MAPT INSTITUTIONS CASE STUDY SERIES

SOUTH AFRICAN APPROACHES TO MRV OF MITIGATION ACTIONS:

THE CASE OF INSTALLING SOLAR WATER HEATERS

Britta Rennkamp

ENERGY RESEARCH CENTRE

December 2012

Case study commissioned by the World Resources Institute for the Measurement and Performance Tracking Project. Findings represent the views of the author and do not necessarily reflect those of WRI. This research report builds on the previous Scoping Report from December 2011.

For more information on the institutions component of the MAPT Project contact:

Samah Elsayed at selsayed@wri.org

Supported by:

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

based on a decision of the Parliament of the Federal Republic of Germany

CASE STUDIES AVAILABLE AT: SITES.GOOGLE.COM/SITE/MAPTPARTNERRESEARCH

EXECUTIVE SUMMARY

How to measure, report and verify (MRV) mitigation actions? This question calls growing attention in the international negotiations on climate change, because industrialized countries agreed to support developing countries in their efforts of reducing emissions through so-called 'nationally appropriate mitigation actions' (NAMAs). In the process of defining those NAMAs, the question stands out how the emission reductions can be verified. This case study illustrates the way 'MRV' works in the case of solar water heating. South Africa has no officially registered NAMAs in the United Nations Framework Convention for Climate Change (UNFCCC) yet. Therefore, we chose one of the most advanced 'mitigation action', which is the roll out program for solar water heating, which is a key energy efficiency program. We find that the incentive system matters for collecting data for MRV. The responsible agency for the incentive needs to provide for data collection. The process becomes easier if previsions for MRV are already made in the stage of designing the policy. We recommend to design the MRV system of mitigation based on existing structures, such as the measurement and verification (M&V) standards, which apply to the monitor efficiency programs. We further recommend to make the data collection and management transparent, and to designate an independent, cross-sectorial agency to support the government in the data management and quality control, to ensure coherent and reliable reporting.

1. INTRODUCTION

So-called 'mitigation actions' (MA) are actions and processes, which aim at reducing greenhouse gas emissions. The term has become core to the international climate change negotiations, as the main instrument to induce emissions reductions in developing countries. The negotiations coined the term 'nationally appropriate mitigation actions' (NAMA) in 2007, which comprises that developing countries can expect support from developed countries for implementing actions to reduce emission. In return, developing countries need to prove the impacts of their actions. Actions need to be 'measurable, reportable and verifiable' (MRV) says the convention's text in the Bali Action Plan (BAP 2007). However, the substance of reporting requirements for developing countries' actions has been subject to the negotiation for the last five years without any clear results.

This case study provides some insights on the current practice on how mitigation policy is monitored in South Africa. South Africa has a number of policies in place for renewable energy and energy efficiency. However, the government has not registered any official NAMAs through the United Nations Framework Convention on Climate Change (UNFCCC) by the end of 2012.

The main incentive system for renewable energy is the recent independent power producer procurement program (REIPPPP), which is implemented since November last year. The program is too recent to assess the MRV system yet. For this reason, we chose the roll out of solar water heating systems (SWH), because it is South Africa's most advanced 'mitigation actions' at the moment.

The national government set a target to roll out one million solar water heaters in the country between 2009 and 2014. Achieving the goal of 1 million solar water heaters equals avoiding the need to generate 620MW of coal-based electricity, according to a DoE official (DBSA 2009). Simultanously, consumers can save between 30% and 50% of their electricity costs and help to reduce South Africa's carbon emissions. Soon, the government has to proof whether the one million-target was achieved or not. This raises questions about monitoring the progress of the roll out program. The solar water roll out program reveals important findings for the broader framework for 'MRV' of mitigation in South Africa. Many other mitigation initiatives are not yet as mature and therefore more difficult to assess.

We argue that the structure of the incentive system and executing agency is crucial for setting up a functional MRV structure. The study finds that there is no independent agency, which keeps a record of the overall intervention. The mandate for the monitoring is with the Department of Energy (DoE) and the public electricity provider Eskom. The incentive systems matter because data sit in individual institutions, which administer the incentives programs. Eskom is keeping track most efficiently through a weekly dashboard, where it collects information from the service providers.

This case study does not comprise exact calculations of the emissions reductions of SWH and developmental impact. The focus of this case study is not on the methdology of technical calculations. The focus is on the question how to MRV the implementation and the emissions reductions of the program. The program is well designed in its target and framework. The DoE presented an implementation plan, which was consolidated with industry actors (DoE 2009). The MRV work is linked to the monitoring and verification of Eskom's well established energy efficiency program. Yet, there is a no independent agency with a clear MRV mandate.

2. MRV OF MITIGATION ACTIONS: THE ROLE OF THE INCENTIVE SYSTEM

A glance at the research literature shows numerous approaches to MRV of mitigation actions. This comes back to the old question of how a mitigation action and a NAMA can be defined. A WRI paper on MRV on China considers all major national climate policy interventions as NAMAs, although none of them is actually registered as such yet. An ERC brief suggests a broader definition of mitigation actions as those actions and 'processes, [...] which aim at reducing greenhouse gas emissions.' And NAMAs are defined as those 'actions, which seek support and/or recognition [...] in the context of the international climate negotiations' (Tyler et al 2012). However, the common ground in both definitions is that the term NAMA suggest that these actions will derive from domestic policies (Teng et al 2009, p.5).

MRV of specific interventions then depend on the goals and indicators, which the country has identified. These indicators vary depending on the intervention. South Africa's main policy interventions in the energy sector are mostly monitored in installed capacity quantified in megawatts or gigawatts. The table below provides an overview of the MRV system for the main climate and energy interventions in South Africa.

Table 1 Overview: Key national climate and energy policies and their MRV mechanisms

Intervention	Scope	Targets	Indicators	Reporting Mechanism	Verification Mechanism	Schedule
Electricity planning	National	9,6 GW of nuclear; 16,3 GW of coal; 17,8 GW of renewables; and 8,9 GW other by 2030	GW	Integrated Resource Plan (IRP)	Public review	Every two years since 2010
Renewable Energy	National	3,725 MW by 2016, 3,200 MW by 2020	MW	REIPPPP	DoE, IRP, Treasury	Bidding rounds
Renewable energy/ EE	National	1 000 000 solar water heaters installed by 2014	Number of SWH installed	Solar Water heating roll out	Eskom/ DoE	National Implementation plan
Renewable Energy	National	10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013[1]	GWh / MW	None	DoE Renewable Energy White Paper	Implementation through IRP and REIPPPP
Carbon tax (planned)	National	To be defined	ZAR/per ton of CO2	To be defined	National Treasury	To be defined
Emissions reductions	National, International	Reduce emission through mitigation actions by 34% by 2020, 42% by 2025	% of reduced emissions from BAU	National communications, GHG inventories	To be defined in the M&E system by 2013	Key deliverables by 2013

Source: own compilation based on Teng et al (2009)

[1] '10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW). This is equivalent to replacing two (2x 660 MW) units of Eskom's combined coal fired power stations. (DME, 2003, p.25)

The indicators above seem straightforward and logical for each intervention, which should allow the implementing agencies to track the progress of the interventions.

Eskom, South Africa's state-owned electricity monopolist, monitors the installed capacity. This information then goes into the monitoring of the IRP and the renewable energy program, which only started recently.

However, monitoring the progress of policy implementation can become difficult for various reasons: Firstly, monitoring is unlikely to happen if there is no strong commitment and clear responsibilities assigned. Secondly, if multiple agencies are involved, coordination might become an issue. Thirdly, again coordination on different governance levels can hinder efficient monitoring. This is only to mention some determinants of failure. There might be others.

The best starting point is to focus on the incentive system and the institutions involved in their implementation, in order to disentangle the monitoring structures. Renewable energy programs are usually rolled out with a public incentive, which one or more public institutions administer. Common incentives are feed-in tariffs, quota systems or procurement processes.

In the South African case, the Department of Energy is the main responsible institution for procuring wind, solar (PV and CSP), biogas and small hydro, in order to achieve the 10 000 GWh targets stated in the Renewable Energy White Paper (DME 2003). Ten government institutions are involved in different aspects of the implementation of the program.[2] Yet the monitoring of the implementation of installed MW is likely to be quite simple, because the Department of Energy allocates determined number of MW to an independent power producer with a price guarantee. Eskom will be contractually obliged to buy the electricity produced by the independent power producers over a determined period of time. In the future, Eskom should be able to provide exact data on the de facto MW purchased from the independent power producers. The procurement program only started to operate practically after the financial closure of the first bidding round in November of this year. It's a major program that deserves a lot of attention in MRV research. Monitoring of socio-economic co-benefits, such as manufacturing capacity, job creation and community revenues is more complex.

However, we decided to focus this case study on the solar water heating roll out program, because it has been implemented for a longer period of time and its due for implementation by 2014.

3. INCENTIVE SYSTEMS FOR SWH INSTALLATION AND THEIR DOCUMENTATION

In 2009, the South African government decided to roll out solar water heating technologies throughout the countries on a large scale.[3] One million solar water heaters should get onto the roofs until 2014. The solar water program shall contribute ~23% of the renewable

---

[2] Overview: Pickering, Mark: SAWEA Policy & Legislation Working Group, Presentation Policy Alignment in the REIPPPP, Windaba, Cape Town, October 2012

[3] On 23 June 2009, the Minister of Energy in her budget vote speech stated that: "The Department will ensure that one million solar water heaters (SWHs) are installed in households and commercial buildings over a period of five years."
http://www.energy.gov.za/files/swh_frame.html

energy target of 10 000 GWh of renewable energy in 2013, from the Renewable Energy White Paper (DME 2003). The White Paper already foresaw a large-scale roll out of low cost solar water heating technologies in its renewable energy target (DME 2003, p. 25), but the exact target of was only specified in 2009 (DoE 2009).[4]

There are a number of incentives to stimulate the use of solar water heating technologies. These incentives differ for the different income classes, because South Africa is one of the most unequal societies in the world. The incentive system reflects this structural feature of South African socio-economic reality. Four different structures have emerged in the incentive system: i) energy efficiency driven incentives, rebate system as part of the demand side management program for low and high- pressure systems; ii) climate driven incentives; iii) donor driven incentives; and iv) leasing schemes.

EFFICIENCY DRIVEN INCENTIVES: REBATES UNDER ESKOM'S DEMAND SIDE MANAGEMENT PROGRAM

The main subsidy is the rebate scheme through the Eskom administered energy efficiency demand side management program. The national electricity regulator (NERSA) established a fund based on a levy on the electricity tariff to finance this program. The fund offers a rebate scheme for consumers on high-pressure systems. For high pressure systems, the program subsidizes the upfront cost of a solar water heater, which cost between 7000 – 35 000 ZAR, depending on the size and make. These systems are more expensive then electrical geysers. The purpose of the rebate here is to reduce the higher upfront cost, which otherwise puts consumers off. Consumers purchase the heaters through accredited companies who claim the rebate through Eskom. The rebate can be between R3,280 and R8,964 ZAR, depending on the size of the installation. [5] The rebate scheme often fully covers the cost of low-pressure systems. The costs of the low-pressure systems are lower and range between R3000 and R7500 ZAR.

The Department of Energy funds additional installations to speed up the roll out program.[6] The Department of Trade and Industry (DTI) received parts of the additional funding to incentivize local production of solar water heaters.[7]

The rebate scheme is the best-documented incentive system. Eskom keeps statistical record of the installed water heaters in its weekly dashboard. Between 2008 and 2012, 224 431 low pressure systems, and 57 664 high pressure systems installed through the rebate scheme. [8]

---

[4] The 2003 White Paper specifies that 'Domestic solar water heating is currently about 1.3% of the solar energy market. Residential consumption of electricity in 2000 amounts to about 32 846 GWh (2.83 Mtoe). Assuming that some 30% of total domestic electricity consumption is used for water heating and that 60% of this electricity can be replaced by solar energy by using a hybrid solar-electric water heating system, then the potential savings for urban residential households come to 5 900 GWh (0.508 Mtoe). This is about 18% of urban residential consumption which is equivalent to a large coal-fired power station (900 MW). There is thus considerable scope to increase the application of solar water heating, which would contribute favourably to electricity demand-side management and deferral of new generation capacity. An increasing market for solar water heating would result in a growth in the relevant manufacturing industry and increased employment opportunities. (DME 2003, p. 22)

[5] Eskom, Solar Water Heating Rebate Programme Fact Sheet, 2011a, correspondence no. 6

[6] Correspondence no. 4

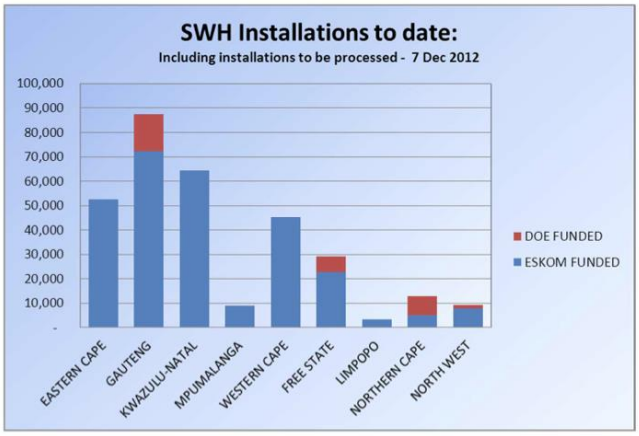
[7] Correspondence no.10

[8] Eskom, Dashboard 7th of December, 2012a

The South African Bureau of Standards calculates a Q-factor for efficiency for each installation. Only SABS accredited producers can claim the rebate. ESKOM has done the estimates on the emissions reductions per saved kilowatt-hour (Eskom 2011a).

Table 3 Overview of installed Solar Water Heaters

Province	ESKOM funded	DoE funded
Eastern Cape	52 522	
Gauteng	72 322	15 094
KwaZulu Natal	64 344	
Mpumalanga	9 001	
Western Cape	44 996	
Free State	22 863	6 475
Limpopo	3 274	
Northern Cape	5 014	7 837
North West	7 770	1 362
TOTAL	282 095	30 768



Source: Eskom, 2012b

These data are typically collected through so-called Monitoring and Verification (M&V) teams, which are based at eight South African universities, including the University of Cape Town. Growing demand for M&V services has been attended through an increasing number of private companies recently. M&V is a very structured activiety, which follows narrow international and national standards to measure, report and verify the electricity savings through energy efficiency programs. M&V of Eskom's demand side management program is a well established system, which has been in place for more than a decade. We described the M&V process in detail in a previous report (Boyd et. al 2011). In practice, M&V data is collected very systematically to identify electricity saving. With the help of specific emissions factors we can identify the emissions reductions, which result from these savings according to the South African electricity mix. However, data and emissions factors are subject to strict confidentiality agreements, which makes it difficult to access even for research purposes. Therefore, we identified the emissions reductions of this interventions on the basis of publicly available emissions factors and average hotwater demand (Eskom 2011a, Gets and Stewart 2011, Stewart 2009).

Table 2 Estimated emissions reductions for SWH roll out

Emitted	Emissions per kWh	Units	Emissions accounting for 330,97	GWh/a
Coal	0,53	kg	175 413 250,30	kg
Water	1,4	liters	463 355 755,52	liters
Ash	155	g	51 300 101 504,00	g
Particulate	0,33	g	109 219 570,94	g
CO2	0,99	kg	327 658 712,83	kg
SO2	7,75	g	2 565 005 075,20	g
Nox	4,18	g	1 383 447 898,62	g

Source: own calculation based on Eskom (2011a), Eskom (2012), Gets and Steward (2011)

This is attempt to calculate the emissions reduction has the purpose to illustrate that it is possible to calculate the savings. The M&V teams collect systematic data only on the electricity savings, and so far there is no coherent reporting explicitly on the emissions reductions of the solar water heater program.

CLIMATE DRIVEN INCENTIVES

The Kuyasa Project in a Cape Town was Africa's first Clean Development Project and the world's first carbon project awarded with Gold Standard, which praises the projects positive developmental impacts. Kuyasa is a neigborhood in Khayelitsha, Cape Town's largest township. 2,309 low-income households received retrofitted solar water heaters, ceiling insulation and CFL lightening. The project started in 2005 with ten pilothouses, which led to the first roll out phase from 2008 to 2011. The extension of the project to other neighborhoods in a second phase of the roll out has not started yet. The current challenge is the maintenance scheme which has to combat rusting low quality heaters from China with few skilled technicians, who find higher paid opportunities elsewhere quickly once trained in the project. The Kuyasa project is a collaborative effort between the community, the NGO SouthSouthNorth (SSN), the City of Cape and the Department of Environment and Tourism's (DEAT), Social Responsibility Program and Provincial Government's Department of Housing. [9] The monitoring towards verification according to the UNFCCC rules for CDM projects was conducted by the implementing organization the South African Export Development Fund. Verification of CDM projects is done by Designated Operational Entities (DOE) accredited by the CDM Executive Board of the UNFCCC. Such entitites verified also the Kuyasa CDM Project. SSN also keeps a record of the installed heaters. [10]

South Africa has a total of four registered CDM projects.[11] Kuyasa is registered as a small-scale project. Three other projects are registered as Program of Activities, which allows the project to specify a larger project area. Not all registered CDM projects are actually implemented (yet). A fluctuating carbon price on the compliance market and changes on the EU market have delayed the progress of CDM projects in South Africa.

eThekwini is planning a PoA to top up the existing rebate program with an additional incentive of 500 ZAR, which are supposed to be financed through the carbon credits in the future. Currently the program runs on municipal and other funding sources.[12]

There are two problems for accurate MRV: Firstly, carbon credits (compliance or voluntary) can and are often sold upfront, before the actual systems are installed. Emission reductions might be accounted for, but not realized. Secondly, the CDM projects do generally have the option to make use of the ESKOM rebate program as well. So there is a risk of double counting.

---

[9] Presentation project manager in Kuyasa, Khayelitsha, November 2012, correspondence no.9

[10] Correspondence no. 11

[11] Further information on the projects and PoA is available at http://cdm.unfccc.int

[12] Interviews no.1 and no.2

DEMAND SIDE INCENTIVES

The literature makes arguments for demand push regulations, because it saves the expensive subsidies and rolls the costs over to the consumer. The case of Israel shows a 95% coverage on Israel's roof, because the use of the technology is compulsory.

Pure demand side policy without subsidies are not a feasible option for South Africa, given its socio-economic inequalities and political economy, where radical policy changes are difficult to implement.[13]

The National Building Regulations and Building Standards Act (No 103 of 1977) allow for National Buildings Regulations, which can be fulfilled through the SANS 10400 standard. The energy efficiency regulation Part XA and its implementation standard SANS 204 alongside 10400 were promulgated in September 2011 and came into force. Municipalities became responsible for implementing it in 10 November 2011. The regulations have in effect been in operation for a year.

A City's Building Development Management oversees compliance with the regulations and standards. According to City representatives, it took a while to train of inspection staff to assess applications in terms of Part XA, but new buildings are now fully assessed in terms of Part XA. The building plan submission stage assures compliance. All the requirements of Part XA need to appear on the building plans and specifications of the submission, otherwise applications will be rejected. The Building Control Officer is responsible for ensuring that the systems are actually installed and Part XA is fully complied with 'as built'.

In order to collect data on SWHs installed in new buildings there is data on the number of new build applications since November last year. An average of 30 000 applications are submitted annually and then determine the extent to which PBDM assessed the applications in terms of compliance with Part XA.[14] Further analysis will show whether the SWH systems implemented for compliance reasons are considered for the ESKOM rebate and therefore reflected in the given numbers.

DONOR SUPPORT FOR SWH INCENTIVES

International donors support the SWH rollout in South Africa. In particular the low-pressure systems which are predominantly implemented on government social housing projects. The REEEP Renewable Energy and Energy was for example involved with the South African NGO Sustainable Energy Africa, which task it was to support the Department of Energy and the municipalities in organizing the roll out program.[15] DANIDA stood out by funding the implementation of actual SWH systems as in the Joe Slovo Housing Project in Cape Town.

---

[13] Point confirmed independently by two representatives from two municipal governments at two ERC Workshops in June 2012, and November 2012, correspondence no.7 and no.8

[14] Correspondence no.5 and no.3

[15] Report on the REEEP cooperation available at

http://www.sustainable.org.za/index.php?option=com_docman&task=cat_view&gid=20&Itemid=12

The World Bank's Clean Technology fund was one of the multiple funders of the Solar Water Heater Program, which local municipalities and the Development Bank of Southern Africa (DBSA) are implementing with funding from Eskom's demand side management budget and NERSA.

There is still a lot of potential for additional funding, especially for on side training of solar water heating technicians in low-income communities to ensure that the installed units remain well maintained. Additional funding can contribute to urgently needed jobs in poor urban and rural areas.

4. CONCLUSION

This case study showed that different incentive systems matter for the data collection. The case of the South African solar water heating program showed two typical problems in its MRV system.

The first problem is a lack of design for data collection. Most incentive schemes are not designed to collect data on implementation. As in the building regulations, old forms do not capture new regulations and new installations in new build houses. To solve this problem, we recommend to think about MRV data collection at the stage of policy design and update the registration forms to collect data on SWH installations.

The second problem is the lack of transparency and sharing between institutions that collect and manage data. Data stay in the different institutions, which administer the respective incentive schemes. Confidentiality agreements compromise the transparency. In the case this specific mitigation action, the established M&V methodologies apply and ensure measurement, reporting and verification according to international standards. Therefore, this particular action is realitvely well monitored. Other mitigation actions may not fall under this scheme and will require a similar methodology to 'MRV' the emissions reductions. So far, there is no designated independent agency to collect and manage data. Supposedly this happens at the Department of Energy, where there is little capacity for this.

Therefore, the key recommendation from this case study is that it will be necessary to designate an independent agency, either public or private, to do data collection and management as part of the monitoring and evaluation of public policy. This needs to become a key component of the design of NAMA and should be considered already at the planning stage.

There are a number of options how this agency can be set up. An efficient way would be to explore synergies with the existing schemes, such as the M&V schemes. Another way is to request estimated emissions reductions in the procurement programs, to get an estimate of the impact of the intervention, which can then be verified in the end. Independent public and private service providers could collect MRV data in specific sectors, which could be oversee by a knowledgeable institution in quality control and data management. The South African Statistics Agency (StatSA) could play a role as a cross-governmental agent for quality in data management. StatSA could assist other agencies or companies, which collect MRV data of emissions reductions and contribute to an efficient way of reporting GHG reductions to the UNFCCC through the Department of Environmental Affairs.

5. REFERENCES

City of Cape Town. 2012. The National Building Regulations Part Xa: Energy Efficiency. Available at http://www.capetown.gov.za/en/EnergyForum/Documents/PartXA%20Presentation%20-%20Peter%20Henshall-Howard_01Mar2012.pdf Accessed 10.11.2012.

DME. 2003. White Paper on Renewable Energy. Tshwane: Department of Minerals and Energy

DoE. 2009. Minister's Budget Vote Speech, Dipuo Peters, Cape Town: Department of Energy

http://www.energy.gov.za/files/swh_frame.html accessed 30.11.2011

DoE. 2009. South African National SWH Strategic Framework and Implementation Plan, Tshwane: Department of Energy

DoE/DBSA. 2009. The National Solar Water Heating Conference: Building Consensus On Accelerating The Rollout Of Solar Water Heaters In South Africa http://www.dbsa.org/Confr/DBSA%20COP%2017%20Related%20Documents/Solar%20Water%20Heating%20Conference.pdf?AspxAutoDetectCookieSupport=1 accessed 1.2.12.2013

Gets, Alastair, and Alistair Stewart. 2011. Measuring Temperature, Energy and Water Consumption in Low-Income Households at Cosmo City. Johannesburg: Climate Change Directorate Environmental Management Department, City of Johannesburg.

Eskom, 2011a, Annual Report 2011, Johannesburg: Eskom

Eskom, 2011b, Solar Water Heating Rebate Programme Fact Sheet, Johannesburg: Eskom

Eskom. 2012a. Eskom Solar Water Heating Programme Weekly Administrative Dash Board Reporting Period - Week Ending on 07/12/2012. Johannesburg: Eskom.

Eskom. 2012b. Eskom Overview Solar Water Heating Program, PPT, Eskom Email Correspondence Solar Water Heating Program, December 2012

Teng, Fei, Yu Wang, Gu Alun, and Ruina Xu. 2009. Mitigation Actions in China: Measurement, Reporting and Verification, WRI Working Paper. Washington DC: World Resource Institute.

http://pdf.wri.org/working_papers/china_mrv.pdf accessed 30.11.2011

Tyler, Emily, Kim Coetzee, Marta Torres Gunfaus, Anya Boyd, and Harald Winkler. 2012. Understanding the Interface between LCDS, NAMAs and Mitigation Actions. *MAPS Policy Brief*, MAPS Program. Cape Town: Energy Research Center, University of Cape Town.

http://www.mapsprogramme.org/understanding-the-interface-between-lcds-namas-and-mitigation-actions/ accessed 10.12.2012

6. INTERVIEWS AND OTHER CORRESPONDENCE

1. Interview City Representative eThekwini, Energy Office
2. Telephone Interview City Representative eThekwini, Energy Office
3. Telephone Interview Principal Engineer, Climate Change, City of Cape Town
4. Interview, Representative Department of Energy
5. Email correspondence, Climate Governance Researcher, City of Cape Town
6. Email correspondence, Eskom Solar Water Heater Program
7. ERC Workshop on multilevel governance of MRV, Johannesburg, November 2012
8. ERC Seminar, Solar Water Heating Program, Leasing and Subsidies, June 2012
9. Visit to the Kuyasa Project, Khayelitsha, November 2012
10. Interview Representative, Director Renewable Energies, Department of Trade and Industry

11. Email correspondence Director, South South North