context, it is

worth recalling that the key driver of the subsidy from which the SASSA project, and its like, was able to benefit, was the energy security agenda – and the strategic and economic development considerations attendant to it – rather than the climate change dimension.

Develop a national green financial architecture. This would contribute considerably in accelerating South Africa towards a green economy by attracting private and international development finance through modest domestic public investment (such as the commitment to the National Green Fund), thereby creating investor certainty, reducing barriers to scale and using public procurement. The creation of a green financial mechanism which seeks to leverage large amounts of private investment and international finance through more modest public investment is therefore a further recommendation in support of sustaining and replicating initiatives such as the SASSA SWH project.^{xviii}

Further develop regulatory schemes such as minimum energy efficiency standards for new and existing buildings in order to speed up the uptake of LCR technologies and stimulate the associated domestic sectors.

Create a formal platform for active and structured engagement with the private sector on LCR infrastructure in order to ensure that the right incentives and stimulus packages are developed without unintended consequences.

Facilitate opportunities for public-private deliberation, collaboration and standard-setting, so that opportunities for private sector participation can be identified and barriers addressed. For example, South Africa should join the international Construction Sector Transparency Initiative (CoST) as soon as possible in order to diversify stakeholder engagement and to provide a new forum for standard-setting and consensus-finding. CoST is a multi-stakeholder based initiative that has been piloted between 2008-2012 in eight countries including Ethiopia, Vietnam, Guatemala, Zambia and the United Kingdom³⁶. Disclosure of 'material project information' has helped those countries identify governance and regulatory deficiencies that have led to over-spending or time over-runs in publicly-funded projects, prompted policy reform and the strengthening of oversight, and helped pre-empt corruption.³⁷ While South Africa expressed interest in joining, it has not yet done so.³⁸

Implement a framework for carbon pricing, be it a carbon tax, a sectoral carbon-budgeting approach, or a combination of both. It is clear that National Treasury has now settled on its own view of the need to instigate a carbon tax, and plans to do so as soon as 2014. The proposed carbon tax seeks to level the playing field between carbon intensive (fossil based firms) and low carbon emitting sectors and result in a contraction in the long run of carbon intensive sectors while contributing to net GHG emissions reductions. This will give South Africa first mover competitive advantage gains and will form a key part of the new policy environment going forward, but the potential negative impacts on industrialisation should be carefully worked through.

^{xviii} An indication of the scale of financial commitment required - the Energy Research Centre at UCT conducted a technical analysis of, among others, a possible NAMA for financing upgraded energy specifications in subsidy housing. Based on the provision of SWHs and thermal efficiency measures to one million new-build low-income houses by 2020, it estimated the capital cost of the proposed interventions at USD 2.8 billion (and the GHG reductions from baseline at 30MtCO₂eq for 2011-2020 and 95 MtCO₂eq for 2011-3030).

6. CONCLUSION

Ultimately, the key message to be taken from our analysis of South Africa's LCR infrastructure context and trajectory is that the country needs to de-link economic growth from its historical reliance on fossil fuels. Greater usage of green technology, a shift to renewable energy and more efficient settlement patterns would all contribute to a de-linking of growth from South Africa's carbon footprint. What may be required in the long term, therefore, is a fundamental shift in the structure of the economy, changing agricultural patterns and regions and more innovative ways of planning and managing water-related infrastructure.

The first NDP offers a glimpse of what such a future might look like, and the attendant trade-offs involved in such a transition, but there is much work to be done if the plan is to gather traction so as to provide a feasible blueprint for change. The case study points to some of the many policy and regulatory, as well as institutional, factors that will determine whether such a transition can be achieved.

A deeper analysis of these factors is required to understand fully the opportunities and constraints that lie on the horizon, especially with regard to the substantial strategic infrastructure programme that South Africa is about to implement. Private sector participation in such programmes is essential, as the government recognises. Doing more to encourage such participation through concrete steps such as those outlined above, accompanied by a clear-sighted appreciation of when, and how, public investment can justifiably prompt private sector involvement, is essential if the potential opportunities that exist, and which are illustrated in this case study, are to be grasped and the obstacles to similar future initiatives overcome.

7. References

- ¹ Cop 17: South Africa on Climate Change [online]. Retrieved from: <http://www.cop17-cmp7durban.com/en/south-africa-on-climate-change/effects-of-climate-change-on-south-africa.html>
- ² Department of Environmental Affairs, National Climate Change Response White Paper, 2011
- ³ List of countries by carbon dioxide emissions [online]. Retrieved from: http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions
- ⁴ Stats SA [online]. Retrieved from: http://www.statssa.gov.za/key_indicators/keyindicators.asp
- ⁵ Stats SA (2008), Income and Expenditure Survey. National Income Dynamics Study (2008).
- ⁶ National Planning Commission, National Development Plan, August 2012.
- ⁷ National Planning Commission, National Development Plan, August 2012.
- ⁸ National Treasury, Budget 2012, Budget Speech.
- ⁹ National Treasury, Budget 2012, Budget Speech.
- ¹⁰ Cloete, B & Venter, F. June 2012. "Low carbon economy work programme: Carbon Lock-In – Infrastructure Investment Research Piece" for the National Planning Commission. Unpublished
- ¹¹ Giordano, T. 2010. Adaptive planning for climate resilient long-lived infrastructures. Utilities Policy. Retrieved from: <http://dx.doi.org/10.1016/j.jup.2012.07.001>
- ¹² Presentation of the 2012-13 Budget to Parliament by Finance Minister Pravin Gordhan on 2 February 2102.
- ¹³ The Presidency (2011). Development Indicators.
- ¹⁴ Hirsch, A. 2005. A Season of Hope: Economic Reform under Mandela and Mbeki. UKZN Press for IDRC: Durban.
- ¹⁵ Ahmedi Vawda, M&E, Presidency – personal communication 8 August 2012.
- ¹⁶ National Planning Commission (2012). National Development Plan.
- ¹⁷ Kuyasa CDM project [online]. Retrieved from: <http://www.kuyasacdm.co.za/vision.php>
- ¹⁸ Golino, C. November 2011. Climate Change and Low Income Housing in Climate Change. e-digest, DBSA.
- ¹⁹ SESSA [online]. Retrieved from: http://www.sessa.org.za/divisions/swh/item/sessa-welcomes-finance-minister-s-commitment-to-swih?category_id=13
- ²⁰ Engineering News: "SWH target exceeded – Peters", by Idele Esterhuizen, 16 July 2012.
- ²¹ Engineering News: "Consolidation seen as key to making fractured solar-geyser industry sustainable", by Natalie Greve, August, 7 2012
- ²² Chris Nelson of SASSA – personal communication 22 August 2012
- ²³ Gardner, Wendy. Ernst & Young: "Climate change taxes"
- ²⁴ World Bank [online]. Doing Business retrieved from: <http://www.doingbusiness.org/rankings>
- ²⁵ National Treasury, Budget 2012, Budget Speech, page 10.
- ²⁶ <http://www.idc.co.za/IR2012/green-industries.php>
- ²⁷ Industrial Development Cooperation (IDC) [online]. Retrieved GEEF: <http://www.idc.co.za/development-funds/geef>
- ²⁸ http://www3.weforum.org/docs/WEF_GCR_Report_2011_2012
- ²⁹ www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13
- ³⁰ Green Accord [online]. Retrieved from: <http://www.nedlac.org.za/media/17514/finalgreeneconomyaccord.pdf>
- ³¹ Human Sciences Research Council [online]. Retrieved from: http://www.hsrc.ac.za/HSRC_Review_Article-105.phtml
- ³² Carbon disclosure project [online]. Retrieved from: <https://www.cdproject.net/EN-US/WHATWEDO/Pages/South%20Africa.aspx>
- ³³ Zadek, S, Forstater, M and Naidoo, S "Shaping a Sustainable Future" UNECOSOC paper, forthcoming.
- ³⁴ Yawich, J & Nicholls, S., November 2011. The implications of climate change for infrastructure in South Africa in Climate Change e-digest, DBSA.
- ³⁵ IPCC [online]. Retrieved from: http://www.ipcc-wg2.gov/SREX/images/uploads/SREX-SPMbrochure_FINAL.pdf
- ³⁶ Retrieved [online] from: www.constructiontransparency.org
- ³⁷ Calland R. & Hawkins, J. 2012. The Construction Sector Transparency Initiative (CoST): promoting public accountability through multi-stakeholder Collective Action, in Pieth M. (ed). Collective Action: Innovative Strategies to Prevent Corruption". Basel Institute for Governance: Basel
- ³⁸ http://www.constructiontransparency.org/news_&_events.cfm

8. Bibliography

Calland R., and Hawkins, J. 2012. The Construction Sector Transparency Initiative (CoST): promoting public accountability through multi-stakeholder Collective Action, in Pieth M. (ed). *Collective Action: Innovative Strategies to Prevent Corruption*". Basel Institute for Governance: Basle.

Carbon disclosure project [online]. Retrieved from: <https://www.cdproject.net/EN-US/WHATWEDO/Pages/South%20Africa.aspx>

Cloete, B., and Venter, I. June 2012. "Low carbon economy work programme: Carbon Lock-In – Infrastructure Investment Research Piece" for the National Planning Commission. Unpublished.

Construction Transparency [online]. Retrieved from: http://www.constructiontransparency.org/news_&_events.cfm

CoP 17: South Africa on Climate Change [online]. 2011. Retrieved from: <http://www.cop17-cmp7durban.com/en/south-africa-on-climate-change/effects-of-climate-change-on-south-africa.html>

Department of Environmental Affairs. 2011. National Climate Change Response White Paper, 2011.

Development Bank of Southern Africa. 2012. The state of South Africa's economic infrastructure: opportunities and challenges. Development Planning Division: Halfway House.

Development Bank of Southern Africa. 2011. Greening infrastructure. Roundtable held on 9 September 2011. Developmental conversations. Development Planning Division: Halfway House.

Development Bank of Southern Africa, 2011. Greening infrastructure. Roundtable held on 9 September 2011. Developmental conversations. Development Planning Division: Halfway House.

Du Plooy, P 2012. Financing green infrastructure – why and how? Trade and Industrial Policy Strategies, unpublished.

Engineering News. 2012. "SWH target exceeded – Peters", by Idele Esterhuizen, 16 July 2012.

Engineering News. 2012. "Consolidation seen as key to making fractured solar-geyser industry sustainable", by Natalie Greve, August, 7 2012

Giordano, T. 2010. Adaptive planning for climate resilient long-lived infrastructures. Utilities Policy. Retrieved online from: <http://dx.doi.org/10.1016/j.jup.2012.07.001>

Green Accord [online]. Retrieved from: <http://www.nedlac.org.za/media/17514/finalgreeneconomyaccord.pdf>

Hirsch, A. 2005. A Season of Hope: Economic Reform under Mandela and Mbeki. UKZN Press for IDRC: Durban.

Human Sciences Research Council [online]. Retrieved from:
http://www.hsrc.ac.za/HSRC_Review_Article-105.phtml

Industrial Development Cooperation (IDC) [online]. Retrieved GEEF:
<http://www.idc.co.za/development-funds/geef>

Intergovernmental Panel on Climate Change (IPCC) [online]. Retrieved from: http://www.ipcc-wg2.gov/SREX/images/uploads/SREX-SPMbrochure_FINAL.pdf

Kuyasa CDM project [online]. Retrieved from: <http://www.kuyasacdm.co.za/vision.php>

National Planning Commission, 2012. National development plan 2030. Our future – make it work. Shereno Printers: Pretoria.

National Planning Commission. 2012. Low Carbon Economy Work Programme,. A just transition to a low carbon economy in South Africa: assessment of areas of critical policy misalignment.

National Planning Commission. 2012. National Development Plan 2030. Transforming Human Settlements and National Space Economy.

National Treasury, 2012. National Treasury Budget 2012 budget speech. Press release, 22 February 2012.

National Treasury. 2012. Budget Speech 2012, page 10. Retrieved from:
<http://www.idc.co.za/IR2012/green-industries.php>

National Treasury. Gardner, W. Ernst & Young: "Climate change taxes". Unpublished

OECD, 2012. Mobilising private investment in sustainable transport. The case of land-based passenger transport infrastructure. OECD Publishing: Paris.

OECD, 2012. Green growth and developing countries consultation draft. OECD Publishing: Paris.

OECD, 2012. Towards a green investment policy framework. The case for low-carbon, climate-resilient infrastructure, OECD Publishing: Paris.

OECD. 2012. Working party on climate, investment and development. Mobilising private investment in low-carbon, climate-resilient infrastructure. OECD Publishing: Paris.

Oxfam International. 2011. Owing adaptation. Country-level governance of climate adaptation finance. Oxford: Oxfam Great Britain.

Personal interview - Chris Nelson, SASSA. Pretoria, 22 August 2012.

Personal interview - Ahmedi Vawda, The Presidency: Department of Performance Monitoring and Evaluation. Pretoria, 8 August 2012.

Presidential Infrastructure Coordinating Commission. 2012. Economic development conference on infrastructure. A summary of the infrastructure plan. Pretoria, South Africa, April 2012.

The Presidency (2011). Development Indicators [online]. Retrieved from:
<http://www.thepresidency.gov.za/MediaLib/Downloads/Home/Publications/NationalPlanningCommission4/Development%20Indicators2010.pdf>

Sustainable Energy Society of Southern Africa (SESSA) [online]. Retrieved from:
http://www.sessa.org.za/divisions/swh/item/sessa-welcomes-finance-minister-s-commitment-to-swah?category_id=13

Stats SA [online]. Retrieved from: http://www.statssa.gov.za/key_indicators/keyindicators.asp

Stats SA. 2008. Income and Expenditure Survey. National Income Dynamics Study (2008).

The World Bank, 2012. Inclusive green growth. The pathway to sustainable development. Office of the Publisher: Washington DC.

The World Bank [online]. Doing Business retrieved from: <http://www.doingbusiness.org/rankings>

United Nations Secretary-General's High-level Panel on Global Sustainability (2012). Resilient People, Resilient Planet: A future worth choosing. New York: United Nations.

Wikipedia. List of countries by carbon dioxide emissions [online]. Retrieved from:
http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions

World Economic Forum [online]. Retrieved from:
http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13

World Economic Forum [online]. Retrieved from:
http://www3.weforum.org/docs/WEF_GCR_Report_2011_2012

Yawich, J. and Nicholls, S. November 2011. The implications of climate change for infrastructure in South Africa in Climate Change e-digest, DBSA

Zadek, S, Forstater, M and Naidoo, S. 2011. "Shaping a Sustainable Future". UNECOSOC paper, forthcoming.