



Building Energy Efficiency V-NAMA in South Africa

Development of vertically integrated Nationally Appropriate Mitigation Action (V-NAMA) to improve energy efficiency of public buildings in South Africa

Energy efficiency in buildings is an area where local governments can have a key influence and is one of eight priority areas identified in South Africa's national Climate Change Response Strategy. Since 2012, GIZ supported partners in the South African government to develop a "Vertically integrated National Appropriate Mitigation Action" (V-NAMA) focussing on energy efficiency in public buildings. The V-NAMA proposal development process has helped national government, provinces and municipalities to overcome barriers in their vertical coordination. It has also lead to increased horizontal coordination between different sectoral departments within the same sphere of government. Once implemented, the Energy Efficiency in Public Buildings Programme (EEPBP) V-NAMA will strengthen private sector engagement with provinces and municipalities, enhance the effectiveness of national subsidy programmes and contribute to transformational change in the management of public buildings.

Background

Buildings are a major contributor to greenhouse gas (GHG) emissions, accounting for around 40% of global energy consumption, which in turn generates around 30% of all energy-related GHG emissions. Investments in energy efficiency measures for buildings generally can have large net economic benefits with negative abatement costs. Investments in energy efficiency enjoy relatively quick returns and become even more profitable in the face of rising energy prices.

Control over building codes and energy efficiency standards is an area where municipalities around the world generally have a high degree of influence. This makes them key actors in any efforts to reduce GHG emissions by im-

Country	South Africa, in four pilot provinces and nine municipalities
Sector	Energy Efficiency in Public Buildings
Duration	May 2012 – April 2015
Framework	The South African V-NAMA programme forms part of the BMUB-IKI-global project 'V-NAMAs – Vertically integrated NAMAs for the involvement of sub-national actors in national mitigation strategies'. It is funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).
Implementing agency	Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ)
Partners	National: Department of Energy (DoE), Department of Public Works (DPW), Department of Environmental Affairs (DEA) Provinces: Eastern Cape, Free State, Gauteng, KwaZulu Natal Municipalities: Nelson Mandela Bay, Cris Hanj, Mangaung, Matjhabeng, Ekurhuleni, Randfontein, eThekweni, Ilembe, Kwadukuza

proving energy efficiency in buildings. Despite this, there are still many barriers and challenges to overcome, when it comes to implementation.

On behalf of:



Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

South Africa has pledged a voluntary mitigation target to reduce its GHG emissions by 34% in 2020 and 42% in 2025 below business as usual (BAU), premised upon developed countries meeting their commitment to provide financial, capacity-building, technology development and technology transfer.

The National Climate Change Response Strategy (White Paper) of 2011 includes eight “Near-Term Priority Flagship Programmes”. Three of these flagship programmes focus on climate change adaptation, and five cover mitigation, including the Renewable Energy Flagship Programme; the Energy Efficiency and Energy Demand Management Flagship Programme; the Transport Flagship Programme; the Waste Management Flagship Programme; and the Carbon Capture and Sequestration Flagship Programme.

The Energy Efficiency and Energy Demand Management Flagship Programme focusses on energy efficiency, spanning industry, commercial and residential public buildings.

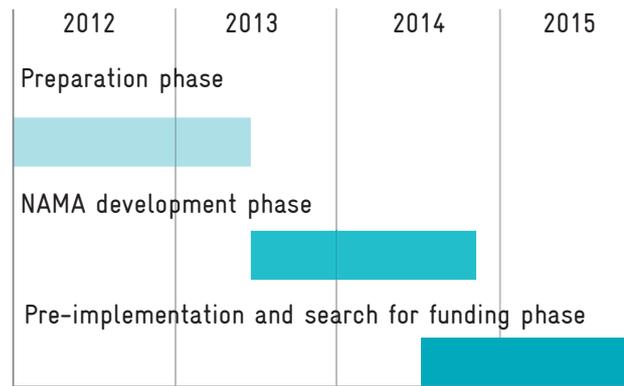
In 2005, South Africa passed legislation setting a 15% reduction target for energy intensity in public buildings. The country aims to address energy efficiency through a variety of projects, programmes and initiatives, including the National Energy Efficiency Demand Side Management (EEDSM) Programme for efficiency measures in municipalities. Private sector involvement in provincial and municipal energy efficiency activities has so far been limited to infrastructural obligations only except for one case involving a guaranteed savings contract.

Description of Activities

To implement the Energy Efficiency and Energy Demand Management Flagship Programme, the government of South Africa partnered with GIZ in the project ‘V-NAMAs – Vertically integrated NAMAs for the involvement of sub national actors in national mitigation strategies’, financed through the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). The V-NAMA development process can be divided into three phases: *preparation, development, and search for funding and pre-implementation*.

Preparation phase (May 2012 – May 2013)

The preparation phase started with the recruitment of staff and programme inception activities including the establishment of contacts with stakeholders, and an initial stock-take of public buildings and national climate change policies and actions.



Further activities included:

- Baseline analysis of energy efficiency in public buildings in South Africa, focussing on energy consumption and efficiency potential as well as on main barriers and proposed solutions.
- Formation of a preliminary steering structure for the programme. This steering structure included representatives of the Department of Environmental Affairs (DEA), the Department of Public Works (DPW) and the Department of Energy (DoE) with support from GIZ and was located within an Interdepartmental Task Team on Energy Efficiency in Public Buildings.
- Based on the baseline analysis, four provinces were selected to participate in the programme, including: Eastern Cape, Free State, Gauteng and Kwazulu-Natal. Selection criteria used included: (1) Energy consumption levels and hence the potential to reduce GHG emissions; (2) Political commitment; (3) Alignment with other related programmes in the country; (4) Balance of urban and rural context; and (5) Moderate support needs (related to finances and capacity).

The preparation phase culminated in a stakeholder workshop in April 2013, which firstly included discussion and refinement of the components of the V-NAMA programme based on the experiences, and specific conditions and needs of the selected provinces and municipalities. Secondly, it resulted in the enlargement of the programme steering structure. Thirdly, a step-wise work plan with clear distribution of roles and responsibilities and timelines was elaborated into a ‘Concept Note’ which was agreed on by all parties. This was then followed by council resolutions in the participating provinces and municipalities to provide political backing to the project.

The main objective for developing the V-NAMA shifted away from concrete energy efficiency measures in selected buildings, towards more systemic energy efficiency solutions enabling transformational change of the whole

public buildings sector, a key focus being how to overcome barriers for increased private energy efficiency investments in public buildings.

- *Economic/financial barriers:*

- Especially barriers for private sector investments due to low mutual trust between governments and private sector companies;
- Ineffective incentive mechanisms for energy efficiency measures in provinces and municipalities;
- An energy services sector with a weak capital base;

- *Institutional barriers:*

- Absence of a vertically co-ordinated system
- Insufficient capacity at national but also provincial and municipal level to implement energy efficiency support programmes for provinces and municipalities;
- Lack of reliable data (e.g. estimations for public buildings' electricity consumption range from 4.2 to 9.7 Terawatt hours in 2010);

- *Political barriers:*

- Policy constraints, including ineffective subsidy mechanisms and regulatory hurdles for provinces and municipalities to enter into contracts with the private sector.

V-NAMA development phase (June 2013 – Nov 2014)

The V-NAMA development phase included the elaboration of a number of individual elements, each building upon the other. These elements form the basis of a concept that addresses the aforementioned barriers and leads to a transformational change of the energy efficiency in public buildings subsector. In the case of South Africa, the core elements consisted of:

- *Baseline development:* A sample of about 260 public buildings was selected for the installation of smart meters, 80 of these being provincial and municipal buildings. The purpose of which was to record and monitor their current energy consumption. In a second step, 87 building managers and other officials from the participating provinces and municipalities conducted building energy audits and set energy consumption baselines for government buildings (two provincial and two municipal buildings in each pilot-province). These tasks were supported by experts from an Energy Service Company (ESCO). The baseline development was designed in such a way, that it could at the same time serve as training and capacity building for the officials involved. The estimated energy savings for individual measures in pre-selected public buildings with focus on lighting, air conditioning, water heating and behavioural change amounted to 20-30%. (Theoretical)

pay-back periods for these measures amounted to 0.3-3 years.

- *Business model development:* Existing and potential business models were analysed and evaluated to establish which would be the most feasible to trigger increased energy efficiency investments in South African public buildings. Different models included:
 - Shared and guaranteed savings contracts with private ESCOs;
 - Fee-for-service contracts;
 - NAMA bonds and carbon tax revenues.

The analysis concluded that shared savings contracts would have the highest potential to tap energy efficiency and GHG mitigation potentials in public buildings. To undergo a reality check, two volunteering municipalities (eThekweni and Graaf-Reinet) agreed on piloting the shared-savings model with assistance from consultants.

This test helps

- to discover obstacles for the establishment of the business model; and
- served as proof-of-concept for the first V-NAMA element to be implemented.

- *Incentives system:* the South African government already supports energy efficiency measures with a number of different incentives, including EEDSM (see above) and

Energy Performance Contracts

Technical and economic risks can be transferred to an Energy Service Company (ESCO). In this model, an ESCO guarantees a certain amount of savings in energy consumption and thus energy costs to the municipality by implementing and maintaining energy efficiency measures.

For this, the ESCO receives an agreed fixed regular (e.g. monthly) payment during the contract period. If the savings are not achieved, the ESCO has to pay the difference to the municipality. The upfront investment required for the energy efficiency measures can either be financed by the municipality ("guaranteed savings agreement") or the ESCO ("shared savings agreement", in this case the municipality does not have to contribute to the upfront investment) or a hybrid of the two.

In any case, realizing the potential of energy cost savings will repay the upfront investment. The benefit of both models is that the municipality can transfer the risk of not achieving the projected savings to the ESCO.

various programmes managed by the state-owned energy provider Eskom, since enhanced energy efficiency is a national priority.

The existing incentive schemes underwent a SWOT-analysis with the result, that the EEDSM Programme implemented by the Department of Energy and financed through the division of revenue act would be the best starting point for an effective V-NAMA-incentive mechanism. EEDSM had already allocated R180m ZAR/€12m EUR (fiscal year 2012/13) for municipal energy efficiency activities in the field of buildings, street lights and other public infrastructure. Due to a lack of capacity at the local level and a lack of support structures at national level, only a limited share of the budget is allocated by the municipalities. Together with stakeholders from all spheres of government and building on good practice examples from other countries (e.g. incentives mechanisms of the German government's national climate initiative NKI), an improved incentive system was developed for the V-NAMA proposal.

- *MRV-system development:* Energy consumption baselines for buildings based on UNEP's Common Carbon Metric ($\text{kg CO}_2/\text{m}^2/\text{year}$) and the comparison of consumption patterns before and after carrying out efficiency measures form the core of the project MRV system. The main criteria for the development of the MRV system were its applicability and integration into existing Monitoring and Evaluation (M&E)-systems. Since energy consumption in South Africa means almost always electricity consumption through the state-owned monopoly Eskom, the electricity mix is the same everywhere in the country and consumption can easily be translated into greenhouse gas emissions (emissions factor: $0.95 \text{ t CO}_2/\text{MWh}$).

The installed smart meters not only record consumed electricity but can also provide daily, weekly or annual load profiles covering the consumption of individual parts or sub-distribution-networks of buildings and can submit the recorded data to a central database for further analysis.

At the request of municipal stakeholders it was decided that to support behavioural change and enhance local ownership, easy access to such data must always be provided to the actual owner of the building (e.g. the province or municipality).

The EEPBP-NAMA Proposal

Framework

The V-NAMA proposal forms part of the Energy Efficiency and Demand Management Flagship Programme of the South African Climate Change Response Strategy and scales up practical implementation of this flagship.

Name and objective

During discussions with stakeholders, the issue came up not to use the term 'sub-nationals' for provinces and municipalities since it would subliminally suggest that the national level is of higher rank. Also the term 'provinces and municipalities' was dismissed, since role of the national level would not be adequately taken into account. The stakeholders decided to call the V-NAMA project outline 'Energy Efficiency in Public Buildings Programme (EEPBP)' and subsequently formulated the following objective: "All South African spheres of government (national level, provinces and municipalities) have contributed to the national GHG mitigation and energy efficiency targets by applying cost-effective mechanisms for energy efficiency interventions in public buildings".

Concept and methodical approach

Despite energy efficiency investments being cost effective with relatively quick returns, international financial support for EEPBP is required to introduce new business models that catalyse and de-risk private sector involvement and increase public funding leverage. Moreover, international technical support is needed to increase capacity, to strengthen institutions and to help overcome structural barriers.

Consequently, EEPBP includes the following three components:

A financial component: Here the national ministries will establish an Energy Efficiency (EE) Fund hosted by the Development Bank of Southern Africa (DBSA) that provides a unified financial service platform for provinces and municipalities to implement energy efficiency and serves to:

- blend public, private and international funding sources;
- offer financial services to provinces/ municipalities and private ESCOs;
- mitigate certain risks, such as payment risks in public-private shared savings contracts;

A *policy component*: Here, the national Department of Energy, in association with Department of Public Works and Department of Environmental Affairs, with assistance from GIZ, will:

- develop best practice examples including monitoring provisions for energy performance-based contracts between public sector and ESCOs;
- develop a standardized approach for public institutions to sign contracts with ESCOs; and
- create the structure for a Green Building Project Management Office to pilot Energy Performance Certificates and other standards in public buildings.

A *capacity building component*: where the above mentioned departments, with assistance from GIZ, will

- establish a support mechanism (staff, capacity building, financial support, services) for public institutions that want to apply for funding for energy efficiency interventions in public buildings. Access to this support is differentiated according to their capacity (a 'Two-Windows' approach); and
- provide funding and capacity building for Energy Efficiency Managers, which support the implementation of shared savings contracts and other energy efficiency instruments.

The main elements of the proposal include:

- A central fund as a clearly defined resource for provinces and municipalities to apply for grants and other subsidies. The fund is hosted in the Development Bank of Southern Africa (DBSA) which has extensive experience in managing similar mechanisms and in working together with all spheres of the South African government.
- A number of support mechanisms to overcome capacity barriers. Some of these mechanisms are influenced by elements of the German National Climate Initiative (NKI), under which the Federal Ministry for the Environment (BMUB) provides support for local climate change action. This includes the communal Energy Efficiency Managers (based on the NKI instrument 'Climate Protection Managers' with a wider range of tasks) and installation of a 'national helpdesk', especially for less experienced provinces and municipalities (based on the NKI 'Service Center for Municipal Climate Protection').
- Enabling the private sector to invest in public buildings by providing services to provinces and municipalities on one side and removing various obstacles to energy service companies on the other.

Financial and Mitigation ambition

In a period of 5 years and with a budget of €14.5m EUR of international support (€10m EUR for the financial assistance and €4.5m EUR for the technical assistance), leveraging investments from the private sector and other sources in a 1:1 ratio, an estimated 1,000 public buildings could reduce their energy consumption by 20-30%. This would lead to a greenhouse gas mitigation reduction of 95,000 t CO₂eq/year. The EEPBP concept is designed in a way that after establishment, private sector investments should continue without further support, so that the full cost-effective energy efficiency potential of South African public buildings (estimated at 0.8 to 2.8 Mt CO₂eq/year) can be realised.

Additionally, two alternative scenarios, a limited option with a €5m EUR budget and an extended option with a €25m EUR budget have been developed and other options are possible, so to meet donor or investor specific priorities.

Sustainable development co-benefits

When it comes to cooperation with provinces and municipalities, co-benefits are often a strong motivator for action. Implementation of the V-NAMA seeks to realise a number of accompanying co-benefits in various sectors, which include:

- Reduction of energy costs which translates to direct public budget savings;
- Improvement of public service quality by retrofitting existing infrastructure;
- Improved coordination between different spheres of government and sector departments;
- Direct and indirect contribution to reducing energy scarcity and avoiding load-shedding and black-outs;
- Removing barriers for private sector investments and job-creation in many different regions of the country, different sectors, different sized companies and at different skill levels

- *Institutional Strengthening*: Encouraging investment in energy efficiency measures for existing buildings via incentives is important but another important element considered was the establishment of certain energy efficiency standards for existing and new public buildings. Support for the development, application and compliance of these standards could be provided by a Green Building Project Management Office under the Department of Public Works and its regional branches for which a concept has been developed.
- *Capacity Building*: Strengthening of institutional capacity was integrated into the activities for baseline development (see above).

Capacity building was also identified as required in the following areas:

- For energy efficiency project development including understanding of efficiency and financing options (grants, private sector involvement) at the provincial and municipal level;
- Guidance and support for provincial and municipal 'clients' at the national level;
- To enhance the effectiveness of technical energy efficiency measures (e.g. replacement of inefficient electrical equipment etc.);
- To support behavioural change of building users.

Interim results of these NAMA elements were discussed and jointly developed with different stakeholders over the aforementioned period. The key event to evaluate, adjust and bind the elements together into a V-NAMA proposal was a stakeholder workshop with representatives from all spheres of government and the preselected provinces and municipalities which took place in June 2014. The results of this workshop culminated into a NAMA project outline (see box above) which was submitted to possible financing institutions to request implementation support.

Pre-implementation and search for funding phase

The V-NAMA proposal (EEPBP Project Outline) was agreed between the three national partner ministries (DoE, DPW and DEA), the pre-selected provinces and municipalities and all other stakeholders involved (DBSA, GIZ etc.) on 15 July 2014, which serves as the starting date for this next phase.

The search for funding and the implementation of first elements of the concept go hand in hand and influence each other. This phase speaks to:

- The availability of an international funding source for this specific program;

- The identification of elements which can be implemented by the country's own means helps to prove the feasibility of the concept which could enhance its attractiveness to funding organisations;
- demonstration to the provinces and municipalities that concept preparation is followed by concrete action;
- How the national level can use this action to demonstrate action towards reaching its voluntary mitigation target and as part of delivery of its Climate Change Response Strategy.

Shared-savings energy contracts are being tested in two selected municipalities, eThekweni (KwaZulu-Natal province) and Graaf-Reinet in Cacadu district municipality (Eastern Cape province).

The role of Energy Efficiency Managers on local level and the support structures around the Energy Efficiency fund at national level were supported by private facilitators for the purpose of this experimental arrangement.

These pilots explore how to:

- overcome the regulatory barriers for private sector investments;
- bundle attractive building packages for ESCo investment; and
- gather all necessary information and identify all relevant stakeholders needed for effective energy efficient retrofit projects.

The results of these implementation pilots will be shared with other municipalities in a nationwide workshop.

While these aforementioned implementation actions are financed through the V-NAMA proposal development budget, there are other actions which are – for the time being – free of international funding needs and implementation is well underway. These include actions around Green Building Standards and Promotion such as the formulation of a concept for a Green Building Project Management Office and Green Building Policy. They have been fed into the parliamentary process with reference to the EEPBP (V-NAMA) concept.

The implementation of these actions has been accompanied by other promotional activities including presentation of the concept to other potential donors on various occasions, including: the South African National Climate Change Dialogue in November 2014 and the international climate conference COP20 in Lima/Peru in December 2014. These actions are planned to culminate in the upload of the V-NAMA concept to the UNFCCC NAMA registry. With this upload South Africa aims to demonstrate how it

is actively working towards implementation of its Climate Change Response Strategy.

It is hoped that all these actions ultimately lead to an international organisation providing funds for the full implementation of the EEPBP program.

Lessons learnt

Success factors

1. An intensive stock-take at the outset is important as it:
 - helps to access new partners in both provincial and municipal spheres of government;
 - helps to overcome (as far as possible) the lack of data, which at municipal and provincial level is often substantial;
 - helps to bring all stakeholders involved to the same level of knowledge (using well-connected, experienced national consultants to assist in this task helps to ensure useable outputs).
2. Jointly developing a Concept Note helps to avoid lengthy discussions on the way forward at later stages of the project. Issues that should be covered include: available options and preferences; risks; potentials; opportunities and challenges, in other words “getting to know what is there, where you want to go and how to get there in a structured way”.
3. Allowing appropriate time for the two aforementioned processes is necessary when it comes to a collaboration between so many different stakeholders from various spheres and different departments of government. Building trust and confidence as a basis for joint activity takes time. It is important for advisors (GIZ in this case) to take a neutral role and respect political sensitivities since possible conflicts between stakeholders involved are not always clear at the outset.
4. Helping all stakeholders to understand each other’s motivations, priorities and possible benefits from the project, is important to enable the development of a concept that will enjoy wide support. NAMA development shouldn’t be seen as an additional burden but rather it should emphasise the “nationally appropriate” aspect as a way to solving existing challenges and support planned or ongoing action. In the case of the EEPBP, it was designed in a way that helps the Department of Energy to bring its Energy Efficiency Demand Side Management Programme to another level. At the same time, it supports the Department of Public Works to fulfil its tasks in the field of buildings maintenance and the promotion of Green Buildings standards. For the Department of

Environmental Affairs, it contributes to the implementation of the Climate Change Response Strategy and helps to show a proof of action in reaching towards the voluntary mitigation target. For the provinces and municipalities involved in EEPBP it can serve as a regional investment and job-creation program, which at the same time improves local service quality.

5. When it comes to the collaboration with three national departments, four provinces and nine municipalities, it is necessary to identify a group of key stakeholders who will drive the process and motivate the others to follow. The role of key stakeholders can change over time and some might become more important while others might lose interest or become less important.

Lessons learnt

1. Processes at the local level are more immediate, concrete and hands-on than at national level. That’s why in the case of vertically integrated NAMAs, more emphasis should be given to the implementation of actions during proposal development to maintain engagement and interest of local actors. In other words: try not only to take but also to give, showing the positive impacts of participating and putting efforts and staff hours from a limited budget into the project. Small measures like the installation of smart meters or the participation in a training event or delegation trip can help to keep stakeholders motivated and give a first answer to the question “what is in for me?”
2. Coordination of effective dialogue in such a vertically integrated project is particularly important due to the larger number of stakeholders from varied spheres of government involved. Since many donors and development cooperation projects follow multi-level-approaches and work together with different spheres of government, also the number of development programs and international development agencies may increase. This, in turn increases the need for alignment, coordination and sharing of information (especially planned activities and data) to avoid conflicts. A detailed stakeholder analysis and mapping at the outset and frequent exchange meetings help to achieve this.
3. Being open to vertical integration and collaboration between different spheres of government also leads to enhanced horizontal cooperation.
4. Developing V-NAMA proved both challenging but successful and the aim of tapping mitigation potential at local level is achievable.



Recommendations

1. Decide and clarify early, what role national government plays: is it for the political and financial framework conditions or, as in this case, will national buildings and their mitigation potential form part of the NAMA.
2. Ensure you allow time and resource for coordination and facilitating effective dialogue between the large and diverse group of stakeholders engaged in the project.
3. To keep all stakeholders motivated throughout the process, 'taking' (data, list of buildings, time for workshops etc.) should be well balanced with 'giving' (capacity building, opportunities to attend international conferences, pilot projects or other incentives like the installation of smart meters).
4. Create a flow of vertical communication that is regular using data flows, committees, and standardised processes.

Sources and References

- Department of Environmental Affairs, Government of South Africa (2011). National Climate Change Response White Paper.
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (2013). Energy Efficiency and mitigation action in local, provincial and national public buildings of South Africa – Concept Note for a vertically integrated national flagship programme.
- Greenovation Energy Services (2014). Development of an Energy Audit and Analysis in selected buildings. Unpublished.
- Linkd Environmental Services (2014). Integrated Report for Developing a Vertically Integrated National Flagship Programme on Energy Efficiency and Mitigation Action. Unpublished.
- Sustainable Energy Africa (2013). Report on Baseline, Energy Savings Potential, Energy Efficiency Programmes in Public Buildings in South Africa and Recommendations. Unpublished.



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