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Capacity Building in Energy Planning and Management

Tariffs mechanisms Mozambique

Mission report

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ABBREVIATIONS

AfDB	African Development Bank
CNELEC	National Electricity Council
DSM	Demand Side Management
EDM	Electricidade de Moçambique
ESKOM	Electricity utility of South Africa
GoM	Government of Mozambique
HCB	Hidroélectrica de Cahora Bassa
IPP	Independent power producer
LPG	Liquefied Petroleum Gas
ME	Ministry of Energy
PPA	Power purchase agreement
PPI	Producer Price Index (South Africa)
PPP	Public-Private Partnership
PV	Photo voltaic
SHP	Small hydropower
SHS	Solar home system
SME	Small and Medium-sized Enterprise –(less than 250 employees)
USD	United States Dollar

1 INTRODUCTION

This report relates to Activity 4 of the EuropeAid 127640/SER/MZ on Capacity Building for Energy Planning in Mozambique.

The aim was to assist the Directorate of Studies and Planning in getting an overview of the formal tariff setting mechanisms in the country and the current status of implementation. The issue of tariffs is linked to the work of establishing the energy statistics and the energy modelling and the discussion of policy measures necessary to ensure a sound development of the energy sector.

The mission that was carried out during a 10-day period to Mozambique in late March 2012 included:

1. Description of the current tariff regime in Mozambique, what are the mechanisms and the process involved. This should be done for electricity and petroleum products, but also off-grid if possible.
2. Review of the Energy Strategy Paper from 2009 on tariffs and financial mechanisms (chapter 7) as an input to revision in 2013.
3. Link to International practice in tariff setting
4. Make recommendations

The Ministry of Energy emphasized that the tariff areas is very politically sensitive and that the role of the consultant was to focus on capacity building and creating overview and not to carry out a tariff review as such. Subsequently, interested ME staff were given an introduction to basic tariff principles and vocabulary during the mission.

During the mission the consultant in cooperation with appointed ministry staff carried out interviews of key sector stakeholders involved in tariff setting and/or providing energy services for a fee.

The key observations have been presented to Ministry of Energy orally at the end of the mission as well as in this mission note.

The consultant on this assignment was Ms Christine Rud Wennerberg, short-term key expert, Grontmij A/S assisted by the Team-Leader Mr José Miguel Nicolau, Grontmij A/S. From the Directorate of Studies and Planning; Ms Laura Nacale, National Director and Mr Anucência Bouene, economist.

2 THE CURRENT TARIFF REGIME IN MOZAMBIQUE

Tariffs that ensure sufficient revenues and address the efficiency of the sector are key in ensuring the financial sustainability of the energy sector. In general the tariff-setting in the energy sector in Mozambique are guided by the following principles:

The tariffs and terms of supply to be applied shall be fair and reasonable:

- Ensure the minimum possible cost to consumers and which is consistent with the quality of the service provided;
- Amortise over time the capital and operating costs; and provide an adequate return on the capital invested in the installation in question.
- No government subsidisation
- Encourage efficient use of energy

2.1 Electricity tariffs

2.1.1 Regulatory framework

The key entities impacting the electricity tariffs setting in Mozambique are:

Institution	Main role in relation to tariff setting
Ministry of Energy/Ministry of Fianance	Approves the tariff. Gives instructions to CNELEC on focus and working areas until end of 2012.
CNELEC	Reviews tariff proposals and methodologies and advise the ME
HCB	Negotiate with ESKOM on price of electricity that directly is linked to price of main generation in Mozambique. HCB supplies ESKOM and EDM from the hydro power plant La Cahora Bassa
EDM	Electric utility of Mozambique, proposes tariffs adjustments, in charge of imports/exports, some generation, transmission, distribution, sales to end-customer.

Electricity tariffs are based on the principles stipulated in Electricity Law (Law 21/1997) and further detailed in Decree 42/2005 and Decree 29/2003. The ladder includes some tariff principles and an adjustment formula that includes cost of HCB supply and inflation rates in Mozambique.
The electricity pricing principles are also outlined in the Energy Strategy from 2009: setting principles:

- Cost reflection
- Incentives for energy savings and energy efficiency
- Mitigation of environmental costs
- Social considerations and fairness
- Promotion of national cohesion
- Ensure fair profits for investors.

The timing and frequency of the tariff process are not stipulated in the regulations. In practice tariff adjustments are proposed by EDM as and when EDM assess a need for adjustments. The proposal is reviewed by CNELEC who provides its recommendations to the Ministry of Energy who put the request to Government.

The Electricity Law is currently under review. The review report from March 2011 is currently with stakeholders for comments and feed-back. It is expected that a revised electricity law is to be put before parliament in September 2012.

Law review proposes the following orientation of the tariff regime (priority order): ensure financial sufficiency, economic efficiency, fairness, simplicity and transparency.

The key issues of the review deals with:

- Establishing CNREC as an regulator of electricity tariffs
- Concession conditions
- Alignment with other legislation, e.g. on public-private partnerships, access to resources, and various degrees approved since 1997.

2.1.2 CNELEC

The National Electricity Council, CNELEC, was created as legal entity with the approval of the Electricity Law in 1997. However, it was only staffed in 2006 and its functions were limited to that of an advisory body for an interim period from 2006-2009. A directive from the Ministry of Energy in July 2006 established a plan for CNREC during the transitional setting-up period. The transitional period was later extended to 2010 and finally to 2012.

The staff of CNELEC is currently 11 persons including two engineers, 3 economists and 1 lawyer. It is funded through a share of concession fees, currently 2.5% of the concession fee paid by HCB.

The workplan for the first period up to 2010 included three main tasks:

- Monitoring of the performance contract between government and EDM
- Make recommendations in relation to technical and commercial quality of service of EDM (mainly)
- Make recommendations for revision of the current tariff methodology applied by EDM with emphasis on tariff levels, tariff structure, calculation of operation and capitals costs, as well as principles and methodologies for cross-subsidisation between different consumer categories.

With assistance from the World Bank/ ERAP CNELEC contracted a consultant to carry out the review of the tariff methodology. The study, however, did not go into detail on EDM cost and subsequently EDM in cooperation with CNELEC has contracted a consultant to make a more detailed tariff review and proposal for tariff adjustment. The review was completed in March 2012.

The instructions to CNELEC for the second period, 2011-2012, requests CNELEC to:

- Evaluate and publish annually its evaluation of EDM's commercial, technical and financial performance
- Establish standards for commercial service and technical quality of service
- Carry out an independent annual review and validation of data reported by EDM

CNELEC staff has not produced or published analysis of its own work but relies on external consultants. It is proposed as part of the revision of the electricity law that CNLEC is established as a proper regulator. CNELEC, however, has so far not managed to establish itself as an proactive and serious player in the sector and it is doubtful that mandating CNELEC as a regulator will significantly change this.

2.1.3 HCB

HCB is the main generator of power to Mozambique, but the bulk of the generation is supplied to Eskom in South Africa on a long-term agreement. HCB used to sell power through the South African Power Pool SAPP, but in 2008 EDM took over the role of importing/exporting power. HCB has four units in normal operation and a fifth reserved for emergency and reserve.

HCP has an obligation to supply 300 MW as firm power to EDM. In an agreement linked to putting the reserve unit (the fifth unit) into operation at HCB, EDM now receives an additional allocation of 200 MW.

The tariff that EDM pays to HCB is directly linked to the tariff that Eskom pays to HCB. EDM pays 55% of the Eskom tariff for the first 300 MW and 38% for the power from the fifth unit.

The Eskom tariff consists of two elements:

- The basic tariff that is estimated and negotiated every five years.
- An annual adjustment based on the PPI index from SA.

The basic tariff is based on the avoided cost of generation in South Africa and is negotiated between Eskom and HCB directly. The tariff is not regulated or overseen by CNELEC. The current Eskom tariff is around 2.5 US cents per kWh. A tariff review is due in 2012.

The annual adjustment from 2011-2012 was 10.6%

When HCB cannot meet its supply obligations to Eskom, the penalty for non-delivery to Eskom is 125% of the tariff.

The avoided cost of power in South Africa will be increasing in the coming years due to the need for new generation capacity. The options available to Eskom are a limited amount of hydro power at cost below 5 US cent per kWh and electricity from new-build coal-fired plants at typically 10 USc. Eskom is willing to pay a premium for renewable energy such as hydro.

As the cost to EDM for HCB power is directly linked the Eskom tariff the developments in the power sector in South Africa is of immense importance to Mozambique. A good understanding of the power situation and the dynamics and priorities in South Africa is therefore a prerequisite for understanding and forecasting the power situation in Mozambique and the future developments in the cost of power to EDM.

2.1.4 EDM

EDM is in charge of imports/exports of power, operator of the transmission network as well as distribution and supply to end-user in Mozambique. Decree no 43/2005 designates EDM to be in charge of the national transmission network and to separate this function from its other activities including the costs.

Like the situation between HCB and Eskom, the EDM tariff regime consists of a basic tariff and an adjustment mechanism. However, there is no specific timing for the review of the basic tariff and the adjustment formula is not automatic.

The latest major tariff review was approved in 2001, but a new review that looks a the tariff methodology and structure and introduces new features such as time-of-use (TOU) tariffs for large customers, Demand Side Management (DSM) and Demand Market Participation (DMP) has just been completed and will be submitted in the first half of 2012 to CNELEC for consideration.

The adjustments following the formula in the Decree 29/2003 are considered only when EDM submits a proposal for adjustment to CNELEC and the Ministry of Energy. The latest adjustment was proposed in 2011 and approved, but subsequently redrawn for political reasons.

EDM gets the bulk of its power need from HCB as an allocation of capacity (se above). As the load in Mozambique varies with the time of the day and over the year, there are periods during which EDM is not drawing fully on the HCB allocation of power. During these periods, typically at night and weekends, EDM export power to neighbouring countries to make the maximum of the allocation form HCB. EDM has five staff working full-time to the task of buying and selling power at the regional market. During peak hours the allocation from HCB and EDM's own generation is not sufficient to meet the demand. During these hours (typically during the evening lighting peak) EDM imports emergency power from Eskom at a very high cost.

Key issues in the assessment of the EDM end-user tariff are the forecasts of costs in generation, transmission and distribution as well as the developments in the customer base in the coming years:

- A rapid growing demand for electricity and an increasing peak demand (616 MW in 2011) mean that new generation capacity is to be added to be able to satisfy the Mozambican market. The peak demand is growing by approx. 60 MW per year.

- The peak demand cannot be covered by the current HCB allocation and EDM's own power generation. Importation of power from ESCOM is therefore necessary to cover the deficit. The cost of this import amounted to approx. 20% of the total costs of EDM in 2011 although in energy terms it constitutes only 90 GWh (or a few per cent of local demand).

- Income from exports amounts to 10-14% of total EDM income.

- Transmission bottlenecks. High investments are needed in transmission networks to enable new generation capacity feed into the grid and to evacuate sufficient power to the demand centres. The current wheeling charges are too low to attract investments in transmission.

- Large power generation projects often require government guarantees. This is an important issue for GOM to be conversant with and have a position on.

- Electrification is to a large extent progressing according to political requirement and not according to feasibility criteria. The Government request to electrify all administrative centres regardless of the costs is an example of this. How are these costs to be covered when the growing customer numbers are in the poorer areas?

- The annual number of new connections as well as political request to expand national coverage of the electricity grid supply leads to a growing share of customers with very low demands. The overall electrification level was 16% at the end of 2011. This is made up of a high ratio in the south of more than 35% and much smaller numbers in Central and North (less than 10%). The average consumption of domestic customers is now less than half of the level ten years ago. In 2010 the average domestic consumer consumed 1,135 kWh per year or less than 100 kWh per month.

- Losses, technical and commercial, are still high, despite the roll-out of pre-payment meters now reaching approximately 90% of the domestic customers.

- The tariffs for domestic, commercial and agriculture consumers are currently progressive, meaning that the consumer pays more per unit the higher the monthly consumption. The tariffs are differentiated according to the following levels: 0 – 300 kWh, 301-500 and above 500 kWh. With demands leading to imports of emergency power at 30 US cents or more it might be prudent to look at the structure and the need for the tariff regime to be more progressive than is. Domestic demands above 500 kWh per month implies use of inefficient appliances and high-consuming appliances such as air-conditioners.

- The social tariff, applicable for monthly demands lower than 100 kWh is hardly used. EDM has only registered 3,000 customers on the social tariff out of now approximately total of one million costumers. Costumers with a demand below 100 kWh per months do not automatically pay the social tariff. To become eligible the consumer has to submit an application to EDM justifying their application. It is clear that EDM does not promote the option.

2.2 Petroleum products

The key stakeholders in setting the fuel prices in Mozambique are:

Institution	Main role in relation to tariff setting
Ministry of Energy	Reviews prices on a monthly basis and announce adjustments

Ministry of Finance	Set levies and fuel taxes
The oil market companies (OMC)	Import, distribute and market fuels for industrial customers at filling stations. The company Impetro imports petroleum products on behalf of all OMC.

The principles guiding the fuel tariffs are presented in the Decree62/2006:

- Ensure an efficient, effective and economic supply of petroleum products
- Promote competitions
- Promote a better access to products nationwide
- Promote efficient and rational use of petroleum products while protecting the environment.
- Support small-scale farming

Fuel tariffs are reviewed every month by the Ministry of Energy, Directorate of Fuels following a formula stipulated in the Decree 62/2006. Tariff for large industrial customers have been regulated accordingly, but tariffs at the filling stations have not been adjusted for the past 2 years for political reasons.

The tariff is made up of cost of importation, operators' margin and levies and taxes. The prices are made for Matupo, Matola and Beira (Zone A) and a 500 meter zone along the national route 4. For filling stations outside these areas a transport margin is allowed. The adjustment formula includes elements such as inflation, exchange rate, etc.

The licence fee is used as a means to make supplying rural areas more attractive. The licence fee is very high in Zone A, whereas it is very low for stations outside this zone. Zone C includes remote towns in districts that are difficult to supply. Zone B is all that is not A or C.

A part of the geographical levy inspection taxes are used to fund an initiative of improving access to fuels in rural areas. This initiative is managed by Funae. Kerosene is tax exempted and tax imposed on LPG is very low.

In the past two years an important increase in sales of gasoline and diesel has been noted. An analysis of the reason for the increase has not been made. The distribution of the sales on industrial customers and that of filling stations and its development over time could give an indication of the drivers of the demand. This information is, however, not readily available. Smuggling across the borders to neighbouring countries could be a contributing factor to the increase in sales, but concrete data are not available to confirm this.

2.3 Off-grid tariffs and feed-in-tariffs for renewable energy

Currently there are no regulations related to end-user tariffs for off-grid energy supply from sources such as solar PV, mini-hydro, bio-fuels etc. other than what is stipulated in the legislation related to concessions. Tariffs for electricity delivered to the grid by private owners of renewable energy are currently handled on a case-by-case basis by EDM as for traditional IPPs.

The agency Funae plays an active role in establishing a commercial market for renewable energy technologies and supply of energy in rural areas. Funae was established through the Decree 24/97 as an agency under the Ministry of Natural Resources and Energy. During the first ten years of operation, Funae was largely funded by donors, but now Funae receives its funding from several streams of which a 40% share of the HCB concession fee is most important. From a staff of approximately 25 in 2007 Funae now employs around 128 people (135 including trainees) and has opened local offices in Sofala, Nampula and Niassa. Funae reports to the office of the Minister of Energy.

The market for renewable energy technologies is, however, still not well developed in Mozambique. Funae has therefore in some government or donor-funded projects taken on the role as owner of the systems and is delivering energy services to end-users for a monthly service fee. The tariff that the end-user pays has traditionally depended on the project circumstances and the funding source with criteria such as size of the system, amount of donor-funding as well as ability-to-pay and cost of delivering the service. Typically the consumer pays a monthly fee that covers the cost of collection and small maintenance work. The investment cost and major repairs are paid for by Funae made possible through donor funding and government contribution. As the projects, according to the ministry of Energy, still have the characteristics of being pilot projects or part of a learning process, service charges and conditions have not been subject to formal regulation.

Funae is currently engaged in the establishment of 3 larger solar PV plants in Niassa (Muembe, Mecula and Mavago) that will be connected to the local electricity grid and in several mini-hydro projects involving a large number of customers.

Ministry of Energy through the Directorate of New and Renewable Energy has, as part of the implementation of the Strategy for Renewable Energy, requested Funae to initiate a work of formulating standard tariffs for renewable energy related to the technology, geography and the service delivered. In February 2012 Funae in cooperation with CNELEC and the Ministry of Energy therefore launched a consultancy on renewable energy tariffs, a work that apart from service charges also will include work on Feed-in-tariffs for renewable energy delivering electricity to the grid. The study is referred to as the NEXANT study.

Funae coordinates with EDM on plans for electrification. It does happen, however, that an area serviced by Funae is reached by the EDM grid. In this case Funae dismantles its equipment and removes it. It happens, according to Funae, that a costumer prefers to continue getting the service from Funae even after the area is electrified by EDM. This is accepted by Funae.

A test case for Feed-in-Tariffs is currently being launched by the Ministry of Energy in the form of a public tender for a grid-connected wind farm in Inhambane. The tendering process for the wind project is in line with the general rules for generation concessions. As the grid capacity to evacuate the wind power may be a constraint the bidder needs to asses this himself and propose a suitable project. The max. size of the wind farm is 30 MW. Another test case could be the solar PV plants in Niassa that Funae is in charge of.

The following key issues have been identified:

- The role of Funae as an electricity producer and supplier is unclear. As Funae increases its activities and areas of operation this would need to be clarified.
- An off-grid service charge or tariff depending on technology, capacity and possibly geography as foreseen in the Nexant study would require a number of other issues to be dealt with, e.g. quality of supply issues, definition of concession areas for PV electrification, approval and adjustment of the tariff and other regulatory issues.
- A concession agreement “light” is already being considered by the Ministry of Energy for small-scale RE power generation. A simpler concession process for smaller renewable energy systems seem relevant to promote smaller renewable energy technologies either feeding in to the national electricity grid or supplying into a small local grid.
- The continued service delivery by Funae in areas in which EDM provide service seems inefficient and inappropriate.

3 SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS

The Energy Strategy Paper was approved in 2009 as the guidance of government intervention in the Energy Sector. The strategy is to be updated during 2013. Section 7 deals with tariffs and fiscal regime of the energy sector. The strategy outlines very briefly the principles on which energy tariffs should be based but does not present an analysis the current tariff regime and the issues that need to be dealt with. This is very much needed.

Although the mechanisms and methodologies applied for end-user tariff setting in electricity and fuels sector in Mozambique in general follow internationally accepted principles the pricing policy could be improved and made clearer in a number of areas. The areas are presented below.

The cost of electricity generation and transmission will increase significantly in the future as massive investments in new and more expensive infrastructure is needed to satisfy the increase in demand. Although the share of low-consumption consumers is increasing as the electrification of the country progresses, the main driver of electricity consumption is the economic growth and the need for electricity to industry and large commercial entities. These changes in consumer base and in the future cost of supply necessitate a rethinking of the electricity tariff regime to be able to ensure quality supply for industry and productive entities. As the electricity sector expands the need increases for a clear demarcation of cost of monopoly services and that of commercial activities.

It is recommended to relate the discussions on tariff setting to that of the **future electricity market structure** envisaged for Mozambique. One challenge is to ensure that low cost electricity generation options in Mozambique is not exported without any benefit to the consumers in Mozambique, who then are forced to pay for expensive imports during peak hours. One way to encourage generation in Mozambique could be to introduce a levy on electricity exports.

Social concerns form part of both the electricity and fuel price setting. Although the methodology for determining electricity and fuel tariffs follow the same principles of cost reflective tariffs, the principles of setting the final consumer tariffs are very different in fuels and electricity sectors. Where the principle of uniform geographical tariffs is used for electricity and follows a progressive tariff regime– the higher the consumption the higher the unit cost, - the fuel prices are differentiated according to the allowed transport margin from fuel supply centres.

While it is acknowledged that the electricity and fuel sectors have different development paths it might be worthwhile making a common approach to setting end-user tariffs while at the same time ensuring to financial viability of the companies involved in the service delivery. The principles for the distribution of the costs on various consumer categories according to e.g. social development objectives in the various energy subsectors should be aligned and transparent. Inclusion of social concerns in energy tariff setting is difficult albeit legitimate and should be done carefully to avoid unnecessary subsidies and complexity . It is important for the government to have an overview of key mechanisms in energy price setting that have a social element, e.g. a clear view of target groups (who qualifies), what are total impact of the subsidies and other levies on various consumer groups, are there groups who can afford to pay more? Such an analysis could be useful to carry out as part of the preparation for the revision of energy strategy in 2013.

Tariffs for off-grid services are currently being analysed in a study initiated by the Ministry of Energy together with feed-in-tariffs for renewable energy technologies. Funae is becoming more and more involved in direct energy service delivery and a discussion seems needed of the role of Funae in providing the services in the future and the need for regulation of these activities.

Review of the **concession arrangements** to introduce a simpler process for small-scale generation and service delivery would be instrumental in promoting renewable energy and harvesting the potential for small-scale generation.

ANNEX A LIST OF PEOPLE CONSULTED

Ministry of Energy:
National Director, Studies and Planning, Ms Laura Nacale
National Director, Fuels, Ms, Felicebela Cunhete
National Director, New and Renewable Energy, Mr António Saìde
Biomass Officer, Directorate New and Renewable Energy, Ms Emilia Come
Advisor to the Minister, legal officer, Mr Ilido Xavuer Bambo,

CNELEC:
CEO and chairman Mr. Guilherme Luis Mavila
Commissioner, engineer Mr Issufo A. Remane Mussag
Engineer Mr Sérgio P. Moreno
Accountant Ricardo Manuel Mato
Assistant, Ms Claudia Jeremias,

HCB:
Planning and consumption control, Mr Pedro Gove,

EDM:
Director Market Operations, Mr Adérito Sousa

Funae:
Head of Planning and Studies, Mr Edson Clarêncio Uamusse

ANNEX B LIST OF DOCUMENTS CONSULTED

EDM, Annual statistical report 2010
EDM, Annual report 2010
EDM, Technical quality report of the transmission network performance, 2010
EDM, Technical quality report of the distribution network performance, 2010

Ministry of Energy, Electricity Law, Law No 21/97
Ministry of Energy, Instructions for CNELEC for the transitional period 2011-2012
Ministry of Energy, Decree No. 8/2000 on concessions for energy supply services
Ministry of Energy, Decree No. 25/2000, on the organisation and functions of CNELEC
Ministry of Energy, Decree No 62/2006 on petroleum products
Ministry of Energy, Estructura de preços dos combustíveis, February, 2011
Ministry of Energy/ERAP Mozambique, Review of Mozambique Electricity Law, final report, March 21, 2011
Ministry of Energy, Energy statistics 2000-2011, draft unpublished version, April 2012
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Ministry of Energy, Energy Strategy, 2009
Ministry of Energy, Renewable Energy Policy, 2009
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ESKOM, Eskom's Tariff Design Methodology 2008/9

www.funae.co,mz

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