ESMAP
Energy Sector Management Assistance Program

Briefing Note 007/11

Implementing Energy Efficiency and Demand Side Management

South Africa's Standard Offer Model

LOW CARBON GROWTH COUNTRY STUDIES PROGRAM

MITIGATING CLIMATE CHANGE THROUGH DEVELOPMENT

CARBON FINANCE ASSIST

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South Africa faced an acute power crisis beginning January 2008 brought on by a combination of supply-side problems, including coal availability, maintenance needs, and unplanned outages that caused power system reserve margins to fall, virtually overnight, from 10% to almost zero. The size of the power shortage was staggering—about 3500 MW or about 10% of peak demand, every weekday from 6 am to 10 pm. This shortage was expected to last until new capacity could be built.

At the time of the power crisis the World Bank, assisted by the United Nations Development Program and the Energy Sector Management Assistance Program (ESMAP), was providing support to South Africa's Long-term Mitigation scenario (LTMS) (Box 1). The power crisis further emphasized the urgency for near-term, practical assistance to implement the LTMS, for energy efficiency/demand side management (EE/DSM) measures. An associated program of technical assistance in EE/DSM—proven to be a cost-effective, quickly scalable approach to mitigating power shortages and reducing load shedding—was therefore developed to provide timely support to South African counterparts.[1]

This support included the review and discussion of international best practices in implementation of EE/DSM, including the role of special purpose EE or DSM funds, with Eskom, the Department of Minerals and Energy (DME), National Energy Regulator of South Africa (NERSA), and other stakeholders. The review of the status of the Eskom EE/DSM fund, its business model, goals, and operational procedures, resulted in a general agreement among all stakeholders that the Eskom EE/DSM fund business model should be revamped to:

- reduce bureaucracy
- accelerate the approval of projects and disbursement of subsidy funds
- provide a transparent and long-term pricing regime
- differentiate between the contractual complexity required for DSM and EE projects
- adjust the incentive scheme to provide equal treatment to energy efficiency and DSM investments

[1] See also, Best Practices for Market-Based Power Rationing Implications for South Africa, ESMAP Briefing Note 008/11.

BOX 1.

Supporting Implementation of South Africa's Long-Term Mitigation Scenarios

South Africa's historically low-cost energy supplies together with the predominance of extractive industries have combined to create a highly energy-intensive economy. At present, South Africa is the largest contributor to greenhouse gas (GHG) emissions in Africa. On a per-capita basis, its GHG emissions are higher than in most other major emerging economies, including Brazil, China, and India (Figure 1).

The Department of Environment collaborated with the University of Cape Town to develop Long-term Mitigation Scenarios (LTMS) with the aim to provide a platform for low carbon investment planning. The scenarios were based on alternative projections using Marginal Abatement Curves built up from specific projects and programs to reduce GHGs. Energy Efficiency and Demand Side Management Programs are the first steps towards implementing the low carbon strategy. Recognizing the global challenge from climate change impacts, the Government prepared five scenarios designed to decrease GHG emissions (see Figure 2).

- "Growth Without Constraints" scenario, with no GHG constraints, so as to set a baseline representing outcomes from unrestricted emissions ("business as usual" scenario);
- "Start Now" development trajectory, in which the public sector invests in alternatives that have important co-benefits, such as EE/DSM, renewable energy and nuclear power;
- "Scale-up" scenario, which builds on the "Start Now" scenario through regulatory interventions, extending EE/DSM, renewable energy, and nuclear power interventions into more costly options;
- "Use the Market" scenario, which is designed to implement a radical shift in lowering carbon emissions, by implementing a carbon tax; and
- "Required by Science" scenario, to help the world fully meet the global warming challenges by decreasing GHG emissions in the 60-80 percent range. This scenario assumes that there are no resource constraints and thus establishes what is considered to be the lower bound GHG emission trajectory (endorsed by Cabinet in July 2008).

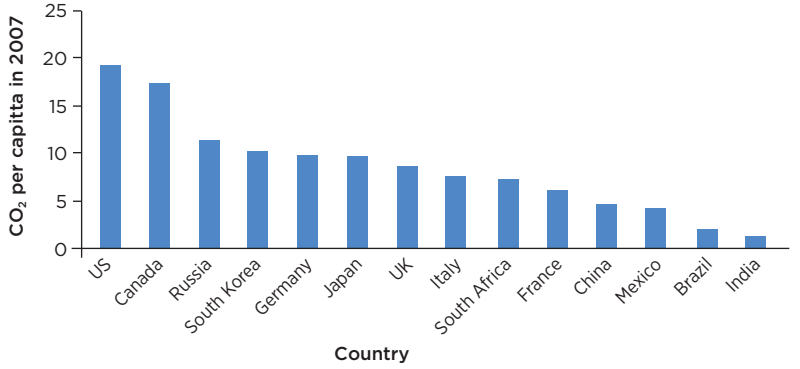
The gap between the Growth without Constraints and the Required by Science scenarios is projected at 1300 $MtCO_2e$, or more than three times current emission levels. The LTMS developed mitigation scenarios designed to illustrate how this huge gap could be closed. The LTMS identified the priority mitigation wedges, or options to reduce emissions, in South Africa as energy efficiency, renewable energy, nuclear energy, passenger modal shift, and improved vehicle efficiency.

Since 2007, the World Bank, assisted by the United Nations Development Program and the Energy Sector Management Assistance Program (ESMAP), has supported implementation of South Africa's LTMS. This included an international peer review of the LTMS prior to its submission to the Cabinet and the provision of substantial technical assistance on energy efficiency, demand-side management, and power rationing in light of the urgency of these issues for near term due to the acute power crisis which struck South Africa in January 2008.

This briefing note focuses on implementation support for EE and DSM. It discusses options to accelerate and streamline implementation and disbursement of South Africa's EE/DSM fund based on international experience in implementing a Standard Offer model.

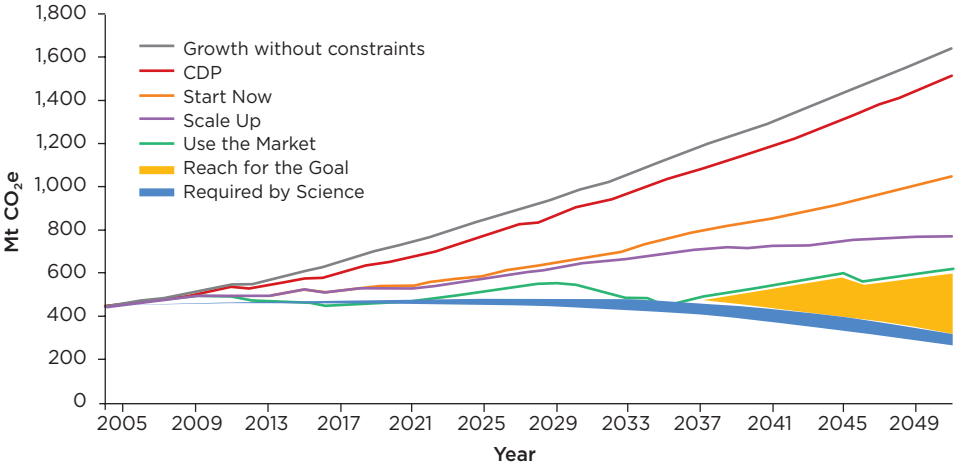
Source: The World Bank, 2010c.

Figure 1: CO_2 Emissions per Capita



Source: OECD Factbook, 2010.

Figure 2: Long-term Mitigation Scenarios



Source: Government of South Africa, Department of Environmental Affairs, 2008.

The Standard Offer approach was developed to support these objectives and is an improved mechanism for substantially increasing the implementation of EE/DSM projects. It was presented to Eskom, DME, NERSA, and the other stakeholders in a series of briefings and is discussed further in this briefing note.

Standard Offer is the mirror image of a feed-in-tariff mechanism used to procure supply side, renewable resources. Under this approach, the Buyer offers pre-determined tariffs for delivery of energy efficiency resources from different technologies. It is different from demand side bidding where demand resources compete on price.

SOUTH AFRICA'S REGULATION OF DEMAND SIDE MANAGEMENT AND ENERGY EFFICIENCY (DSM/EE)

The Need for DSM and EE

South Africa's economy is driven by large mining and related industries that are energy intensive. These industries rely on coal as the predominant fuel source. South Africa has also placed an emphasis on rural electrification, which has led to increased demand for electricity that also relies mainly on coal as the basic fuel source. The reliance on coal has resulted in South Africa being one of the highest emitters of CO_2 per capita in the world and also created significant adverse environmental impact at the local level. The South African government has recognized the importance of EE and DSM as key elements in a strategy to minimize environmental impacts and contribute to a sustainable development strategy. The "White Paper on Energy Policy," published by the South African Government through the DME in 1998, emphasized the goal of providing the nation with wider access to energy services, while ensuring that the environmental impacts of energy conversion and use are minimized as much as possible. The need for EE/DSM led to the formulation of specific policies and regulations, such as the Energy Efficiency Strategy and a new *Regulatory Policy on Energy Efficiency and Demand-side Management,* as described below.

Energy Efficiency Strategy of the Republic of South Africa

With the increasing pressure on South Africa's electricity system to meet growing demands, the need for EE/DSM was further emphasized by the government in 2005. The DME published the "Energy Efficiency Strategy of the Republic of South Africa," a comprehensive document that established national targets for EE improvement and a timetable for achieving these targets. The vision and goals of the Energy Efficiency Strategy are summarized in Box 2.

Regulatory Policy on EE/DSM—Historical Perspective

The National Electricity Regulator (NER) in South Africa is mandated to ensure that there is sufficient installed generation capacity to meet the needs of future electricity demand. As the reserve margins of Eskom's electricity supply capacity are getting smaller, NER determined that to maintain a safe supply-demand situation, provide energy services to customers at the least possible cost, and enforce the government's stated objective of improving the efficiency of the electricity supply sector, there was a need to scale up EE/DSM programs. In 2004, NER therefore promulgated the *Regulatory Policy on Energy Efficiency and Demand-Side Management for the South African Electricity Industry.*

This Policy made EE/DSM planning and implementation one of the license conditions of all major electricity distributors and defined their responsibilities and obligations. It also defined the potential roles of energy service companies (ESCOs) (Box 3) and created an independent Monitoring and Verification (M&V) body, accountable to NER, to conduct all of the M&V functions related to EE/DSM implementation. NER established the EE/DSM Fund to be administered by Eskom (the Eskom EE/DSM Fund) and defined the rules and procedures for its implementation.

[2] The National Electricity Regulator (NER) has now been redesignated as the National Energy Regulator of South Africa (NERSA).

BOX 2.

Energy Efficiency Strategy of the Republic of South Africa

Vision

To encourage sustainable energy sector development and energy use through efficient practices thereby minimizing the undesirable impacts of energy usage upon health and the environment, and contributing toward secure and affordable energy for all.

Goals

Social Sustainability

1. Improve the health of the nation
2. Create jobs
3. Alleviate energy poverty

Environmental Sustainability

4. Reduce environmental pollution
5. Reduce CO_2 emissions

Economic Sustainability

6. Improve industrial competitiveness
7. Enhance energy security
8. Reduce the need for additional generating capacity

Source: Department of Minerals and Energy, 2005.

The Eskom EE/DSM fund established by NER was considered to be consistent with international best practice (Box 4). NER established the following rules and procedures for the deployment of the Fund,[3] also illustrated in Figure 3:

- Eskom would be required to implement EE/DSM as a condition for the approval of Eskom's tariffs/price increase in accordance with the regulatory policy on EE/DSM. Eskom is to submit an EE/DSM rollout plan to the NER.
- Eskom would establish the EE/DSM Fund and recover the direct EE/DSM costs from the tariffs of all customers in the manner specified by the NER.
- Eskom would evaluate and approve EE/DSM projects submitted by ESCOs and any customers' internal ESCO.
- The NER would set a license condition of the Major Distributors to develop an EE/DSM Plan and Implementation Schedule and submit these to the NER for approval.
- Major Distributors would screen EE/DSM project proposals from ESCOs and customers.
- The NER would approve the benchmark criteria for approval of EE/DSM projects by Eskom and for screening of project proposals by Major Distributors.

[3] See National Electricity Regulator, op cit.

BOX 3.

Energy Service Companies or ESCOs

An energy service company (ESCO) is a service provider that helps clients to save energy by evaluating their energy use, developing and designing a project to lower the client's energy bills, and implementing the project. Typically, this work involves conducting an energy audit, project engineering and design, procurement, construction and installation, and project monitoring—on a turn-key basis. ESCOs typically enter into an energy savings performance contract (ESPC) with the energy consumer, or "host facility," to provide a range of services related to the adoption of energy efficient products, technologies, and equipment. The services provided may also include the financing of the energy efficiency upgrades, so that the host facility has to put up little or no capital. The host facility pays for the services from the money it saves from reduced energy consumption. In many cases, the compensation is contingent on demonstrated performance, in terms of energy efficiency improvement or some other measure, thereby creating a system where the services and equipment can be paid from the actual energy cost savings.

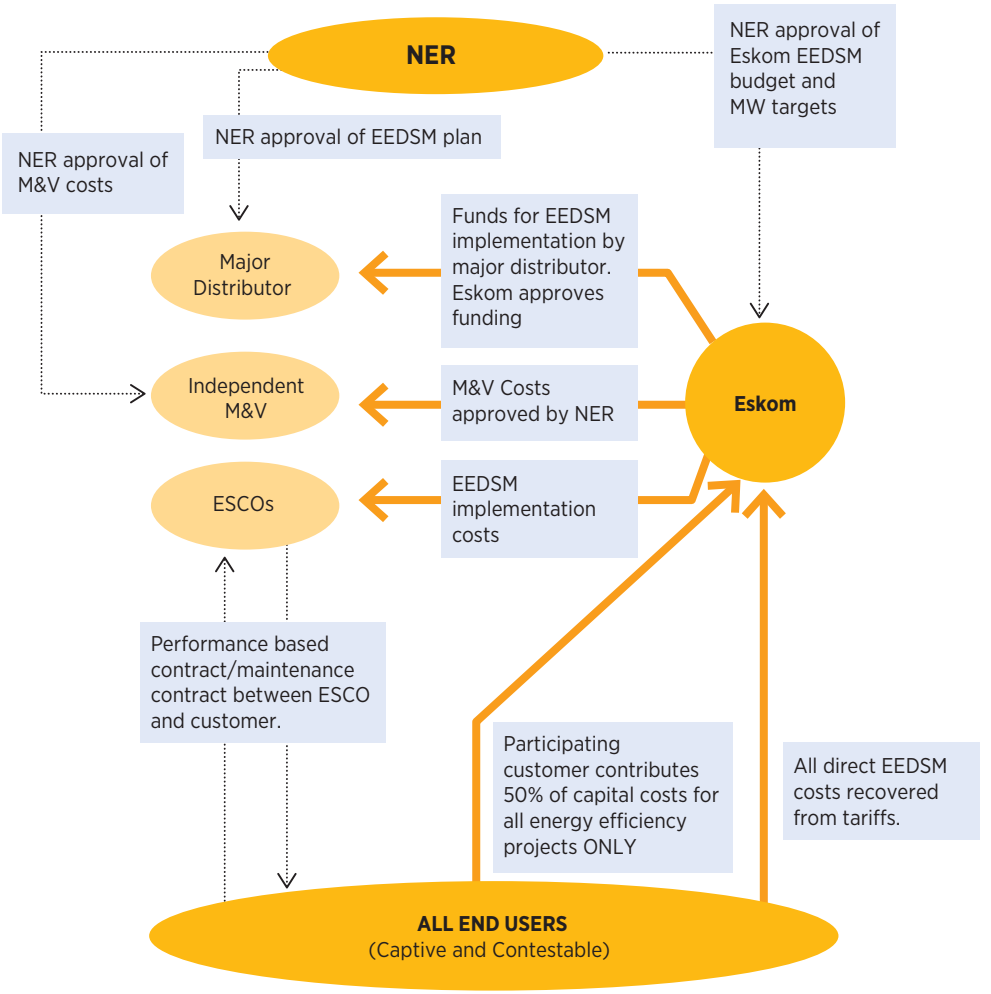
ESPCs and ESCOs were first developed in the U.S. in the late 1970s in the wake of the energy crisis and the rapid increase in oil prices resulting from the OPEC oil embargo and the Iranian revolution. Increasing energy prices created awareness among building and industry owners and managers of the need to use energy more efficiently. The elements of performance contracting evolved as the ESCO industry developed, and these concepts have now been accepted as standard features of ESCO services. Traditionally the term "ESCO" has been used to designate an organization that provides a full range of energy services. However, the ESPC approach can be implemented by organizations such as energy suppliers, equipment manufacturers, vendors, construction management companies, engineering firms, mechanical and electrical contractors, and other related businesses that may not be commonly recognized as ESCOs.

The ESPC approach is generally characterized by the following key attributes:

- ESPCs can offer a complete energy efficiency service, including design, engineering, construction, commissioning, and operations and maintenance (O&M) of the energy efficiency measures; training; and measurement and verification (M&V) of the resulting energy and cost savings.
- ESPC services also include providing or arranging financing, often with a link between ESP compensation and project performance, so that customers pay for the energy services with a portion of actual energy cost savings achieved.
- ESPCs typically include performance guarantees, based on the level of energy or energy cost savings, for the entire project (as opposed to individual equipment guarantees offered by equipment manufacturers or suppliers).
- Most of the technical, financial, construction and performance risks are borne by the energy service provider under the ESPC.

Source: Singh, et al., 2010.

Figure 3: Eskom Energy Efficiency and Demand Side Management (EE/DSM) Fund Funding Mechanism



Source: National Electricity Regulator, 2004.

- ESCOs would investigate feasible projects with customers and obtain a Letter of Intent from the customer. A project proposal would then be submitted to Eskom DSM or Major Distributor.
- The Independent M&V Body would be initiated before implementation of the project to verify the MW reduction and/or energy to be saved per EE/DSM project and report to the NER, Eskom DSM, Major Distributor, and customer.
- All customers participating in EE programs (using EE/DSM funds) would be required to contribute 50% of the capital costs of an EE project.
- ESCOs would be required to have a Maintenance or Performance Contract with the customer.
- All maintenance costs would be borne by the customer.
- NER would approve all M&V Benchmarked costs.

BOX 4.

International Best Practice in Energy Efficiency and Demand Side Management (EE/DSM) Funds

An assessment of international best practices in EE/DSM funds highlights the following lessons:

- EE funds have been very successfully used in the U.S. (in a number of different states), as well as in many other countries, including Australia, Brazil, Korea, New Zealand, Romania, and Thailand.
- While the different funding mechanisms have included a tariff levy on electricity consumption, special taxes, general state tax revenues, revenue bonds, petroleum taxes, certification fees, etc., the most common, reliable, and sustainable source of funding is a tariff levy established by the energy regulator and collected by the utility via the customer's bills.
- The levels of funding vary among the different funds. The more progressive states in the U.S. have assessed a levy of 1% to 3% of electricity sales revenue to finance their EE Funds.

Source: Limaye, 2008.

Implementation Issues with the Eskom DSM Fund

A number of major issues and concerns related to the previous implementation of the EE/DSM fund by Eskom were identified in consultation with senior managers and executives of Eskom, DME, NERSA, the South African Association of ESCOs, individual ESCOs, large industrial customers, and the National Business Initiative. The general consensus was that the implementation of EE/DSM projects had been far short of what was expected and possible, and that substantial modification and enhancements were needed to make the EE/DSM process more efficient and effective.

The key issues identified included the following (Mathews, 2005):

- Eskom's DSM group was understaffed and overburdened.
- The process that had been used by Eskom to evaluate and process EE/DSM proposals was very cumbersome, slow, and non-transparent. The proposal process —a sequence of technical, financial, and procurement reviews conducted by separate Eskom committees— led to substantial delays and costs to the project developers, and often represented a major disincentive to applying for EE/DSM funds. Further, questions raised at any stage of review required the applicant to resubmit and restart the review process, contributing to further delays and costs.
- The criteria that had been used by Eskom for project approval appeared to be unclear and inconsistently applied.
- The process of proposal evaluation had suffered from misunderstanding, poor communication, and insufficient feedback, particularly regarding why proposals were rejected.

- Eskom's evaluation teams had been overly concerned about and spent inordinate amounts of time on the details of the energy savings calculations and costs of the EE/DSM measures.
- Eskom's contract negotiation process was very complex, time-consuming, and adversarial.

In the opinion of many ESCOs, Eskom appeared to be a barrier to EE/DSM implementation rather than a facilitator of EE/DSM projects. Further, in their opinion, the uncertainty and delays in the Eskom evaluation process created large risks and made many projects very difficult to finance and implement. Eskom maintained that it had to devote sufficient time and resources for proper due diligence of every project as they were essentially responsible to assure that the "ratepayer" funds in Eskom EE/DSM funds were spent fairly and judiciously. Both Eskom and the ESCOs agreed that the goals of the EE/DSM fund were not being met.

The Eskom Accelerated DSM Plan

In view of the lack of progress with EE/DSM implemented by ESCOs (due to reasons cited above), Eskom changed its focus to emphasize technologies that could be implemented by Eskom rapidly and launched a large-scale rollout of compact fluorescent lamps (CFLs) in the residential sector. In 2008, Eskom also announced an Accelerated Demand-Side Management Plan with the objective to achieve and sustain 3,000 MW of electricity savings by March 2011 and a further 5,000 MW by March 2026; and to ensure effective collaboration among all major stakeholders, including National Energy Efficiency Agency (NEEA), DME, NERSA, and Eskom.

All stakeholders, including Eskom, agreed that the business model of the EE/DSM fund should be revamped to reduce bureaucracy, accelerate the approval of projects and disbursement of subsidy funds, provide a transparent and long-term pricing regime, differentiate between the contractual complexity required for DSM and EE projects, and adjust the subsidy scheme to provide equal treatment to EE and DSM investments. The Standard Offer model was proposed as an alternative mechanism for acquiring demand-side resources at a series of briefings for Eskom management, DME, NERSA, and the other stakeholders.

THE STANDARD OFFER APPROACH

What is a Standard Offer?

The Standard Offer is a mechanism for acquiring demand-side resources (EE and load management) under which a utility (or a government agency) purchases energy savings and/or demand reductions using a predetermined and prepublished rate in cents per kWh or Rand per kW based on verified savings. Any energy user (utility customer) or ESCO that can deliver energy and/or demand savings is paid the fixed amounts per kWh or kW (the Standard Offer amounts) upon completion of the EE/DSM project and certification of the achieved savings by an authorized M&V organization. Essentially, the Standard Offer approach treats EE and load management projects in a manner analogous to customer generation of electricity, and considers the energy or demand reductions as resources

that the utility will pay for. It is comparable to the feed-in tariffs utilized to promote increased implementation of renewable energy resources. The amounts to be paid for the energy savings and/or demand reductions under a Standard Offer Program (SOP) are generally based on the value of these reductions to the utility system.

Objectives of the Standard Offer

The Standard Offer aims to:

- Provide customers and ESCOs a predetermined amount for delivered energy and/or demand savings, allowing them to efficiently and rapidly structure and propose EE/DSM projects
- Streamline the project approval process and scale-up project development and implementation
- Simplify the contracts between the utility and the ESCOs or customers
- Reduce the burden on the utility staff for project evaluation and processing
- Provide transparency to project proponents on the payments for delivered savings
- Facilitate the leveraging of commercial financing for EE projects
- Reduce the utility's risk by making the payments performance-based and pay only for measured and verified savings

Box 4 provides examples of successful applications of this approach.

International Experience with the Standard Offer Approach

The Standard Offer approach was initially developed by regulators in the U.S. to encourage electric utilities to promote DSM activities (Limaye, 2006). Utilities or agencies in a number of states, including California, Colorado, New Jersey, New York, Texas, and Wisconsin, successfully instituted SOPs to achieve EE goals (Box 5). These programs offer performance-based incentives to customers, paying them a certain amount per estimated kWh or kW saved through installation of energy saving equipment. Contract terms, requirements, and payments are standardized for participants in a particular program—hence the name "Standard Offer."

The features of standard offers have varied widely (Greany, 2009). Some states have administered these programs through quasi-governmental agencies (e.g., New York, New Jersey), while others have required utilities to offer the programs directly (e.g., California, Texas). Some SOPs are geared toward commercial or industrial customers, while others are designed to reach residential consumers. Some SOPs either permit (e.g., California, New York) or require (e.g., New Jersey, Texas) customers to work through an ESCO or other intermediary, which plans and executes the efficiency equipment installation.[4] These programs are usually funded through special charges on all electricity customers' bills.

Box 4 provides an overview of some of the SOPs in the U.S.

[4] See Public Service Electric and Gas Company of New Jersey, http://www.pseg.com/customer/business/industrial/standard/letter.jsp.

BOX 5.

Examples of Standard Offer Programs in the U.S.

New Jersey

New Jersey introduced the prototype Standard Offer Program in 1992 and saved almost 1,100 GWh at an average cost of 4.8kWh/$ from 1992-1997—prompting the New Jersey Board of Public Utilities to refer to this highly successful program as an "Energy Efficient Power Plant." Today, the state offers a pay-for-performance incentive program for improvements in existing nonresidential buildings with a minimum annual average peak of 200 kW. The retrofits must reduce the building's energy consumption by at least 15% and customers must work with an "approved performance partner," such as an ESCO.

New York

Two types of SOP are offered in New York: an Electric Efficiency Performance Based Incentive (for adding installing efficiency equipment); and an Industrial and Process Efficiency Based Incentive Existing Facilities Program (for implementing productivity projects that reduce energy consumption per unit of production). Both SOPs are administered by a quasi-governmental agency, the New York State Energy Research and Development Authority. These SOPs are successors to the Enhanced Commercial Industrial Performance Program (1998-2008). The incentives, which may be disbursed either directly to a customer or to an ESCO that the customer may use, range from US$0.12 to $0.16 per kWh saved, depending on the supplying utility, but cannot exceed 50% of the cost of the project and are capped at US$2,000,000 per facility. In the 18-month period from June, 2006 to December, 2007, New York's SOP produced savings of more than 250 GWh.

Texas

Texas instituted a SOP in 2000, following the passage of a bill in 1999 requiring each investor-owned utility to reduce Texas customers' energy consumption by a minimum of 10% of the utility's annual growth in demand. The programs are "technology neutral;" there is no specific menu of eligible projects, but the retrofit must produce measurable demand and energy savings for a minimum of 10 years. In the Texas plan, these programs are implemented by third-party project-sponsored Energy Efficient Service Providers, such as ESCOs, contractors, or retail electricity suppliers, rather than by the utilities. The utility provides set incentive payments based on each kWh saved as determined by "deemed savings" or measured savings. With this program, Texas saved 341 MW off of peak demand in 2003 (more than double the original savings target). It also reduced demand by 448 million kWh in 2004.

California

California's Long-Term Energy Efficiency Strategic Plan, adopted in 2008, identified EE as the state's highest priority resource for meeting that state's energy needs. Utilities are required to first satisfy their "unmet resource needs through all available energy efficiency and demand reduction resources that are cost effective, reliable, and feasible." In compliance with this mandate, three of the main statewide investor-owned utilities administer a SOP (known as a Standard Performance Contract Program) for commercial enterprises in their respective territories, funded by a public purpose programs surcharge on customer utility bills. Customers may engage a project sponsor (such as an ESCO), or enter into the program by themselves. The equipment must have minimum useful life of five years and the type of apparatus installed determines the level of the incentive. The incentive is offered on a first-come, first-served basis and is capped at 50% of a project's cost or US$350,000 per project, whichever is lower.

Source: Developed by authors from various state regulatory authority reports.

SOUTH AFRICA'S STANDARD OFFER PROGRAM (SOP)

To overcome the issues that were related to the implementation of the Eskom EE/DSM program, the Standard Offer approach was recommended for adoption following consultation with stakeholders in South Africa. This would replace the procedures being used by Eskom's DSM group to identify and approve EE/DSM projects. The Standard Offer approach, practiced in the Australia, India, U.S., and other countries, would allow Eskom to "purchase" energy savings from ESCOs and customers using a pre-determined and pre-published "price." Implementation of this approach streamlines the process of evaluating project proposals and disbursing the incentives or subsidies, reducing the burden on Eskom staff and facilitating a larger pipeline of projects. The greater transparency, shorter processing times, and reduced transaction risk of the Standard Offer approach would also facilitate mobilization of commercial financing, essential to achieve a substantial scaling up of EE/DSM investment.

Key Program Principles

The SOP will follow these key principles:

- The program will be open and transparent
- Eskom will make a long-term commitment to the program
- There will be a continuous focus on streamlining the process into an efficient market mechanism
- The program will allow for adjustments for business cycles and business needs; such factors as marketing, price, resource deployment and allocation, etc., would be flexible and scalable to changing market conditions
- The program will focus on achieving stakeholder buy-in, specifically DME, NERSA, and industry
- The program will focus on building credibility by sending a clear and unambiguous message to the marketplace and constantly delivering on the message

Implementing the SOP

The major steps for the operation of the SOP were proposed under the ESMAP technical support program for South Africa.[5] Implementation procedures are as follows:

1. Eskom issues Requests for Applications under the SOP.
2. Project Developer identifies Project and negotiates with the customer.
3. Project Developer submits initial application to Eskom.
4. Eskom reviews the application, approves the EE/DSM measures.
5. Eskom requests final application.
6. Project Developer finalizes the measures and develops M&V plan.

[5] The initial design of the SOP assumed that Eskom would be the implementing agency for the program, and Eskom has initiated a Standard Offer Pilot Program using this design. However, as discussed later, NERSA has proposed that the responsibilities for administering the Standard Offer be initially assigned to the Development Bank of South Africa (DBSA) and later to the National Energy Efficiency Agency (NEEA). The National Energy Regulator of South Africa (NERSA) is currently reviewing public comments on its proposed regulations for the Standard Offer and expects to launch the SOP in 2011.

7. Project Developer submits final application.
8. Eskom approves or rejects the application.
9. If approved, Eskom signs the Standard Offer Agreement with the Project Developer.
10. Project Developer implements Project.
11. Project Developer submits Installation Report (IR) and requests for Installation Payment.
12. Eskom reviews IR and requests for Installation Payment.
13. Eskom disburses the Installation Payment upon acceptance of the IR.
14. M&V organization verifies savings and submits report to Project Developer.
15. Project Developer submits Savings Report (SR) and request for Performance Payment along with M&V report.
16. Eskom reviews the M&V report and requests for Performance Payment and disburses funds upon acceptance.

Steps 15 and 16 are repeated for the second Performance Payment where a two-year M&V is needed as illustrated in Figure 4.

Eligibility of Applicants

Each proposal submitted under this SOP would be required to define the Project Developer. A Project Developer may be any of the following types of organizations:

- Any customer of Eskom (residential, commercial, industrial, public institution, government, municipality, etc.)
- Any ESCO, defined as a business entity that provides any or all of the following services: energy engineering, EE measure design, equipment installation, equipment maintenance, and financing services on a performance contracting basis
- Customer cooperatives or nongovernment organizations
- Technology providers (equipment and appliance manufacturers, dealers, suppliers, etc.)

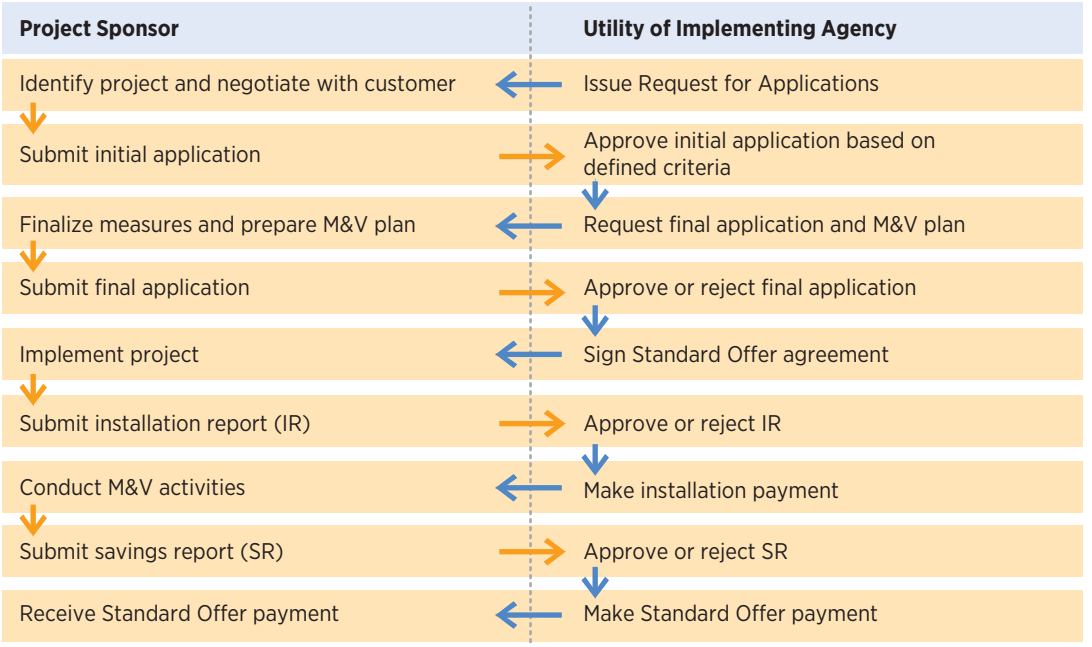
Eligibility of Projects

An eligible project will consist of any EE or load management measures and any associated equipment or improvements that are installed, maintained, or operated by the Project Developer to achieve the energy savings claimed. A site may consist of one or several adjacent buildings owned or operated by a single customer. Eskom may define minimum and maximum project sizes (based on projected energy or demand savings). To be eligible for payments under the SOP, the technologies employed in the project must be pre-approved by Eskom.

Pre-Approved Technologies

Eskom will prepare and publish a list of pre-approved EE/DSM technologies or measures that will be eligible for payments under the SOP. Eligible EE and load management measures must reduce electric energy consumption at the project site during some or all of Eskom's peak period (6:00 am to 9:00 pm), and this

Figure 4: The Standard Offer Implementation Process



Source: Developed by authors.

reduction must be measurable and verifiable. In addition, Eskom could invite technology and equipment/appliance manufacturers and suppliers to propose new or innovative technologies. These proposals will be evaluated and, if appropriate, these technologies will be added to the pre-approved list (Table 1).

Program Funding

The funding for the SOP will be obtained from a tariff levy approved by NERSA. The annual funding levels will be established and published by Eskom.

Pricing the Standard Offer

Payments procedures under the SOP are intended to be simple, standardized and transparent. These payments will be pre-specified so that Project Developers will know exactly the c/kWh or R/kW that they will be paid upon successful delivery of monitored and verified savings. The payment schedule will be determined for specific technologies and measures based on the following factors:

- Benefits to the electricity system of reduced energy and demand during various time periods (time of day, month, etc.)
- Energy and demand savings provided by the project during various periods
- Tariff category of the Eskom customer
- Annual hours of use by time period
- Lifetime of the technology or measure
- Expected persistence of the energy and demand savings over the lifetime

Table 1: Illustrative List of Eligible Energy Efficiency Technologies

TECHNOLOGY	FOCUS	DESCRIPTION
T-5 or T-8 lamps Occupancy control	Lighting Lighting	Fluorescent lamps with high efficiency magnetic ballasts. Infrared or ultrasonic occupancy sensors installed where existing controls to not exist
Daylight dimming control	Lighting	Photocell control system to adjust lighting level installed where existing controls to not exist
Incandescent to Compact fluorescent lamps (CFLs)	Lighting	CFLs to replace standard incandescent lamps. If the screw in base CFL does not contain a lock in device, the M&V must contain an acceptable restocking or replacement plan.
High pressure sodium or metal halide	Lighting	High pressure sodium or metal halides fixtures to replace mercury vapor lamps
Pulse-start metal halide	Lighting	Pulse-start metal halide to replace less efficient lighting.
LED exit signs	Lighting	Light emitting diode exit signs to replace standard incandescent signs.
LED traffic signals	Lighting	Continuous operation signals. Traffic signals replaced with light emitting diode traffic lights and pedestrian signals.
Premium Efficiency Motors	Motors/Other Pre-Approved Measures	Permanently wired motors over 1 hp, operating over 2,000 hours per year.
Variable Speed Drives	Motors/Other Pre-Approved Measures	VSD motor control to replace single speed motor control. Savings calculated on direct motor savings only.
Economizer	Motors/Other Pre-Approved Measures	System must use outside air to reduce cooling or heating loads and operate automatically. Does not include repair of an existing economizer.
EMS System	Motors/Other Pre-Approved Measures	Energy Management System controlling HVAC, lighting loads or air compressor systems. Does not include repair or activation of an existing EMS system.
Heat Pumps	Motors/Other Pre-Approved Measures	Must meet minimum applicable Energy Efficiency Ratio (EER), Seasonal Energy Efficiency Ratio (SEER), and Higher Seasonal Performance Factor (HSPF).
Refrigerated Vending Machines	Motors/Other Pre-Approved Measures	Vending machine with electronic ballasts, improved fan motor and compressor.
Refrigeration	Motors/Other Pre-Approved Measures	Process cooling and ice rink improvements, including conversions of electric and non-electric refrigeration.
Air Compressors	Motors/Other Pre-Approved Measures	Commercial or industrial applications for high-efficiency air compressors replacing less efficient equipment.

Source: Deloitte Touche, 2008.

Monitoring and Verification

A methodology for M&V will be developed by Eskom and approved by NERSA. It is anticipated that the M&V approach will utilize the guidelines provided by the International Performance Measurement and Verification Protocol (IPMVP).[6] The M&V methodology will be published as part of the SOP description. Eskom will also prepare and publish a list of organizations pre-approved to conduct the M&V for projects being proposed under the SOP. Currently, the M&V for EE/DSM projects is carried out in South Africa by a number of university-based groups. To handle the increased workload that is likely to be created by the SOP, the capacity of these university-based groups will need to be enhanced and other accredited M&V organizations may need to be created.

[6] Efficiency Valuation Organization, International Performance Measurement and Verification Protocol, http://www.evo-world.org/

Program Administration

The administration of the SOP will be entrusted to a Standard Offer Program Committee (SOPC) established by Eskom (or any other organization designated as the Program Administrator) to include representation from the major stakeholders, such as NEEA, Department of Energy, NERSA, representatives of large industry, and the ESCO industry. The SOPC would be responsible for:

- Establishing the rules and procedures of the SOP
- Developing and approving the Standard Offer Payments per kWh and kW
- Approving the list of pre-approved technologies
- Developing the M&V protocols and approving the list of M&V agents
- Approving and authorizing payments under the program

The SOPC may also appoint experts as advisors to help modify and refine the program structure and the rules and procedures based on market implementation experience

DEVELOPMENTS IN IMPLEMENTING THE STANDARD OFFER PROGRAM

Eskom submitted a proposal, as a part of its 2008 tariff filing to NERSA, to implement the SOP along the lines of what has been described above. However, in its order dated June 18, 2008, NERSA did not approve Eskom's proposal for the Accelerated DSM Program that included the SOP, in view of the potential adverse short-term impact on the electricity tariffs. The SOP was therefore not implemented at that time.

Subsequent developments with respect to EE policies and regulations in South Africa (Box 6) have led to the Standard Offer being widely accepted in South Africa as the optimum mechanism for implementation of EE measures. In particular, the *Ministerial Notice under the Electricity Regulation Act (2009)* provided for the SOP to be initiated by March 1, 2010.[7] A *New National Policy on EE and DSM (2010)* further established the SOP as the process for implementation of the incentives for EE/DSM, financed from funds collected by Eskom through its electricity tariff approved by NERSA. In response to this Notice, NERSA initiated a proceeding to revise the regulatory policy for energy efficiency and demand-side management (National Energy Regulator of South Africa, 2010a). NERSA calculated the payments that would be made for measured and verified savings delivered by project developers based on the avoided costs of electricity supply.

The SOP applies to the following EE projects:

- Government-owned buildings (particularly hospitals and clinics, prisons, military barracks, offices, etc.) and private residential dwellings
- Commercial buildings, including offices, hotels and other hospitality facilities, employee compounds at mines, refineries and power stations, etc.
- Existing housing developments
- Solar water heating projects
- Energy conservation in the industrial sector

Figure 5 defines the process and the roles and responsibilities of the various parties involved in the implementation process.

A June 2010 *NERSA Consultation Paper on DSM Rules* also proposed revised rules for EE and DSM including:

- NERSA has calculated the Standard Offer Rebates based on the avoided generation cost to Eskom[8]
- The proposed Standard Offer Payment schedule for projects that deliver savings starting in the years 2010, 2011 and 2012 is shown in Table 2, below:

Table 2: Proposed Standard Offer Payment Schedule

YEAR IN WHICH THE PROJECT STARTS DELIVERING SAVINGS	2010	2011	2012
Standard Offer Payment—R/kWh excluding M&V Costs	0.5404	0.5168	0.5798

[7] See Schedules A and B of the Department of Energy Notice, op cit.
[8] NERSA has used the "proxy plant" methodology to calculate these avoided costs.

- Project developers shall be paid the Standard Offer Payment per kWh of savings achieved per month for the duration of the contract between the developer and the SOP Administrator
- The Standard Offer Payments will be made from the tariffs as part of Eskom's Multi-Year Price Determination process
- The "deemed savings" methodology[9] will be used for calculating the savings for a number of technologies, including solar water heaters
- Project installation and achieved savings of technologies with a deemed savings methodology will be verified by accredited M&V teams using the IPMVP[10]
- The rules define the types of technologies eligible for the Standard Offer Payments and the minimum requirements for each
- All projects need to satisfy cost-effectiveness criteria to be eligible for the SOP payments
- NERSA shall accredit M&V teams based on a specified set of criteria
- In the near-term, the DBSA shall be designated as the SOP Administrator. The administration of the SOP shall be assigned to the NEEA in the future when NEEA develops sufficient capacity

The public comments on the NERSA rules were received in August 2010, and NERSA is reviewing these comments. It is anticipated that the SOP will be fully implemented by NERSA by the end of 2011.

In the meantime, Eskom initiated a Standard Offer Pilot Program in July 2010 along the lines of what was described above (Eskom 2010).

IN CONCLUSION

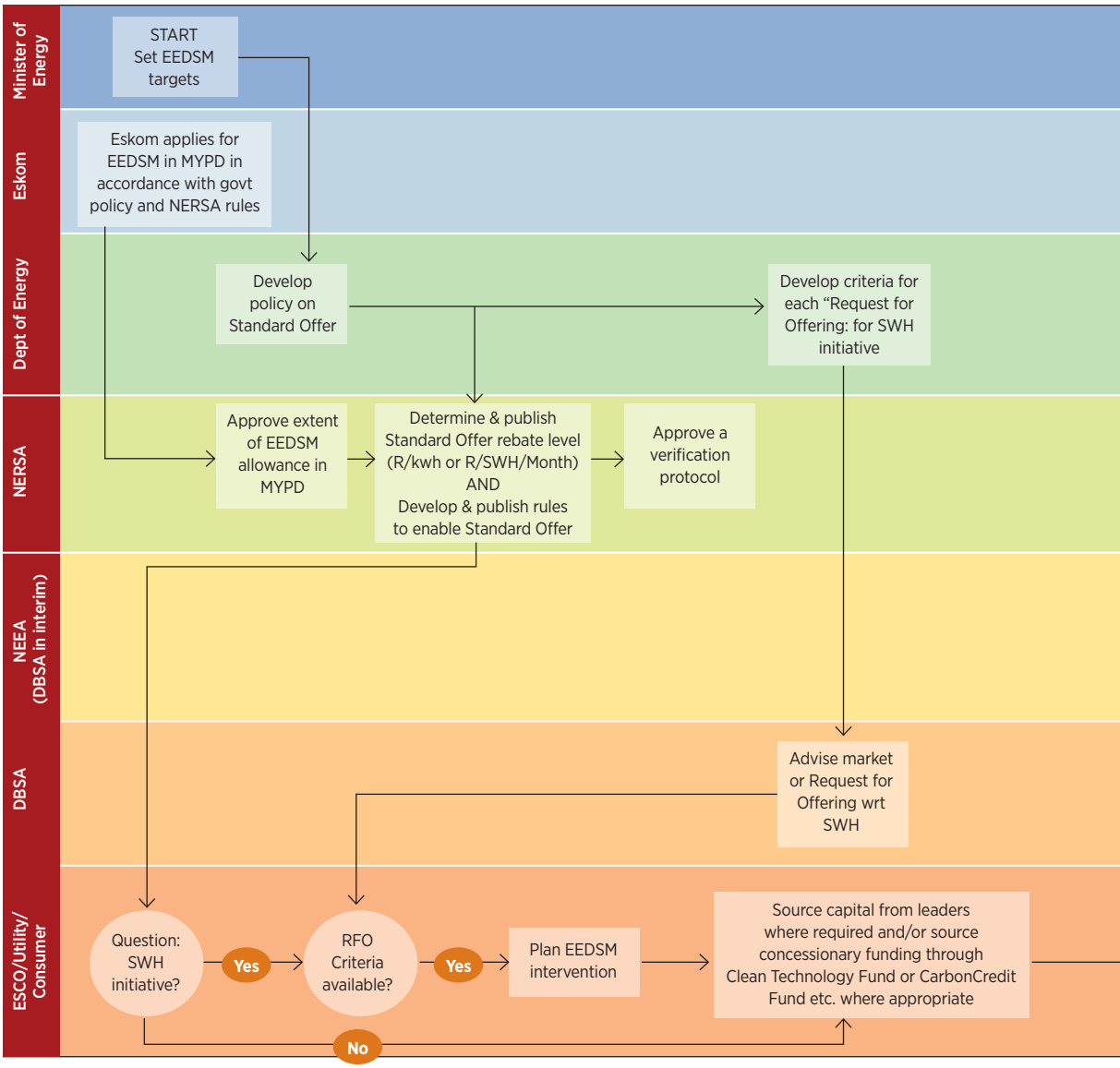
South Africa has many opportunities for aggressively moving along a low carbon development pathway. Opportunities for significant reductions in current levels of GHG emissions exist in every consuming sector and can be realized with several different technologies—EE, DSM, solar water heating, renewable power production. While South Africa has taken important steps towards implementing key elements of a national mitigation strategy, some practical problems, capacity limitations, and market and institutional barriers have affected the progress to date. The support outlined in this briefing note has helped to diagnose and address some of these limitations and barriers by adapting lessons from international experience to South Africa. The current pilot SOP being implemented in South Africa by Eskom and the planned implementation of this approach by NERSA will help scale up EE interventions in the residential, commercial, and industrial sectors, contributing to the accomplishment of the goals of the low carbon growth strategy.

[9] The "deemed savings" methodology estimates the energy savings from a project using previously agreed to or stipulated assumptions and calculation procedures, instead of requiring actual measurements of savings.

[10] Efficiency Valuation Organization, International Performance Measurement and Verification Protocol, http://www.evo-world.org/

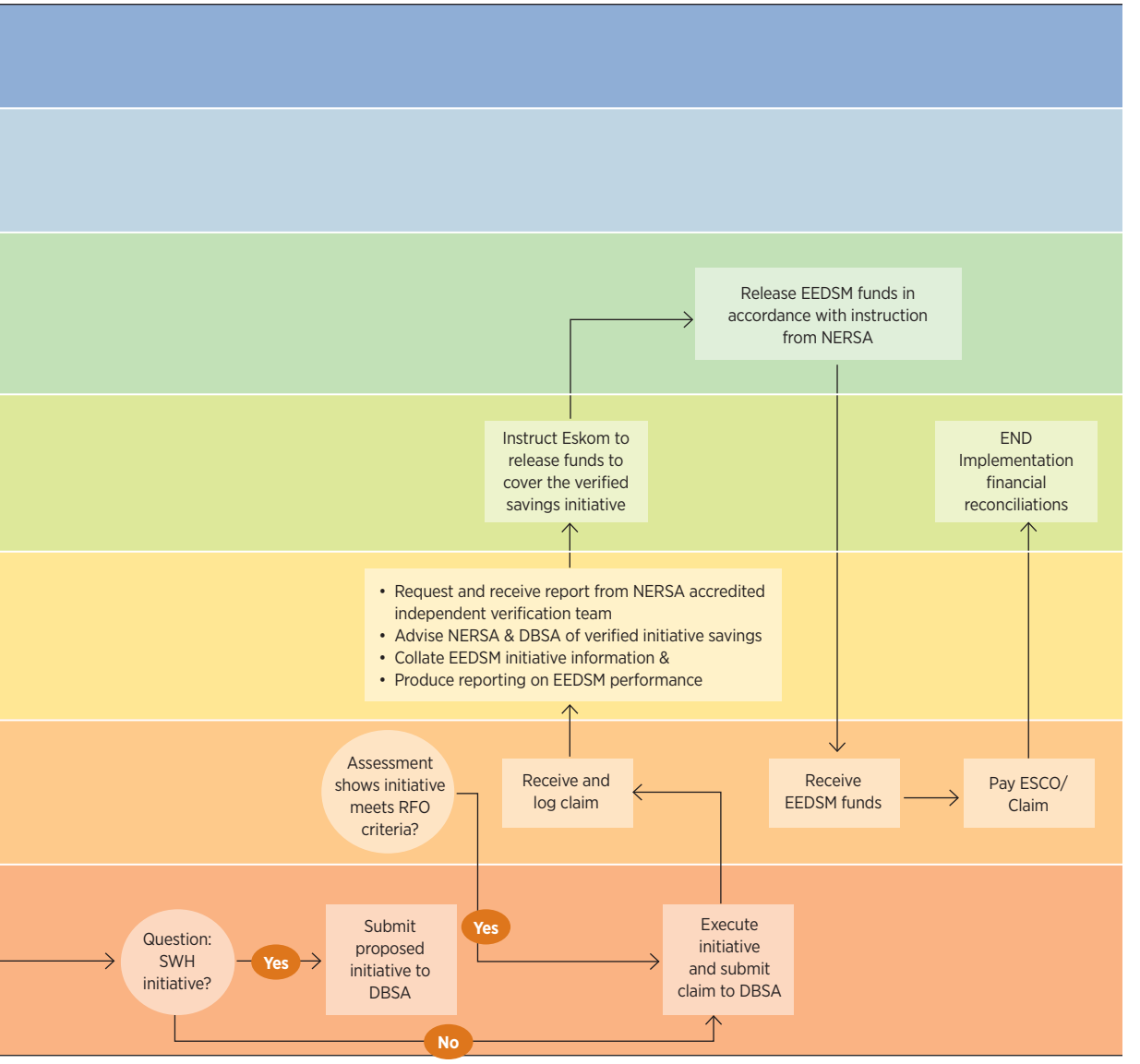
The Eskom Integrated Resource Plan of 2009 (Eskom 2009) had projected savings of about 8,700 GWh by 2015, not including solar water heaters. While NERSA has not yet published the final levels of the incentives to be offered under the SOP, which will also apply to the one million solar water heaters, it is expected that the SOP will deliver more savings than the Eskom estimates. As currently proposed by NERSA, it offers very significant incentives for implementing EE projects. The SOP is likely to mobilize substantial pri-

Figure 5: The Standard Offer Process, Roles, and Responsibilities under the EE/DSM Policy



Source: Department of Energy, 2010.
Note: A process can only commence when all conditions (arrows) into the preceding process have been fulfilled.

vate sector investment. The recent Clean Technology Fund Investment Plan for South Africa established an EE target of 10,000 GWh per year over the next three years. It is likely that the SOP savings will exceed this target. With the estimated 0.9 Mt of CO_2 per GWh of energy savings, the SOP can deliver annual reductions of 10 to 12 Mt of CO_2 within 3 to 5 years (depending on the approved funding levels), thereby contributing substantially to the low carbon growth strategy.



BOX 6.

Recent Regulatory Developments Supporting the SOP

The National Energy Act, 2008 made major changes to the institutional responsibilities for the promotion of efficient generation and consumption of energy and energy research. A new agency, the **South African National Energy Development Institute (SANEDI)** was created and assigned the following responsibilities for EE:

- Undertake EE measures as directed by the Minister
- Increase EE throughout the economy
- Increase the gross domestic product per unit of energy consumed
- Optimize the utilization of finite energy resources

Two existing organizations were placed under SANEDI—the National Energy Efficiency Agency (NEEA), and the South African National Energy Research Institute, both of which existed prior to the passage of the Act as divisions of Central Energy Fund (CEF Pty Ltd.). This Act also designated NEEA, as a part of SANEDI, as the agency responsible for the EE implementation. As stated in the Three-Year Strategic Outlook, 2009–2012, of the NEEA business plan, its objectives are:

- Prioritization and recommendation of EE and DSM projects
- Identification and development of key strategies to address the growing demand for energy
- Development and implementation of comprehensive EE and DSM awareness campaigns
- Overseeing the training and capacity building and the creation of additional jobs in the field of EE
- Coordinating the implementation of EE upgrades in the public sector
- Cooperating with persons, associations, and institutions undertaking EE programs in other countries, to ensure that international best practices are adopted in South Africa

In December 2009 a ***Ministerial Notice under the Electricity Regulation Act*** approved implementation of the Integrated Resource Plan (IRP) on new generation capacity. This IRP takes into account EE and DSM as key components of the future resource strategy. This Ministerial Notice further stated that the implementation of EE and DSM (and the installation of one million solar water heaters) will be accomplished as a part of the IRP using financial incentives, and the SOP will be the mechanism employed in accordance with the implementation rules that NERSA was mandated to develop.

In May 2010 the Department of Energy issued a ***New National Policy on EE and DSM*** that aims to:

- Provide the framework regarding the regulator's role and responsibility pertaining to various EE/DSM interventions
- Provide for the integrated resource plan to include a resource standard for EE, to ensure that the "first fuel" option relating to EE is exploited ahead of more expensive supply side options
- Provide the framework for a tariff-based financial incentive (the standard offer) necessary to stimulate EE
- Introduce a governance structure for the standard offer model for financing EE/DSM interventions, including the respective roles and responsibilities of various players
- Provide for regulatory certainty regarding the scope and extent of tariff-based financial incentives for EE/DSM
- Provide the framework for setting targets relating to various EE/DSM interventions in the domestic, commercial, and industrial sectors

This policy established the SOP as the process to be utilized for implementation of the incentives for EE/DSM. This was followed in June 2010 by a ***NERSA Consultation Paper on DSM Rules.***

Source: Republic of South Africa, 2008; Department of Energy, 2009; Department of Energy, 2010; National Energy Regulator of South Africa, 2010a; and National Energy Regulator of South Africa, 2010b.

ABBREVIATIONS AND ACRONYMS

AFTEG	Africa Energy Group, the World Bank
c/kWh	cents per kilowatt hour (South Africa)
CEF Pty. Ltd.	Central Energy Fund Proprietary Ltd.
CFL	compact fluorescent light
CO2	carbon dioxide
CO2e	carbon dioxide equivalent
DBSA	Development Bank of South Africa
DME	Department of Minerals and Energy
DSM	demand-side management
EASIN	East Asia Sustainable Development Department, the World Bank
EE	energy efficiency
EE/DSM	energy efficiency and demand-side management
ESCO	energy service company
Eskom	Eskom is a South African electricity public utility[11]
ESMAP	Energy Sector Management Assistance Program
ESPC	energy savings performance contract
GDP	gross domestic product
GHG	greenhouse gas
GW	gigawatt
GWh	gigawatt hour
IEA	International Energy Agency
IPMVP	International Performance Measurement and Verification Protocol
IR	Installation Report
IRP	Integrated Resource Plan
kW	kilowatt
kWh	kilowatt hour
LTMS	Long-Term Mitigation Scenario
M&V	monitoring and verification
Mt	million tonnes
MW	megawatt
NEEA	National Energy Efficiency Agency
NER	National Electricity Regulator
NERSA	National Energy Regulator of South Africa
oC	degrees Celsius
R/Kwh	Rand per kilowatt hour
SANEDI	South African National Energy Development Institute
SOP	standard offer program
SOPC	Standard Offer Program Committee
SR	savings report
US$	United States dollar

[11] Eskom was established in 1923 as the Electricity Supply Commission (ESCOM) by the government of South Africa in terms of the Electricity Act (1922). Following the appointment of Dr. John B Maree as Chairman in 1985, Escom was restructured to meet the electricity demands of a changing South Africa. The Electricity Supply Commission (Escom) was replaced by an Electricity Council (appointed by Government) with a Management Board appointed by the Electricity Council. In 1987, Escom was renamed Eskom.

REFERENCES

Clean Technology Fund. 2009. Revised Investment Plan for South Africa.

Deloitte Touche. 2008. Eskom Standard Offer Strategy Document. Draft.

Department of Energy. 2009. Electricity Regulation Act, 2006, Determination Regarding the Integrated Resource Plan and New Generation Capacity.

Department of Energy. 2010. Policy to support the Energy Efficiency and Demand Side Management Program for the Electricity Sector through the Standard Offer Incentive Scheme.

Department of Environmental Affairs. 2007. Long-Term Mitigation Scenarios: Strategic Options for South Africa.

Department of Minerals and Energy. 2005. National Energy Efficiency Strategy.

Efficiency Valuation Organization. 1997. International Performance Measurement and Verification Protocol.

Eskom. 2009. Integrated Resource Plan.

Eskom. 2010. Eskom Standard Offer Pilot Program for Payment of Energy Savings.

Government of South Africa. 1998. White Paper on the Energy Policy of the Republic of South Africa. Pretoria, South Africa: Department of Minerals and Energy.

Greany, J. 2009. Distributed Energy through Distributed Effort: Harnessing the Power of the End-User through Standard Offer Programs and Feed-In Tariff Systems (research paper). International Sustainable Energy Policy Project.

Limaye, D. R. 2006. Establishing a DSM Resource Acquisition Process for Maharashtra. Presentation to the Maharashtra Electricity Regulatory Commission.

Limaye, D. R. 2008, Implementation of Energy Efficiency and DSM in South Africa. Workshop presentation.

Mathews, E.H. 2005. An Alternative Funding Model for EE/DSM Projects.

National Electricity Regulator. 2004. Regulatory Policy on Energy Efficiency and Demand-Side Management for South African Electricity Industry.

National Energy Efficiency Agency. 2008. Leading the Way in Energy efficiency Implementation: A Three Year Strategic Outlook 2009-2012, Business Plan.

National Energy Regulator of South Africa. 2008. NERSA Determination on Eskom's Application for Price Increase.

National Energy Regulator of South Africa. 2010a. Revision of Regulatory Rules for Energy Efficiency and Demand Side Management (EE/DSM) including Standard Offer Program (SOP). June 2010.

National Energy Regulator of South Africa. 2010b. Invitation for Public Comments on Energy Efficiency and Demand-Side Management Rules.

OECD Factbook. 2010.

Republic of South Africa. 2008. National Energy Act, No. 34.

Singh, Jas, et al. 2010. Public Procurement of Energy Efficiency Services: Lessons from International Experience. The World Bank, Washington, DC.

The World Bank. 2008a. Accelerating the Implementation of Energy Efficiency: The Standard Offer Approach. Presentation to senior management of Eskom.

The World Bank. 2008b. Proposed Standard Offer for Purchase of Energy Savings. Draft Report.

The World Bank. 2010c. Project Appraisal Document No. 53425-ZA for a Proposed Loan to Eskom Holdings Limited, Guaranteed by the Republic of South Africa for an Eskom Investment Support Project.

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