UNEP/MEDREP Awareness and Training Support Facility

# Needs Assessment Report
# Capacity Building for Financing Sustainable Energy

Tunisia, Morocco and Egypt

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## Report Summary

Financing of Energy Efficiency projects and companies remains a challenge world-wide. Increasing private sector investment in the ATSF target countries of Tunisia, Morocco and Egypt is no exception. Capacity building for financial institutions along with key accompanying strategies such as applied regulatory frameworks, technical assistance, financial mechanisms remain crucial for energy efficiency market uptake, particularly in developing regions.

In all countries included in his UNEP/MEDREP Awareness and Training Support Facility project efforts are being made on all strategic fronts, albeit at different levels of advancement. Tunisia for example, has longest standing and most developed regulatory framework. This has facilitated implementation of projects, both technical and financing in nature, by national, international development, and multilateral actors in the sector. Energy Efficiency is now also receiving increasing attention in Egypt and Morocco, countries both faced with potential energy shortages and black-outs.

A large portion of the following report including policy framework, policy gaps and barriers, EE technology deployment and market potential, and an overview of financing of energy efficiency served as preparation to two capacity building seminars for financing energy efficiency in Morocco and Egypt.

Recommendations demonstrate the need for ongoing capacity building for financial institutions, particularly in the area of financial engineering, due diligence and risk management.

It was found that, particularly in the case of Morocco where the seminar's main partner is committed to increasing EE activities, sector specific training utility-customer would be of benefit.

In both Morocco and Egypt, executive bankers stressed the importance to receive support for marketing efforts not only the financial institution in order to integrate energy use considerations in investment decisions, but even more so to support communicating the importance of EE measures to the banks clientele as a crucial part of ensuring the company's long term financial viability in terms of energy costs and in terms of reducing energy needs in the face of potential future energy shortages.

In all countries – including Egypt where most sectors have faced a 50% increase in energy costs just weeks after the seminar held within this project. – local partners and financial institutions are poised for future cooperation with UNEP/MEDREP to implement further adapted capacity building for financial institutions.

## 1. Introduction

One of the most important factors to successfully deploying energy efficiency technology is securing reliable and adequate financing. Energy efficiency technology exists and new technological innovations are in development. Policy makers have realised the importance of enabling legislation to support the reduction of energy use and emissions. Financing, coupled with policy, capacity and technological options increasingly plays a catalyst role in bringing projects to implementation and scaling up EE market growth.

The UNEP/MEDREP Awareness and Training Support Facility is conceived to provide the financial community with the necessary tools to evaluate renewable energy and energy efficiency investment alternatives. It seeks to turn the financial sector into a key actor for the promotion of clean energy technologies and sustainable development in MEDREP countries. The Awareness and Training Support Facility is developed jointly by UNEP and its collaborating agency BASE (Basel Agency for Sustainable Energy).

This initial activities of the programme are the preparation of a needs assessment report and 2-one day training/awareness raising seminars in Morocco and Egypt.

This needs assessment report acts as an overview to the EE markets in Tunisia, Morocco and Egypt. The goal is to provide information on the current market situation and technological status for energy efficiency, evaluate the level of awareness of financing energy efficiency within the local financial sector, and identify barriers that impede financing of energy efficiency projects[1]. The report is supported by recommendations coming from training seminars held in two of the target countries—Morocco and Egypt—held to introduce EE financing to local financial institutions and help to understand the local capacity building requirements to increase investment in EE projects and deployment of EE technologies.

## 2. Background

*Tunisia*

When Tunisia experienced its first energy deficit - first in 1994, then steadily as of 2001[2] - it also experienced a loss in energy export revenues. The government had to address security of energy supply and increased energy demand due to increased social and economic growth. One of the main strategies to achieve this was to increase activities on energy savings and management.

Of the three target countries in this needs assessment, Tunisia is by far the most advanced with respect to energy efficiency technology deployment, policy and regulatory support and experience with financing. Its legal and institutional framework for energy efficiency is comprehensive and well-developed, including: legislation and regulations, subsidies to energy audits and investments, fiscal

[1] Information and data available varies greatly between the three target countries. For this reason there is not complete consistency in information and data presented for all countries.
[2] Plan Bleu/UNDP. March 2007 - Tunisia

incentives and dedicated institutions. Tunisia also has successful experience with financing mechanisms for energy efficiency. There is a network of ESCOs and regulation of professional activities in EE projects. [3]

*Morocco*

Morocco has no domestic energy resources (other than renewable energy), with a large dependence on fossil fuels (importing 96% of its energy needs). Growth within many sectors in Morocco is increasing energy demand and awareness on the importance on addressing the energy situation is increasing amongst decision makers and civil society. Still, the projected energy mix remains heavily dependent on fossil fuels.[4]

There are several other factors that will support that need (both on behalf of government and energy users) to increase EE activities and provide financing for them. Moroccan industrial and commercial firms are facing large international (esp. regional) competition, new quality standards have to be respected, particularly for international/multinational firms. From the local financing perspective, positive factors include a surplus of liquidity on the financial market and relatively affordable interest rates offered by banks.[5]

Although Morocco has recently increased its activity in implementing renewable energy projects, particularly solar and wind, energy efficiency policy and initiatives have been limited.

*Egypt*

Egypt, an energy exporter, has had very little motivation or interest in energy efficiency policy or initiatives. Large discoveries of natural gas in recent years kept the government's attention away from developing the renewable energy sector and markets. Oil and natural gas production meet domestic needs (which depend on more than 94% on oil and gas) and remain the main export commodity, playing a key role in Egyptian economy. Total GHG emissions were estimated at 137.11 Million ton of $CO_2$ equivalent in 2004/2005, out of which more than 70% was emitted by the energy sector including about 35% attributed to the electricity sector.[6]

However, Egypt is now faced with the challenge of meeting growing demand[7] and maintaining revenues from oil and gas exports. Increasing energy efficiency in all sectors remains a challenge due to highly subsidized energy prices (although there have been attempts to reduce the subsidies, prices remain very low and hinder the economic viability of most efficiency projects – see page xx).[8] As a result, Egypt is now considering energy efficiency not only for sustainable development, but also to free-up energy for exports, enhance the profitability for industry (an increasing priority as large state-owned industry is privatised) and address green house gasses. Industrial energy intensity in Egypt is three times that of OECD countries. Energy consumption is one fifth OECD countries, demonstrating the high potential

[3] European Investment Bank. October 2007
[4] Plan Bleu/UNDP. October 2007 - Morocco
[5] European Investment Bank. October 2007
[6] Plan Bleu/UNDP. March 2007 – Egypt
[7] From 1980 to 1998, Egypt's energy consumption increased by 171%, (UNEP Egypt)
[8] World Energy Council. June 2007

increase in energy demand[9]. The annual increase in electricity demand between 1981-2 and 2005-6 was 6.64%, placing a large demand primary energy sources, particularly fossil fuels.[10] This demonstrates the need to take action as well as the fact that Egypt will likely become an oil importer in the near future, increasing the role of natural gas to meet energy demands, and thus reducing its ability to meet NG export commitments and its export revenues.[11]

## 3. Policy Framework

Policy supporting energy efficiency

*Tunisia*

Tunisia's legislation supporting energy efficiency goes back as far as 1985. The law on energy management of 2004 brought energy efficiency to the forefront making it one of country's main sustainable development priorities. The most recent strategy is under what is called the 11th Plan, 2007-2011 where objectives have been set at a cumulated 2.7 Mtoe (a reduction of approx. 8%)[12]

The strategy for the rational use of energy is implemented by its national agency for energy management, ANME (Agence nationale pour la maîtrise de l'énergie). Ambitious objectives have been set including an increase of renewable energy to represent 6,5% of in the energy mix by 2030 (presently 1%) and reduce energy intensity by 2% per year[13], and staying on course could prove to save over 100 million tonnes of oil equivalent (TOE) [14]
Its programme[15] includes:

- Enhancing awareness raising and information
- Setting out the appropriate legal framework to encourage the private sector to invest in the field of energy efficiency;
- Involving the public sector in making profitable use of the energy efficiency potential;
- Mobilising the financial resources necessary to the development of the sector;
- Building local capacities and providing support to research and development programmes.
- Policy also includes supporting the contracting of ESCOs for energy savings, legal text for the framework for the operation of ESCOs, including minimum procedures and conditions for ESCO operations to ensure quality control, and financing possibilities including performance guarantee contracting.[16]

One particularly high impact piece of legislation has been the passing of a law[17] that requires mandatory energy audits and their implementation for industrial energy use as of 1000 toe and energy use in transport, tertiary and residential sectors as of 500

[9] Salmawy, Hafez. 2006
[10] Plan Bleu/UNDP. March 2007 - Egypt
[11] ibid
[12] European Investment Bank. October 2007
[13] Energine.com
[14] Infotunisie.com
[15] African Wind Energy Association
[16] World Bank/GEF. 2004
[17] Law n° 2004-72 of 2 August 2004 pertaining to energy management an Decree n°2004-2144 of 2 September 2004,

toe (per annum). This law was largely targeted at the industrial sector (presently some 230 companies in the industrial sector and 80 in the commercial sector)[18] that accounts for 36% of energy consumption in Tunisia. The law set the path for the creation of a market for ESCOs as well as facilitating concrete actions by bilateral/multilateral agency programmes for energy efficiency in Tunisia (see table xx)

To support the policy priorities, the National Energy Savings Fund "*Fonds National de Maîtrise de l'Energie"* was put into place to provide subsidies for[19]:

- 20 % of all EE investments undertaken by corporations
- 50 % of energy audit costs
- 20 % of all solar energy investments
- 50 % of investments in RE and EE demonstration initiatives

The 11th plan also outlines actions for the commercial sector (most focus is presently on the industrial sector) as well as municipalities and public lighting. New legislation is to be added for household appliances, buildings and improving/facilitating better self-electricity generation from wind and cogeneration.[20]

*Morocco*

Efforts focussing on energy efficiency in Morocco have to date been dispersed and without coordination or supporting policy. There has been no incentive or requirement for industrial actors to engage in EE activities and awareness raising and information on EE has been sparse[21] as there has been little government financing allocated for these purposes. At this time the only law that exists, specific to EE is the law creating CDER. which does not have responsibilities in the area of energy efficiency.[22]

However, Morocco's new National programme for the Development of Renewable Energies (RE) and Energy Efficiency (EE) (Programme National de Développement des EnR et de l'Efficacité Énergétique - 2006) sets out concrete goals to increase energy efficiency (EE), specifically energy savings of approximately 800 million TOE. Initiatives to support these policy goals include the elaboration of an EE building code, technical support for its implementation, and energy demand management strategies for the tertiary and industrial sectors. CDER (Centre de développement des énergies renouvelables) is the national agency responsible for RE and EE in Morocco and for implementing the National Plan

This law, the EE/RE Framework Law (le projet de Loi Cadre sur l'efficacité énergétique et les énergies renouvelables) was approved by government council in May 2007. It includes enabling legislation for EE and RE, a fund to finance RE and EE and modifications to CDERs statutes in order to permit them to implement the national programme with a restructuring and new and additional responsibilities

[18] European Investment Bank. October 2007 and www.anme.nat.tn
[19] Plan Bleu/UNDP. March 2007 - Tunisia
[20] European Investment Bank. October 2007
[21] UNEP 2003
[22] European Investment Bank. October 2007 - a new bill will be passed to expand CDER's mission to EE as well.

(and budget).[23] Regular and mandatory audits are being considered (industry) as well as promotion of cogeneration. Other decisions such as increasing the upper limit of self-generators (from 10MW to 50MW) as well as a decree on EE in public buildings are pending. There is a planned reduction of the VAT on solar water heaters from 20% to 14% with discussions of VAT being reduced to 0% for all SWH and renewables. [24]

A planned building code is in development supported mainly by funds from GEF, will require energy efficiency in three key sectors: health, hotel sector and housing. The code will be voluntary at the beginning and most likely applied only five years after coming into effect. Standards and labelling for appliances are also planned. [25]

The framework law still remains to be passed by Parliament and undergo preparation of accompanying regulations, which will likely mean another one to two years before the law will be applied and in force.

*Egypt*

Energy efficiency has been all but absent in Egyptian energy and industrial policy. As there is no specific organization responsible for setting and/or implementing energy saving plans and objectives in Egypt. The New and Renewable Energy Authority (NREA), created in 1986 is mandated to develop RE resources as well as awareness raising. NREA's focus has been almost exclusively on RE and on R&D versus technology deployment.[26] EE efforts and projects are therefore much less developed and tend to be implemented by many different entities (mostly bi-lateral and aid agencies), causing a lack of coordination and minimising impact.[27]

Egypt's national economic development plan does not incorporate renewable energy as a target sector, despite the potential for achieving savings in the national budget and improved environmental conditions. This is partially attributed to large discoveries of natural gas which has shifted the attention away from RE as a possible contributor to energy supplies in the country.

However, a new National Sustainable Development Strategy is in development, and it is hoped that the use and measurement of RE and EE will be defined as one of its major components[28]. It remains uncertain as to whether or not the necessary EE tools, legislation, targets and monitoring will be present in the strategy, particularly as renewable energy will take the main policy priority over energy conservation. There is no documentation of energy efficiency in national goals to date, and the lack of coordination of efforts makes assessment of the status of EE difficult[29] Despite this, the potential impact and benefits of EE measures are significant as the technical, economic and market potential in Egypt are high. What is missing is enabling policy accompanied by quantities measurable targets, economic incentives (vis-à-vis subsidies) and mechanisms to make needed progress.

[23] Plan Bleu/UNDP. Octobre 2007 and European Investment Bank. October 2007
[24] European Investment Bank. October 20
[25] ibid
[26] UNEP 2003
[27] European Investment Bank. October 2007 and www.anme.nat.tn
[27] Plan Bleu/UNDP. March 2007 - Egypt
[28] led by the Supreme Council of Energy, created in late 2006
[29] Plan Bleu/UNDP. March 2007 - Egypt

## 4. Barriers to Financing Energy Efficiency

There are many general barriers to implementing energy efficiency projects and creating an EE market that are common to many countries, including Tunisia, Morocco, and Egypt:

These include:

- lack of awareness of entrepreneurs that EE is a means to control costs
- lengthy decision making procedures within enterprises
- EE improvements face competition for other internal investment within the company, often deemed more important such as production and quality development.
- lack of technical expertise within companies
- lack of experience of local ESCOs
- lack of small project finance for small EE improvements (where internal capital is not available) and affordable medium to long term finance for larger improvements with the most energy savings.
- diverse range of technologies presents challenges for creating standards and protocols for financial evaluation of projects.

**Legal/Institutional/Market Barriers**

The lack of a regulatory and legislative framework is usually the main barrier to the advancement of the EE market. On can note the state of progress of the market in Tunisia where there is legislative support for EE and vs. Morocco and Egypt). The fact that there has been no operational agency dedicated to EE in Morocco and Egypt is also a signal that the sector is not a priority policy priority.[30] (see also policy gaps, below)

*Morocco*

The general lack of government policies (to date) encouraging EE along with accompanying financing mechanisms are the main barriers to EE initiatives in Morocco. CDER, the national energy agency has, at present, no mandate for energy efficiency.

*Egypt*

In Egypt , the absence of well defined legislation supporting energy efficiency is a barrier as well as institutional barriers of having two ministries responsible for energy issues which make integrated energy planning difficult. There is a no dedicated national agency or institution for EE, EE policy, objectives and quantitative targets, regulations, legislations, incentives, R&D programs, and allocated budget.[31]

[30] Plan Bleu/UNDP. October 2007
[31] Plan Bleu/UNDP. March 2007 - Egypt

A study of Egyptian SMEs demonstrated reticence to participate in EE programmes for improvements and savings. Reasons include[32]:

It is against the facilities policy to take loans
Previous experience with EE was not positive: surveys and studies were never followed-up or implemented
Most facilities are unaware of the financial benefits of the EE projects
Many facilities have low energy consumption and believe that EE projects will not be financially feasible
EE is not considered a priority for investment

## Energy Prices and Tariff related Barriers

*Tunisia*

Although energy prices in Tunisia cover most costs, some subsidies have been introduced to accommodate the rise in oil prices. Gas (distribution and electricity generation) is lower than international prices, but does cover all production and distribution costs.[33] Until approximately 2004 STEG[34] electricity tariffs were close to actual production costs. Since 2004, the tripling of oil costs and doubling of natural gas costs have brought energy prices to 15-20% below the true cost of production and the government provides subsidies to the STEG to cover losses and keep prices at their present levels.

This provides for a significant barrier as, despite the more progressive state of legislation and regulation in Tunisia, and, similar to the case of Egypt, motivation to voluntarily reduce costs via energy savings remains low. For example, EE improvements via cogeneration in a ceramic or brick factory, that cost approx 2 million EURO (40% if annual turnover) bring an energy savings of 20%, but only an operational cost savings of 1-2%.[35]

*Morocco*

Morocco has relatively rational electricity tariffs, and limited subsidies to petroleum products. Energy prices are fairly adjusted to cost of supply except LPG and diesel oil . As a result, ONE, the national energy company responsible for production and distribution, has run an annual deficit for several years. [36]

*Egypt*

Among the many barriers hindering the development of EE in Egypt barriers due to subsidized conventional energy prices. Energy subsidies do not give the right signal to consumers and their reduction and eventual elimination is key if wide spread deployment of EE technologies and management is to be achieved.

[32] IFC July 2006
[33] European Investment Bank. October 2007
[34] the national energy company
[35] European Investment Bank. October 2007
[36] ibid

(see section on subsidies in Egypt in Policy Gaps, below)

**Financial Barriers**

Among the many financial barriers faced by EE projects in Morocco, Tunisia and Egypt (as well as in general) is the lack of capital within ESCOs themselves. The EE business model whereby the ESCO is the provider of capital for the project (and unfortunately considered as the financial institution), is almost never feasible.

General financial barriers met in most EE projects include[37]:

- Limited Ability to self-financing: Despite the potential for EE to generate cost-savings, such projects may be inhibited by several internal financial obstacles.
- Banker's aversion to "new technologies" and lack of knowledge on how to deal with an EE project.
- The energy efficiency business model of using energy savings as a revenue stream guaranteed through performance contracts is a concept completely foreign to banks. Also, since energy efficiency projects are often non-asset based, there is no collateral to serve as security.
- The immediate impacts of energy efficiency measures are often "invisible" and thus underestimated
- Many banks have a focus on short-term profit resulting in low tolerance for investments with longer payback periods
- Both energy users and ESCOs have a lack of capital investment due to low profit margin
- Firms are financially tied up in operating expenses
- EE is not considered a priority investment in comparison to investment in equipment directly related to increase in production or product quality
- Given the relatively small investment size and high transaction costs, the banking sector has limited interest in becoming involved with energy efficiency projects, companies and projects tend to be small.
- Because projects usually involve a mix of specialized equipment and materials, as well as significant design and installation costs, the collateral value of assets purchased with loans are often well below loan amounts.
- There is a lack of successful investments in the sector particularly within Tunisia (where the market is distorted due to large amounts of subsidies), Morocco and Egypt.

*Tunisia*

Despite fairly low interest rates in Tunisia, rates for industry (7-10%) and construction (6-9%) are still high. The collateral requirements for Tunisian banks is extremely high. [38] Even if commercial banks are interested in reducing the energy-

[37] SEFI/UNEP 2006 and IFC July 2006
[38] European Investment Bank.

related expenses of customers in order to improve their ability to repay other loans, banks do not want to reduce collateral requirements for energy efficiency measures. In Tunisia for example, even with the GEF project support and financing (see section xx), ESCOs would have to put down on average equity of 30 percent of the total investment in addition to collateral for loans, which leaves them with on average US$60,000 to advance for the project to become financially viable.[39]

*Morocco*

In Morocco as in the other countries, lack of knowledge of EE projects and transaction costs are also an issue. Those financial institutions that focus on investing in conventional energy projects, remain distant toward EE and renewable investment opportunities, not taking into account the economic or social aspects of the projects such as generation of more spin off investments and even job creation.[40]

*Egypt*

Egyptian banks are generally reluctant to lend EE projects. In the past, financing proposals were submitted by the local ESCOs to banks and were largely rejected. These decisions were largely based on general barriers above.[41] The banks unfamiliarity with EE technology and the Transaction Costs were too high. (A U$ 100,000 loan requires the same level of effort and paper work that a U$ 10 million loan needs. All EE investment proposals involved what banks consider small amount of money - i.e. U$ 100,000 to U$ 500,000 per project)

## 5. Policy Gaps

*Tunisia*

Despite Tunisia's well developed legislative framework for energy efficiency, there is always room for improvement. Ongoing and improved measures for EE improvements in existing and new buildings as well as for efficiency of appliances are still needed. The current legislation being prepared will require more incentive, visibility and regulatory support for cogeneration.[42]

*Morocco*

Even if the proposed framework law is passed, approved and implemented, there are still some policy gaps improvements in energy efficiency in Morocco include[43]:

regulatory and legislative measures to support the advancement of EE initiatives and the market, and subsequent accompanying application and controls. This includes:

[39] World Bank/GEF. 2004
[40] Plan Bleu/UNDP. October 2007
[41] UNEP 2003
[42] European Investment Bank
[43] Plan Bleu/UNDP. October 2007

- better coordination between ministries responsible for energy and fuel resources.
- the need for more and better public awareness to create a culture and market demand for energy efficiency. There are presently no awareness programmes at the national level.
- increased and improved regulation on goods, such as standards and labelling
- strategy for market creation including availability of technology, service providers and financing.
- creation of an independent institution to promote and implement legislation for energy efficiency

*Egypt*

In order initiate an increase energy efficiency activities in Egypt single and relatively simple actions are needed such as increasing fuel and electricity prices (see below), as well as longer term and more complex measures to create a market and environment that would make EE products and services a bankable investment.

Macro level strategies, policies, and plans of action are needed, accompanied by concrete actions on the "micro" level such as: energy prices, market mechanisms, availability of technologies, transfer of knowledge and skills to local ESCOs, awareness and information, financial structuring, institutional capacity building, and regulatory interventions. This implies that the government will also need to improve national capabilities in the science and technologies of efficient energy supply and use[44].

Policy and initiatives for awareness raising and marketing of energy efficiency and its benefits, will be of benefit, particularly for industrial and commercial end-users. The development of standards and labels for appliances for example has already begun to play a key role in the EE market in Egypt.

Policy making audits and implementing measures mandatory[45], will support the ESCO market and increase the use, availability and deployment of EE technologies.

The speeding up of the privatization program by the government may lead to bigger interest in EE from newly privatized industrial entities in which the new management would like to improve the efficiency of the production process and minimize cost of production which were typically compromised under state or public ownership.[46]

Demand-side management and integrated resource planning should be the cornerstones of a new energy policy, based on coordinated efforts involving government, industry, the power sector and the other concerned agencies and institutions. There is an incredible potential in Egypt for energy efficiency but it will only become reality when an EE strategy will be adopted and applied in both energy demand and supply sides. [47] .

[44] World Energy Council
[45] such as in Tunisia where companies energy audits are mandatory : see Section 3 - *Tunisia*
[46] (UNEP Egypt)
[47] Plan Bleu/UNDP. March 2007

## Egypt : Energy Prices and Subsidies

One of the main policy gaps or difficulties in advancing energy efficiency measures in Egypt is policies regulating energy pricing and the significant amount of subsidies on all forms of energy. The system is lacking transparency and includes several sub- and cross-subsidies. There are firstly subsidies for fossil fuels and secondly subsidies to lower consumers' electricity rates.

Subsidy removal is taking place for Fuels (oil products and natural gas) and electricity but in a selective pace for each type of energy and each targeted group of end-users.

There are both indirect subsidies to the power sector and subsidies embedded in electricity tariffs[48]:

*Indirect subsidies to the power sector:* The Ministry of Petroleum owns the natural gas resources and sells the gas to the EEHC at a price that is lower than the international price level ("shadow price"). At present, the electricity companies pay only around 56.4% of the current international price of natural gas, 36.2% of the international price of heavy fuel, and 53.3% of the international price of gas oil. The difference between the two prices is considered a debt by the petroleum companies, whereas the electricity companies consider it to be a subsidy, that is, to be non-repayable. The rate of return on investment that the Government receives as shareholder of the power companies is also below what would be acceptable in the private sector. In total, the Government of Egypt is transferring a huge indirect subsidy to the power sector, exceeding LE 7.5 Billion annually (or US-$ 1.3 billion). Approximately 55% of energy consumed by industry is in the energy intensive sectors, which absorb 75% of subsidies on gas and 61% of subsidies on electricity.[49]

*Subsidies to consumers* These also differ between classes of consumers although the cost of supply (tariffs are the same). For example, the Alexandria Distribution Company receives a 424% return on sales to its commercial customers compared to a -140% return on sales to residential customers. Also, a subsidy is also applied in that all customers within a class are paying the same tariff regardless of geographic location and cost of supply, so that customers served by one distribution company are subsidized by customers of another distribution company
Egyptian Electricity Tariffs (in Millim, Euro-Cent, US-Cent per kWh) for the Industrial, Residential, Commercial and Public Sectors[50]

**Table 1: Electricity tariff increase in Egypt**

[48] Wuppertal Institute - these include only some of the energy/fuel subsidies in Egypt.
[49] www.arabianbusiness.com Egypt to end energy subsidies, August 14, 2007
[50] Wuppertal Institute

| Tariff group (1 Euro-Cent = 73 Millim) | Energy Tariff (Dec. 2005) [Millim/kWh] | [$Ct_{EUR}$/kWh] | Power Factor Charge | Increase since Oct. 2004 [%] |
|---|---|---|---|---|
| **1 Ultra High Voltage (220,132 kV)** | 103 | 1,41 | yes | 44,1% |
| **2 High Voltage (66, 33 kV)** | 125 | 1,71 | yes | 5% |
| **3 Housing companies** | 120 | 1,64 | yes | 5% |
| **4 Medium ( 22, 11, 6.6 kV ) & Low Voltage ( 380, 220 V )** | | | | |
| More than 500 kW | | | | |
| - Annual credit [LE/kW] / [EUR/kW] | 96 | 1,32 | | - |
| - Energy Price [Millim/kWh] | 170 | 2,33 | yes | - |
| Agriculture | 90 | 1,23 | no | - |
| - Other consumers | 200 | 2,74 | yes | - |
| **5 Residential** | | | | |
| 0 - 50 kWh/month | 50 | 0,68 | no | 0% |
| 51 - 200 kWh/month | 90 | 1,23 | no | 5,1% |
| 201 - 350 kWh/month | 125 | 1,71 | no | 7,7% |
| 351 - 650 kWh/month | 180 | 2,47 | no | 12% |
| 651 - 1000 kWh/month | 255 | 3,49 | no | 12,9% |
| More than 1000 kWh/month | 310 | 4,25 | no | 14% |
| **6 Commercial** | | | | |
| 0 - 100 kWh/month | 198 | 2,71 | no | 5% |
| 101 - 250 kWh/month | 287 | 3,93 | no | 5% |
| 251 - 600 kWh/month | 366 | 5,01 | no | 5% |
| 601 - 1000 kWh/month | 453 | 6,21 | no | 5% |
| More than 1000 kWh/month | 475 | 6,51 | no | 4,9% |
| **7 Offices and clinics** | 200 | 2,74 | no | - |
| **8 Public lighting** | 331 | 4,53 | no | 5% |

Source: Tariffs: www.egyptera.com/en/Bill_Tariffs.htm

Despite the commitments for gradual reduction subsidies, clear and transparent policy and action on subsidy reduction has been lacking and insufficient to have any impact in increasing EE activities, the EE market and GHG emissions. This is been due to resistance from the industrial sector, but also as a result of negative views on social impact to poor families and their ability to pay for electricity.

An increase in energy costs can also increase income to the Government from fuel taxation, and these revenues can be used to increase EE programmes and encourage the use and deployment of EE technology. Subsequently, a reduction of subsidies will also relieve the national budget deficit, brought on in part by energy subsidies. Recent government statements have indicated abolishing all subsidies within 3 years, policy has yet to be set in place to make this happen.

Subsidizing EE projects could be cheaper and more sustainable in the long term instead of subsidising the energy price.

## 6. EE Technology and its Deployment

Technology is generally available and developed in the sector. However issues such as quality of audits and ESCOs, and overall technical capacity building is still

an issue in some regions. Technical capacity in terms of adapting equipment to specific needs and context is could also be increased.[51]

*Tunisia*

Energy efficient technology is largely available and fairly low risk, given that the technologies are mostly not new or innovative types of technologies and industries implementing are also mostly low-risk with little financial debt.[52]

The main EE technologies and processes being implemented in Tunisia are:

- Cogeneration: at the end of 2007, two cogeneration units of 11.5 MW electric power were implemented, which represent a 23% of targeted implementation. The objective of the existing programme (Tunisian quadrennial energy program) is to implement a total capacity of 70 MW, of which 60 MW in the industrial sector and 10MW in the tertiary sector. Targeted installed capacity the will permit for approximately 110 Ktoe of energy savings.

- Compact Fluorescent Lamps: The total number of CFLs sold between 2005 and 2007 was approximately 3.8 million units. The estimated savings generated by the introduction of the CFLs during the same period were 216 Ktoe. The objective of the existing programme of 2008-2011, is to target 8 million units in the residential sector with a penetration rate of 2 million annually.

- Solar Water Heating: This technology was developed in the residential and tertiary sector with a total installed surface of 22000 $m^2$ by the end of 2005.The objective of Tunisian quadrennial energy program 2008-2011 is to install 30000 $m^2$ of solar collectors in industrial sector by the end of 2011, with global potential of saving estimated to 3 Ktoe.

- Thermal Insulation in Buildings: thermal regulations of new buildings was set up during the period of 2005-2007, the new action program 2008-2001 aim to introduce a voluntary program « PROMO-ISOL » for roofs thermal insulation of 20 000 accommodations and 1500 buildings in the tertiary sector,

- Refrigerator certification: Tunisia has a strict strategy for prohibiting inefficient domestic refrigerators. Energy labels are required for all domestic refrigerator, and as of 1st July 2006, when refrigerators with energy performance class equal to 7 and higher are forbidden to be sold on the market. Bu the end of 2007, refrigerator class 6 and 5 will be equally abolished from the market.

In the industrial sector, common energy efficiency technologies often proposed are: cogeneration, energy recovery, energy substitution, high efficiency motors, variable

[51] Plan Bleu/UNDP. March 2007 - Morocco
[52] World Bank/GEF

speed drive, power factor improvement, automation and process control and energy management systems.

*Morocco*

Despite the limited regulatory framework, some EE technologies are being introduced in Morocco. These include:

Hammam and bakery oven energy improvements . EE technologies permitting for energy savings of 50% (wood burning ovens) as well as some 40 Hammam boilers. Theses improvements are budgeted at 4ME supported in part (1,59 M EUR) by the French FFEM (fond français pour l'environnement mondial and the Moroccan government via a World Bank loan)

Energy efficiency improvements in buildings, including building design, energy efficient systems (air conditioning, heating) and energy efficient management of buildings. The execution of these improvements is supported by a budget of USD $18, 250,000. [53]

Energy Efficient Lighting has been developed to improve energy efficiency in schools, hospitals and other social-targeted establishments. Between 2005-6 1840 low energy bulbs were installed in 10 locations. Supported by CDER and the regional government of Andalucia. Lighting timers have also been used significantly.

Solar Water Heating – Although technically deemed a renewable energy technology, SWH are used within energy savings and management programmes and are the most developed of sustainable energy technologies in Morocco.

EE improvements in the industrial sector are largely for industrial boilers, automation and real time energy management. There are some small experience with cogeneration. More efficient heating pumps, electronic ballasts, timing for lighting.

In terms of technical capacity, several projects supported by IFI and Development agencies have supported the creation and training of consultancy and engineering firms who have the capacity to perform EE services for audits and for implementation.[54]

[53] GEF/UNDP supported initiative including the development of a new Moroccan EE building code
[54] European Investment Bank

*Egypt*

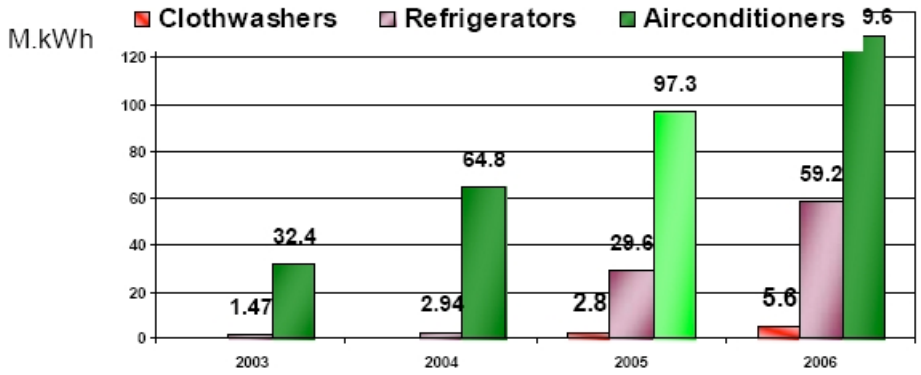
Energy efficiency measures and related applications, equipment, and techniques have become well developed and commercially available in Egypt which would broaden the opportunities and the potential for savings.

EE Technology presently being used in Egypt include:
Efficient lighting (CFL and electronic ballasts)
Energy substitution
Cogeneration (limited), waste heat recovery
Automation and controls
High efficiency motors
Efficient Appliances (focus on refrigerators, air conditioners and washing machines)
Energy management, insulation
Boiler upgrades to natural gas, condensate return
Other demand-side management technologies

Lighting: Within the activities of the EEIGGR project, local manufacturers in Egypt have been assisted to produce CFLs and electronic ballasts. This will increase the use of CFLs (that save 80% energy next to incandescent bulbs) and their deployment as costs will be significantly reduced.

Appliances: EE technologies for efficient washers, refrigerators and air conditioners have also been introduced. See figure below demonstrating energy savings.[55]

**Figure 1: Appliances Energy savings**




## 7. Market Potential

*Tunisia*

There is a large potential for EE in Tunisia, given the advanced state of the regulatory and legislative framework as well as large amounts of development aid and IFI support. As mentioned, the mandatory audit requirements for industry have assisted in boosting the EE service and technology market. The contracts-programmes arrangement, whereby a member of industry enters into a contractual arrangement with ANME agreeing to implement audit recommendations and thus benefiting from subsidies on audits and equipment, makes up a large portion of the

[55] EEIGGR

market (presently 230 firms that are subject to mandatory audits are participating). With better supporting legislation, cogeneration will also bring opportunities in the future. See tables below for market potential and investment requirements.[56]

**Table 2: Energy efficiency market potential stemming from mandatory audits – contract programmes with members of Tunisian industry**

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | Total 2007-2011 |
|---|---|---|---|---|---|---|---|
| **Number of energy savings contracts-programmes** | | **144** | **204** | **258** | **300** | **300** | |
| *Signed before 2007* | | 84 | 84 | 78 | 60 | 0 | |
| *Signed as of 2007* | | 60 | 120 | 180 | 240 | 300 | |
| **Energy Savings Thousands of TOE** | | **164** | **194** | **190** | **205** | **190** | **943** |
| *From contracts-programmes signed before 2007* | | 124 | 124 | 80 | 55 | 0 | 383 |
| *From contracts-programmes signed as of 2007* | | 40 | 70 | 110 | 150 | 190 | 560 |
| **Total projected investment required - millions of Tunisian D (1M TD = approx $US 835 000)** | **8.1** | **19.5** | **19.7** | **19.7** | **19.3** | **18.3** | **104.6** |

**Table 3: Energy efficiency potential from cogeneration in Tunisian industry**

| | 2007 | 2008 | 2009 | 2010 | 2011 | Total |
|---|---|---|---|---|---|---|
| **Total stock (MW)** | **25** | **45** | **65** | **85** | **105** | |
| Existing Facilities | 5 | | | | | |
| *Facilities (MW/yr)* | 20 | 20 | 20 | 20 | 20 | 100 |
| **Projected Energy Savings** Thousands of TOE | **21.8** | **39.2** | **56.6** | **74.0** | **91.4** | **283** |
| *Existing Facilities* | 4.4 | 4.4 | 4.4 | 4.4 | 4.2 | 22 |
| *New Facilities* | 17 | 35 | 52 | 70 | 87 | 261 |
| **Total projected investment required - millions of Tunisian D (1M TD = approx $US 835 000)** | **23.7** | **23.7** | **23.7** | **23.7** | **23.7** | **118.5** |

The division of financing for EE and RE projects is found in the table below, demonstrating investment requirements by financing source. Note that despite the various subsidy schemes and support provided to these projects, 53% is still required by the local banking sector, demonstrating the importance of bringing awareness and capacity building for financial institutions.

[56] Information in tables is from the EIB report " *Mécanisme Financier pour le Développement de l'Efficacité Energétique et des Energies Renouvelables Dans les Pays sud- et est-Méditerranéens* ". The report also provides further information on EE potential and investment requirements in various sectors

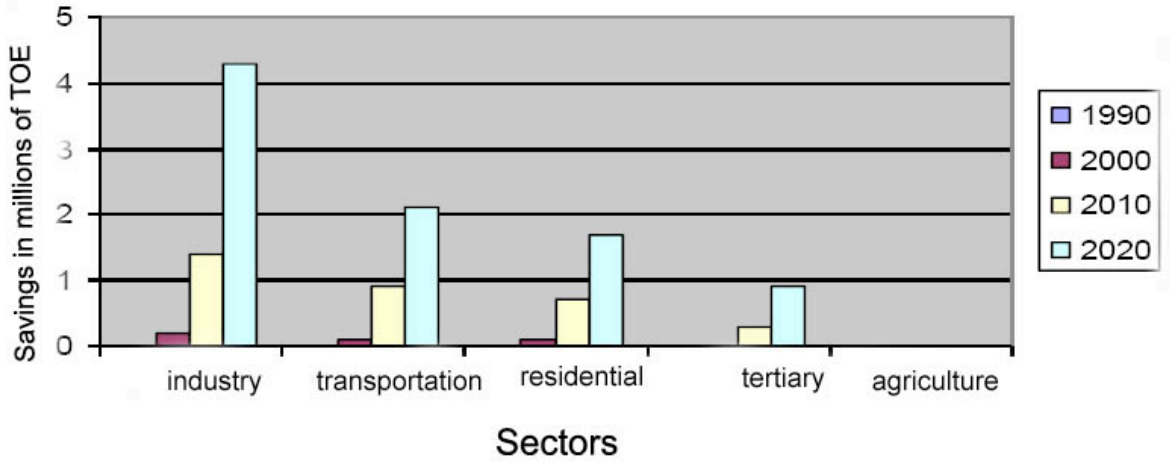
**Table 4: Required financing for EE and RE for Tunisian Industry 2007-2011**

| | Required Investment Million DT | Incentive FODOC/FNME Million DT | Self-Financed Million DT | Investment Funds Million DT | Bank loans/debt Million DT |
|---|---|---|---|---|---|
| Number of energy savings contracts-programmes | 104.4 | **16** | **21** | **10** | **58** |
| *Cogen* | 118,5 | 14 | 18 | 24 | 63 |
| *Wind* | 83 | 9 | 8 | 25 | 41 |
| **TOTAL** | 306 | **38** | **47** | **59** | **162** |
| *Breakdown %* | | 13 | 15 | 19 | 53 |
| *Annual Average* **Million DT** | 61 | 8 | 9 | 12 | 32 |
| **Annual Average Million E** | **35** | **4** | **5** | **7** | **18** |

*Morocco*

The market potential for EE technologies and EE improvements is difficult to measure in Morocco also, given the lack of coordination of efforts and lack of incentive to engage in EE activities. The overall potential savings have been estimated at over 15%, and between 17 and 20% for the industrial sector alone (with and average return on investment of 18 months). A new study by the World Bank demonstrates potential savings of 23% until 2020. The cogeneration market, although limited due to a lack of regulatory and market incentives, is estimated at 400MW.[57] The total volume of required investment for energy efficiency is estimated as approximately 7 million Dh per annum (all sectors) for with an objective of energy savings of 700 000 toe/yr through to 2015.[58]

**Figure 2: Morocco - Energy Savings – Horizon 2020**




An extrapolation of estimated investment for energy efficiency in medium-sized industry, based on participating companies in a project in the industrial zone of Sidi Bernoussi (Casablanca) demonstrates a global national investment volume of 4500 million Dh.[59]

[57] Plan Bleu/UNDP. October 2007, http://www.casanet.net.ma, UNEP 2003
[58] European Investment Bank
[59] projects are smaller scale, with payback periods based on les than 2 years. Figures extrapolated from an extimated investment volume of 90 MDh for 60 participating companies.

The building sector is estimated to provide a large opportunity for energy savings, given urbanisation trends. The market potential identified within the GEF funded initiative for the new building code is 150 000 toe.

In the tertiary sector there is an estimated savings of 50 000 toe to be saving over a period of 5-7 years representing an investment volume of 50 M EUR or 5 M EUR per year.[60]

Low energy consumption products such as for lighting and low energy appliances are much slower in Morocco than in countries such as Tunisia and Egypt. [61] However, ONE, the national energy office has recently launched an initiative (INARA) to replace 5 million incandescent bulbs with low energy bulbs, aiming at an annual savings of 300 GWh by 2009.[62] (The bulbs are delivered free of charge and a monthly payback charge of 100 Dirham (approx. € 0,1) per month is charged to the electricity bill),

The market potential for solar water heaters (all sectors) is estimated at approximately 1 million m², including a potential reduction of wood and coal of 3 million toe. Promosol has a goal of installing 400 000m² of solar collectors for the residential sector alone, and many opportunities lie in the tertiary sector (hotels) as well as industry.[63]

The table below demonstrates the overall potential in savings and in volume of investment in Morocco.

**Table 5: Summary of EE potential and required investment volume64**

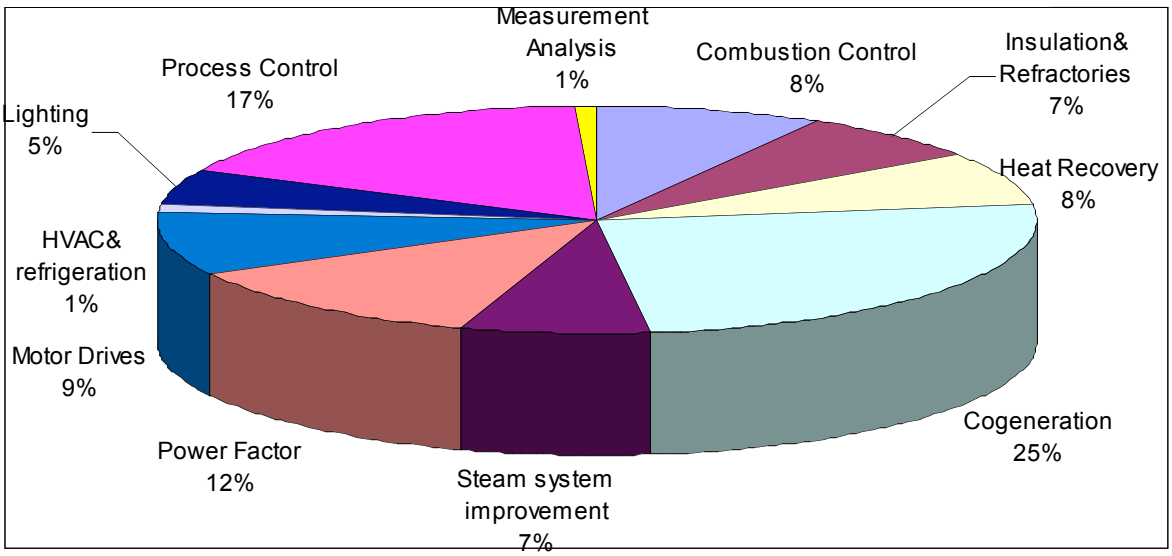
| Sector | Potential | Total Investment volume | Average Investment per project | Investment – market potential | Required external financing |
|---|---|---|---|---|---|
| | | M€ | € | M€ annual average | M€ annual average |
| Industrial – small investments | Fuel: 250 000 toe, Electricity: 150 Gwh | 300 | 10 000-50 000 | 30-40 | 10 |
| Industrial – medium sized operations | Fuel: 250 000 toe, Electricity: 150 Gwh<br><br>and Solar water heating 100-300 000 m2 | 350<br><br>150 | 50 000-500000<br><br>20 000-200 000 | 30-50<br><br>25 | 20-40<br><br>15 |
| Cogeneration | 400 MW | 270 | 2-4 million | 30 | 20 |
| Conversion to Natural Gas (electricity sector) | | 250 | 10 000-400 000million | 20 | 15 |
| Tertiary – Private | 50-100 GWh | 80 | 10 000-200 000 | 15 | 5 |
| Tertiary – Public | 50 GWh | 60 | 10 000-200 000 | 10 | 5 |

[60] European Investment Bank
[61] UNEP 2003
[62] www.one.org.ma
[63] CDER – www.cder.org.ma
[64] European Investment Bank

*Egypt*

Given the lack of coordinated policy and efforts in the field of energy efficiency, estimations of market potential vary considerably. Despite this, energy efficiency measures and related applications, equipment, and techniques have become well developed and commercially available in Egypt, which would broaden the opportunities and the potential for savings. This new situation entails the necessity of updating available information. There are recent market drivers for energy efficiency in Egypt; accelerating privatization of industrial state-owned enterprises has led to more rational in energy use and more awareness of competition. Growing domestic and international competition is creating pressure to improve products quality, and reduce operating costs. Availability of technologies would play a significant role in driving energy efficiency market for products and services.
A USAID study estimates that the "net present-value energy-savings figure is about LE 12 billion," where the potential for energy savings is roughly equivalent to 50% of current energy consumption[65]. Few other previous studies have discussed and estimated a total economic potential of energy savings from EE in the Egyptian supply and demand sides. The potential is ranging from 20% to 40% of the annual oil and gas primary energy consumption which if compared to the energy consumption of 2004/05 would build an annual savings of 11 mtoe to 22 mtoe, but his only if an aggressive energy saving strategy is put in place. Estimates are generic and based on the state of technology at those periods for energy

**Figure 3: Potential energy savings by technology - Egypt**

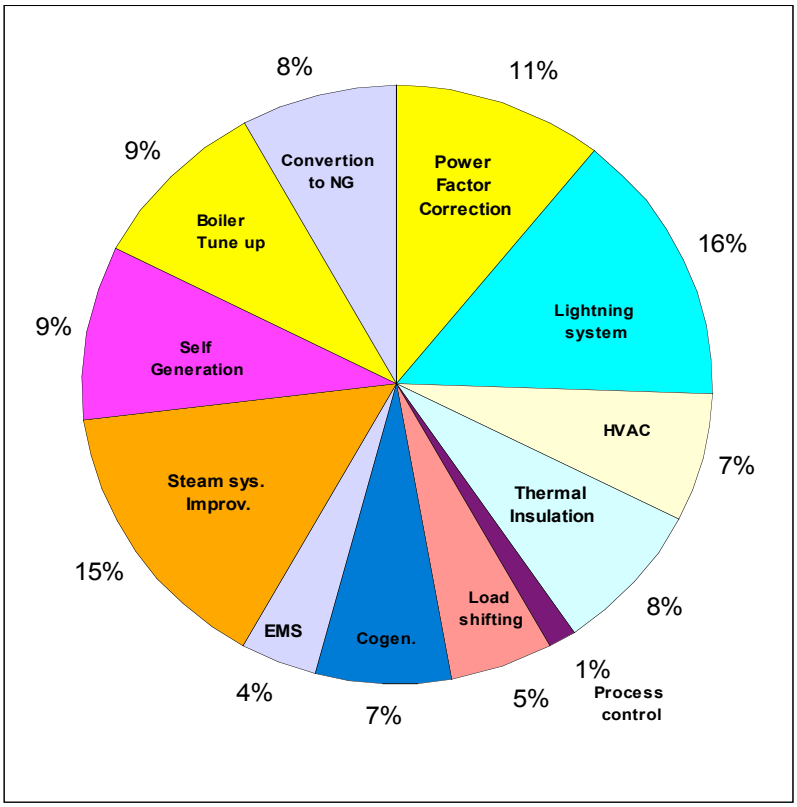



conversion, transmission/distribution, and end use; but they do provide to demonstrate the high potential of energy saving opportunities in the country.[66]
The primary energy supply matrix in Egypt has substantially changed as natural gas consumption is replacing oil products in industrial, residential, and commercial sectors as well as for electricity generation. The ratio of natural gas consumption to

[65] (by the Energy Efficiency Policy Program) UNEP IEA 2003
[66] Plan Bleu/UNDP. March 2007.

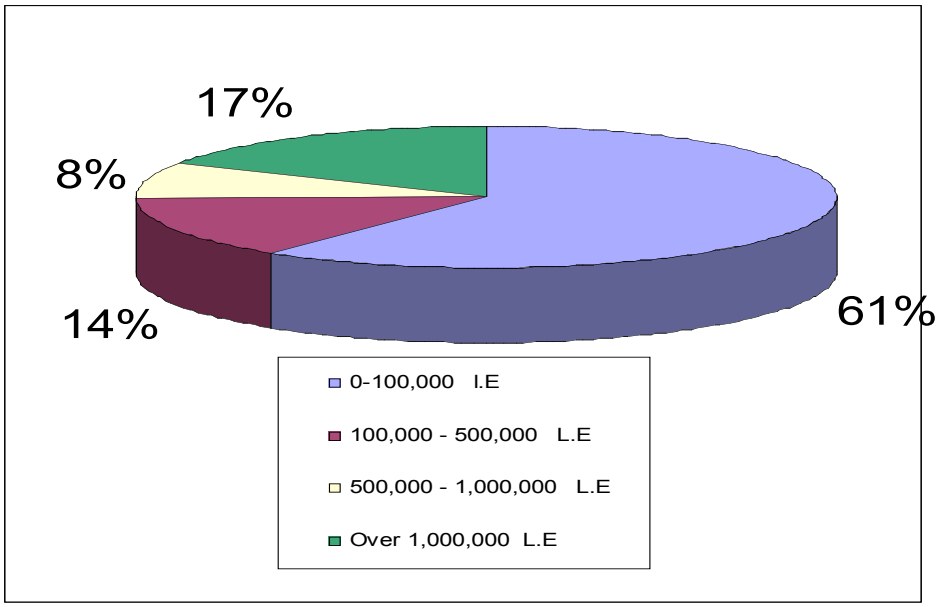
the total sum of oil products and gas consumption has dramatically increased from 12% in 1981/82 to reach 47% by 2004/05[67].
There is a considerable opportunity to improve the end-use efficiency of energy use in Egypt. The figure below demonstrates the energy savings per EE technology as per studies performed under EEIGGR68.

**Figure 4: Breakdown of Potential Energy Conservation Applications Based on Energy Audits Carried Out in 189 Egyptian Industrial and Commercial Facilities**




[67] ibid
[68] Salamwy

**Figure 4: Breakdown of Investment Cost per Energy Conservation Project Based on Energy Audits Carried Out in 189 Egyptian Industrial and Commercial Facilities**



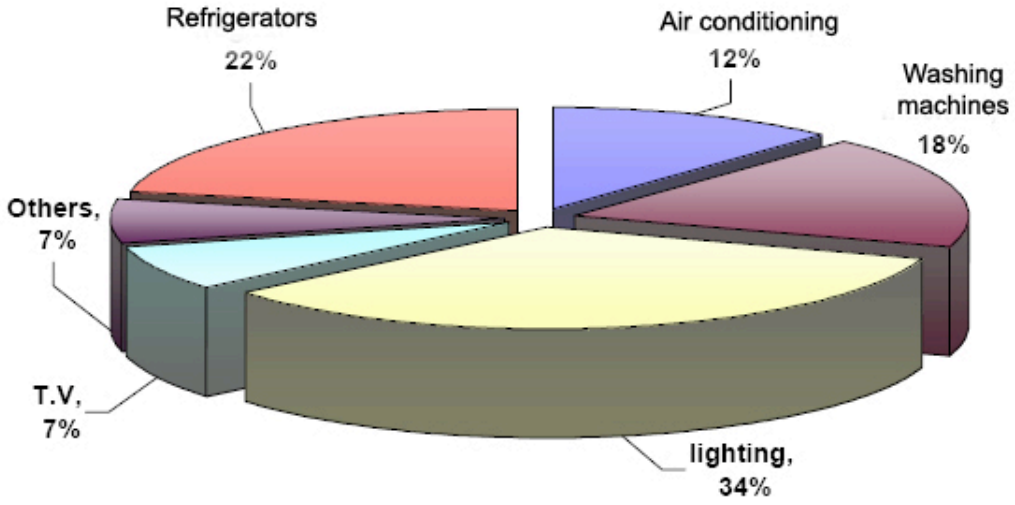

In the industrial sector alone, efficiency of oil gas and electric use can be improved up to 30% or more with investments that pay for themselves in 3 years or less. In the residential sector up to 15 % efficiency improvements in energy use could be technically achieved from improved lighting and electric appliance efficiency. There is less specific data available for the relatively small sectors of commercial buildings and agriculture energy use (primarily for irrigation pumping).

The most significant opportunity for energy savings is seen to be in reduced industrial fossil fuel consumption, particularly in petroleum products. This is due not only to the high efficiency improvement potential in industry, but also because industry is the largest consumer of petroleum products. For electricity, energy savings potential is also greatest in the industrial sector, which uses the greatest proportion of electricity and has very high DSM energy efficiency potential (up to 30 percent of that use).

The residential sector offers the second greatest source of electrical energy savings potential (up to 15% efficiency improvement for 33% electricity use) – primarily from lighting and efficient refrigerators. [69]Lighting in energy consumption accounts for nearly 25% of total energy sold in Egypt, and for this reason CFLs and electronic ballasts have been used in many EE projects due to the simplicity of the technology and the low payback period and overall financial feasibility, even with present electricity tariffs. Residential and commercial sectors consume 34% of energy for lighting purposes, an estimated 43% of their total energy use (see figure below).[70]

[69] World Energy Council
[70] EEIGGR - (The use of of CFLs grew from 245 000 lamps in 1999 to 1.9 million lamps in 2003 achieving an energy saving of ,5million TOE and 1.5 million tons of Co2).

**Figure 5: Breakdown of energy consumption – Residential and commercial**




Cogeneration has increasing value as a means to growing demand particularly as the natural gas infrastructure is well developed in Egypt. Energy savings from cogeneration are generated by meeting electricity and steam demand on-site using a single fuel source. The on-site generation of power saves additional energy by eliminating losses involved in the transmission and distribution of electricity.

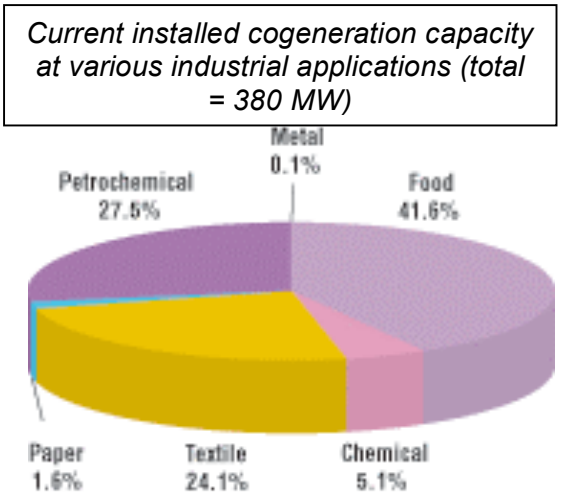
Compared with centralized power generation, which has an average thermal efficiency of about 38%, cogeneration system efficiency is estimated to be in the range of 80%-90%.[71]

There are existing cogeneration installations – presently at a total capacity of approximately 380 MW – installed largely in the industrial sector and based on steam and gas turbines. Cogeneration in the food industry is mainly installed in sugar mills located in Upper Egypt in the south.

Cogeneration applications have a high potential in the industrial sector, particularly in food, textile and chemical plants, where a large amount of steam is used in their industrial processes. Commercial buildings (office buildings, shopping malls etc.) provide large potential for cogeneration applications.. Tertiary sectors applications, such as hotels and commercial buildings can use cogeneration for generating electricity and providing hot water or air for domestic use or for space heating.

[71] Egyptian Ministry of Electricity and Energy Annual Report 2004/2005

**Figure 6: Current installed cogeneration capacity at various industrial applications**




Moreover, cogeneration can be used to cover the thermal demand (cooling/heating) for commercial buildings by using absorption chillers operating on the waste heat from the prime movers of the cogeneration units.
Cogeneration also presents a cheap way for producing desalinated water. Both the multi-flash desalination units and multi-effect desalination units can be attached to cogeneration units. This application has a strong potential in the Sinai and the Red Sea coasts. [72]

A 1998 study[73] indicates that cogeneration offers the second-highest potential for energy-saving projects and indicated that:

- many end-users require the simultaneous use of both electricity and thermal energy in the form of steam and estimates that

- the market for cogeneration incorporates the large capacity potential nationwide - more than 1600 MW

Based on high capital costs of cogeneration equipment[74] it was found that cogeneration applications can represent 74% (about US$1.7 billion based on $800/kW) of the total market for equipment and services of energy conservation projects.

## 8. Status of EE programmes and projects

This section seeks to outline major programmes and projects that support or have supported the EE sector, with a particular mention of those that use financing and financing mechanisms to support EE/R

[72] Cogeneration and On-Site Power Production (COSPP)
[73] by Bechtel Consulting for the United States Agency for International Development (USAID). COSPP
[74] equipment accounts for approximately 70% of the total project cost for cogeneration applications and services (engineering, installation, project management and commissioning costs) account for the other 30%

E market growth. Although most programmes have been funded by international / multilateral organisations (see table 6 below), some initiative and leadership has been taken by national actors as well.

**Table 6: Major donor programmes and projects that support or have supported the EE sector [75]**

| | Funder/Implementation | Project | Description |
|---|---|---|---|
| **REGIONAL** | | | |
| | EU - GTZ led consortium | MED-ENEC | TECHNICAL - Launched 2006<br>To boost energy efficiency measures and to the use of solar energy in the construction sector. Three pilots presently in implementation in Tunisia, Morocco and Egypt |
| | KfW | Special Facility for Renewable Energies and Energy Efficiency | FINANCIAL - 2005-2009<br>€ 500 million on behalf of German Government from 2005 to 2009 Loans with subsidized interest rates<br>Term of up to 10 years and grace period of up to 3 years |
| | KfW | | Regional depollution fund – obtain info |
| | | | |
| **TUNISIA** | | | |
| | GEF World Bank | Energy Efficiency Program/ Industrial Sector | TECHNICAL AND FINANCING - 2004-2009<br>This project aims to overcome barriers to the development of a sustainable market for energy efficiency products (see box, page 32) |
| | UNEP/MEDREP | PROSOL - Solar Water Heating Loan Facility | FINANCING 2005-2007 €1.7 million<br>Loans for residential customers to purchase solar water heaters are made via solar suppliers and have a 5-year term with repayments made via the customer's electricity bill. Subsidy of the capital cost is provided by the Tunisian government, covering 20% of the cost of the system, up to 100 dinars (62 Euros) per square metre. Discounted interest rates on the solar loans are paid from a $US 1 million MEDREP fund and progressive phased out as the market develops. New phases without UNEP support are in development - see pp 32+43 |

[75] **Included in this list are most recent programmes and mechanisms that target EE or provide an financing element. The list is not exhaustive and does not include "general funds" that are not exclusively targeted for EE. EIB report "** *Mécanisme Financier pour le Développement de l'Éfficacité Energétique et des Energies Renouvelables Dans les Pays sud- et est-Méditerranéens* **" for an exhaustive list of all general funding sources, although many (i.e. KfW's FODEP) have not proven well adapted for EE projects**

| | Funder/Implementation | Project | Description |
|---|---|---|---|
| | ANME | PROSOL II | FINANCING 2007-<br>Extension of PROSOL lead by the Tunisian government and its Agency for Energy Conservation (ANME) |
| | ADF - Ambassade de France<br>government of France | Environmental Credit line for Banks | FINANCIAL - Launching in 2007<br>€40 million for environmental loans in the area of energy efficiency, renewable energy and pollution control. (see box, page 32) |
| **MOROCCO** | | | |
| | UNDP GEF / CDER | Energy Efficient Buildings | TECHNICAL (demonstration) Start 2006<br>FINANCIAL (guarantee for participating credit leasing firms)<br>See page xx |
| | CDER / Various donors, GEF, UNDP | Promasol | FINANCIAL.<br>Solar Water Heaters, supported by a line of financing and guarantee mechanism. See page 33 |
| | UNEP/MEDREP / ONE | Ecosol | FINANCIAL<br>SWH for Hotels . See page 34 |
| **EGYPT** | | | |
| | GEF UNDP UNDESA | Energy Efficiency Improvements and Greenhouse Gas Reductions (EEIGGR) | TECHNICAL AND FINANCIAL - 1998-2006 (still in completion)<br>$USD 5.9 million See page 35. |
| | IFC | Environmental Business Finance Program's (EBFP) | FINANCIAL |

***Tunisia***

Tunisia has by far received the most assistance and attention from IFIs and development banks and agencies with respect to energy efficiency projects. This is due to the more favourable regulatory framework and the long history of receiving technical assistance from various agencies. More recent projects and programmes now include financing or financing mechanisms components, as once the technology and technical services (ESCOs) are more developed, securing financing for sustainable market-based initiatives was needed.

**World Bank/GEF Energy Efficiency Program for the Industrial Sector - $31,8 million USD - 2004-2009**

Main Components:

a) establishment of a financial intermediation mechanism to support private sector energy efficiency investments (through ESCO projects among others); (b) a sustainable partial guarantee fund; and (c) technical assistance to local financial institutions, other intermediaries on the development of bankable projects and the mechanisms to secure project financing and creation of ESCOs, and for energy end-user information dissemination and development of a limited number of demonstration projects.

Notably, the World Bank/GEF Energy Efficiency Program for the Industrial Sector has introduced technical assistance, grant support and a financial mechanism in form of a guarantee fund. Most recently, the Agence Française de Développement has launched a EUR 40 million line of credit for Tunisian firms focussing on energy efficiency, renewable energy as well as pollution control and abatement. Another EUR 1,26 million has been approved for institutional support and technical assistance (to ANME and ANPE).

**EUR 40 million line of credit - French Development Agency (ADF)**
**In partnership with 3 private banks: BIAT, Banque de Tunisie and UBCI**

- Interest rate 7-8,5% (max)
- Credit for 5-12 years with a 2-3 grace period
- Maximum loan is EUR 5 million
- Margin for banks 2%
- Technical/institutional support for ANME/ANPE is EUR 1,26 million
- 15% Self-financing required
- Energy efficiency projects with similar criteria/savings requirements as GEF project.

Tunisia's national fund FNME (Fonds National de Maîtrise de l'Energie) was created in 2005 and is financed by taxes on air conditioners and vehicles. The FNME is financed by an environmental tax on vehicles, and an import duty on air conditioning equipment. FNME works in collaboration with a related fund for industrial competitiveness, FODEC, that also covers EE investments.

The newest phases of the GEF and UNEP/MEDREP supported Prosol project include mechanisms for the solar water heating in the commercial sector including grants, softening of bank loans and maintenance costs for 4 years. It remains to be seen if the Prosol II, will be as successful without the financing mechanism previously provided by UNEP/MEDREP.[76]

***Morocco***

Although there are no funds or lines of credit for EE and RE supported by the state government, there have been scattered energy efficiency initiatives in Morocco, focussing on technical capacity building for EE experts, with some auditing activity and technical support for the implementation of audits. However, the visibility and impact of these activities has been quite limited due to the small size of the initiatives, the lack of a global and target EE policy and programmes.[77]

Projects in the past focussed on awareness raising and technical assistance (including training and creation of ESCOs), (USAID, IDAE)- and IDAE energy audits were prepared, however at the time no EE improvements were implemented[78], demonstrating once again the need for regulatory frameworks and financial mechanisms to bring EE projects forward.

There are new initiatives however, that demonstrate a commitment to bring forward EE initiatives. A new project launched with the support of GEF and UNDP for EE building codes, and energy efficient lighting is underway. There have also been efforts to improve demand-side management in SMEs (commercial and industrial).
Some $1 800 000 will be used to support demonstration projects and a financial mechanism to provide a "refinancing fund" and 50% guarantee (PAC – programme d'assurance crédit) to participating credit leasing firms has been created to accompany the project. A partner bank (undetermined) will manage the fund and the guarantee.

Morocco's Promasol, supported by UNDP and GEF, a solar thermal heater programme has been a demonstrated success and the energy efficiency conversion of Hammam's and "fours Boulageries" shows promise and a new commitment to energy management.

Within CDER's Instrument for Leasing (Dispositif Global de Financement Leasing - DGFL) to support financing of renewables (and EE) and its Promosol solar water heater programme. The first support instrument is FOGEER (Fonds de Garantie des Efficacités Énergétiques et es Énergies Renouvelables) a guarantee fund supported by the Italian government and MEDREP, that supports EE and RE investments, including to date mainly those granted for Promosol projects. To date, the guarantee has supported leasing companies and first projects are guarantees to projects in the hotel sector.[79] The guarantee fund has been launched with an initial 10, 000,000,000 DH (approx. $USD 1

[76] introduced in 2005, Prosol supported UNEP/MEDREP's 7% interest loan subsidy (effectly bringing loans to 0%) brought on an increase in sales of 35% within 9 months of its launch and further expansion in 2006 (from approx 6000m2 in 2004 to 35 000 at the end of 2006)
[77] Plan Bleu/UNDP. October 2007.
[78] UNEP
[79] Enerplus

300 000 ). It is managed by the guarantee company DAR AD_DAMANE. The guarantee covers a maximum of 70% of the credit with a ceiling of 1 500 000 DH (almost $USD 200 000). Costs for audits/feasibility studies are covered up to $30 000.

**Ecosol**

ECOSOL a solar water heating project aims to lower financing costs by targeting commercial SWH systems for hotels by offering loan or leasing facilities, as well as a 15% capital cost subsidy to address the high up-front cost of solar water heating systems.

ECOSOL programme is targeting 80 hotels in the regions of Agadir, Ouarzazate and Marrakech, with a potential to further expand in the next few years and includes:

- A credit/leasing mechanism for hotels acquiring commercial SWH at a preferential interest rate of 6% over a period of two or three years,

- A partial financing of the interest rate by UNEP through the MEDREP fund ($US 1 million), which will be progressively phased out

ECOSOL will seek to create the conditions for the development of a market for commercial solar water heaters in Morocco. The loan/leasing facility aims to entice Moroccan financial institutions to participate in the market for solar water heaters. The financial mechanism is designed to lower the risk of customer default, thus allowing a significant decrease in the interest rate. As a consequence, local banks and leasing institutes can provide loans or leasing at preferential rates.[80]

Other technical projects that have performed audits, made some retrofit improvements and installed SWH in the health, and industrial sector have also been implemented.[81]

***Egypt***

There has been a number of energy conservation activities undertaken by many Egyptian institutions (approx $US 100 million) invested in various programmes)[82]. These activities have clarified to major energy users the extent of their wastage of energy and the potential of energy savings that can be achieved through investing in energy efficiency. Most of these efforts have focused on the industrial sector. Although there has been a limited effect on the creation of local market for energy efficiency equipment and services, these initiatives have begun to get the attention of both policy makers and energy professionals to the importance of the rational use of energy for Egypt's energy sustainability.

[80] Medrep Finance Annual Report 2006
[81] Plan Bleu/UNDP. October 2007.
[82] Plan Bleu/UNDP. March 2007.

**Energy Efficiency Improvements and Greenhouse Gas Reductions (EEIGGR)**

Aivities for energy consumption through:

**Industrial sector:**

- Demand side management (efficient lighting, power factor correction, efficient motors, insulation, combustion control, energy management system, waste heat recovery, conversion to natural gas…etc.)
- Load shifting

**Residential & Commercial:**

- Demand side management (efficient lighting, heating, ventilation and
- air conditioning)
- Standards and labels for efficient equipment
- Energy efficient design and construction for new buildings

The largest efforts in the past have been undertaken by USAID, and most recently by GEF/UNDP/UNDESA's Energy Efficiency Improvements and Greenhouse Gas Reductions (EEIGGR) project. They unfortunately neither coordinated nor integrated under a preset EE vision or guideline framework and were even performed as separate independent activities and executed by different national institutions.

This kind of practice had minimized their impact which did not sum up into an accumulated achievements and results on the national level. All investments in the previous projects had a total of about US$ 100 millions and were mainly raised from grants with limited local participation.[83] EEIGGR made progress in terms of training and creating ESCOs and evaluating some market potential. Of all 189 industrial and commercial audits performed under the project only 10% were implemented mostly in power factor and high efficiency lighting which have low technology risks and short payback.[84] To respond from lessons learned in the early stages of the project, a guarantee pilot fund of $USD 280 000 was launched to extend beyond the life of the EEIGGR project - (The – ESLGM) The mechanism provides for a guarantee of up to 70% to a maximum $USD 175 000. Projects of under $USD 8500 are guaranteed at 100%. The guarantee fund is managed by the Credit Guarantee Corporation –Egyptian private joint stock company which has been established by nine public private banks and an insurance company to enable access to finance for small and medium size enterprises. (see box and table)

**EEIGGR's Egyptian Sustainable Loan Guarantee Mechanism (ESLGM)**

- Focuses on technologies and projects with short term payback
- ESCOs and audits are validated by a group of technical experts
- The ESCO is responsible for collecting savings and payments on loans
- Guarantee of 70% to a maximum of $175K (potential of increase from the CGC)
- Projects less than $8500 are guaranteed at 100%

[83] Plan Bleu/UNDP. March 2007.
[84] Salamwy

**Table 7: Egyptian Sustainable Loan Guarantee Mechanism Initiated October 2005**

| Description | Transactions | Loan Amount (thousands of LE) | Guarantee Amount (thousands of LE) |
|---|---|---|---|
| Total Activities | 19 | 1,313 | 1,221 |
| Average Amount | | 69 | 64 |
| Outstanding Balance | 14 | 1,214 | 1,123 |

. The minimal effect of the previous scattered non-sustainable efforts in the field of EE. Those efforts have led to implement pilot projects without actual replication or impacts on energy consumption patterns related to produced services or goods.
Current EE activities are mostly being done through the Egyptian electricity sector. Large efforts are being taken in the electricity supply side concerning fuel switching to natural gas in the thermal power stations, improving conversion efficiency, and decreasing transmission and distribution losses.[85]

Activities are being implemented directly by the end-users without any involvement of governmental agencies and are poorly documented. Some measures under the legislation topic have to be mentioned:

-New buildings' energy standards have been developed to be adopted within new buildings specifications but no enforcement has taken place.
-Energy labelling and standards have been developed and issued for four appliances: washing machines, refrigerators, air conditioners, and electric water heaters. It is compulsory (with limited enforcement) to put the energy efficiency label (reflecting the level of the appliance electricity consumption) on all locally manufactured and imported appliances. Accredited performance test laboratories (Energy Efficiency Testing Facilities) have been implemented within the Egyptian Renewable Energy Testing & Certification Center – RETCC and hosted inside the premises of the New and Renewable Energy Authority – NREA.

There has been limited efforts on:

- Awareness campaigns
- Research programs in universities and research centers.
- Training programs for energy managers, in industrial and commercial sectors.
- Involvement of NGOs under the concept of environment protection through EE.
- Involvement of some local governorates in pilot projects concerning public lighting.

In general concerning the supply side, Egypt currently does not apply any other incentive methods, fiscal measures, quotas, or procedures to encourage local or foreign investment in RUE projects.[86]

[85] Plan Bleu/UNDP. March 2007.
[86] Plan Bleu/UNDP. March 2007.

## 9. Financing Energy Efficiency

In general, sparse investment in energy efficiency (and renewable energy) in the region is largely due to the lack of appropriate legislation and catalysing financing mechanisms. The banking sector is absent due to a lack of information on the opportunities in the sector and the perceived lack of attractiveness of EE investments based on:

- lack of expertise to design and make projects "bankable"
- high level of transaction costs for the banks
- perception of risk for EE projects.

Despite this, there are good reasons to believe that the EE market will pick up and those investors will view the sector as a rewarding one. Firstly, energy intensity figures in many local industries are extremely high providing for large opportunity to improve energy utilization. Second, old manufacturing technologies and processes in industries like oil refineries, textile, iron and steel, aluminum, fertilizers, and food processing all create good opportunities for investing in EE. Third, cogeneration in large service-based buildings like hospitals and hotels also offer attractive opportunities for improving energy utilization.[87]

### Commercial banks

#### *Tunisia*

The Tunisian banking sector includes 14 commercial banks. The government sold its stake in two banks in 2002 and late in 2005 but remains the controlling shareholder in at least four banks that together account for about 42 percent of bank assets.

The Tunisian banking system is a mixture of private and state-owned institutions with varying types of financial instruments and services. The banks are strictly regulated by the Central Bank of Tunisia, which in recent years has required improvements in norms for bank reserves and balance sheets, in compliance with international standards. The leading banks (Société Tunisienne de Banque (STB), Banque National Agricole (BNA), Banque de l'Habitat (BH), Banque International Arabe de Tunisie (BIAT) and Amen Bank) account for about 70% of total banking assets and approximately 60% of banking system loans.

Tunisian banks priorities and challenges include ensuring a continued reduction in non-performing ratios, implementation of tighter credit risk controls and enhanced recovery procedures, and improving the development of seriously under-developed IT applications.

As is the case in Egypt and Morocco, default loans have, in the past, been the main deterrent to banks engaging in new investment portfolios such as energy efficiency and renewables due to an even larger than normal risk aversion. However, during the past ten years, the rate of nonperforming loans at commercial banks was cut from 34% to well below 20%. Tunisian banks tend to be conservative and often reluctant to deal with newer

[87] UNEP/IEA

firms, [88] however there is presently abundant liquidity in the banking sector that provides some openness to new investments.[89]

***Morocco***

Morocco's banking sector is fairly well developed and modern. The banking system is made up of the Central Bank, Bank al-Maghreb, 16 commercial banks (partially owned by or working in partnership with European banks such as BNP Paribas), several development banks, and 36 financing companies. Seven banks control the market and the principal actor is the Banque Populaire's network, followed by Attijariwafa, the BNPE and banks controlled mainly by foreign shareholders, including the BMCI (a subsidiary of BNP-Paribas) and the Credit du Maroc (a subsidiary of the Crédit Lyonnais-Crédit Agricole Group). The Caisse des Dépôts is extremely active in real estate and tourism, funding public interest projects as well as more modest initiatives.[90]

The Moroccan government has adopted a number of measures to liberalize the banking system in recent years. While these reforms have introduced additional competition in the banking sector, in practice, banks do not compete on deposit and lending rates, except for large customers. Caisse Nationale de Credit Agricole and Credit Immobilier et Hotelier were account for over 60 percent of non-performing assets in the banking system. The overall rate of non-performing assets in the banking system is 11 percent.[91]

It is estimated that only 15% of the population uses a bank. [92] Banks presently have a significant surplus of liquidity. Interest rates from at 5,5% - 7% for 5-6 yr. terms, some lower rates can be obtained for larger projects.[93]

***Egypt***

As mentioned, the problem of non-performing loans, particularly in the public sector banks who loaned to loss-making state-owned companies and private businesses. The bad debt situation has improved however and the currant estimate of non-performing loans of 16% (2006)[94] of all outstanding loans is not unusual by developing country standards. Regulating bad debts has been important not only for the overall credit situation in the country, but also to support the privatisation process to ensure that the recent privatization of banks such as Banque du Caire and the Bank of Alexandria were to be sufficiently lucrative to investors. to loss making state-owned enterprises and private businesses.

There is diversity of financial products available in Egyptian banks. Consumer and corporate lending includes short to long term loans, however in practical terms there is

[88] U.S. & Foreign Commercial Service And U.S.Department Of State 2006
[89] European Investment Bank
[90] http://www.animaweb.org/pays_maroc_financesbanques_en.php
[91] U.S. & Foreign Commercial Service And U.S.Department Of State 2005
[92] http://strategis.ic.gc.ca/epic/site/imr-ri.nsf/en/gr122719e.html
[93] European Investment Bank
[94] Has been estimated to be higher by some sources. U.S. & Foreign Commercial Service And U.S.Department Of State 2006

little readiness to lend long-term. Collateral can take many forms such as mortgages, pledges on movable office equipment and production facilities, post-dated checks, third party guarantees or cash deposits. Long term loans, (often all loans) are not based upon the strength of the project or profitability demonstrated by due diligence, but rather by the solvency of the client and its strategic importance to the bank. Many Egyptian banks require a minimum annual turnover before considering lending to a client.

## The local banking sector and investment in energy efficiency projects

### *Tunisia*

To date, all energy efficiency projects implemented in Tunisia have been financed through traditional commercial lending, which requires collateral guarantees. So far, no bank has a developed a specialized approach for financing energy efficiency projects. Other than the GEF guarantee fund, slated to operate until (XXX) there is no private guarantee fund for EE projects. *La Société Tunisienne de Garantie* (SOTUGAR), a private guarantee facility created in May 2003 to enhance access to credit for medium-size industrial and service enterprises, does not provide dedicated guarantees for energy efficiency projects. SOTUGAR manages funds on the order of 52 million dinars, of which 40 million are state funds, and issues credit guarantees of up to 75 percent via the Tunisian banking sector. [95]

Its lack of dedicated credit for such projects is due to:

- The relatively small size of investments in energy efficiency projects, which makes them uninteresting for commercial lending (up US$300,000);
- The lack of experience of commercial banks with financing energy efficiency projects; and
- The lack of demonstration projects.

It remains to be seen how the private financial institutions will take the initiative once the GEF guarantee fund is not longer in operation. Through this experience it is hoped that the banks will learn through medium and small size projects, how to develop project financing.

Equity financing is difficult to access in Tunisia because banks are prohibited from making a new loan to a client until the client reimburses the first loan. As part of the GEF program, financial sector and regulatory issues relative to ESCO projects and/or the management of credits are to be addressed.[96]

Most of the EE investments that have taken place in Tunisia with ANME and the contract-programmes (see section 7) have also had a short term payback, averaging 2 years. Given that the FNME requires that payback must be finalised within 5 years, larger

[95] World Bank/GEF
[96] ibid

investments for bigger energy intensive enterprises would likely not be accommodated within the present financing structure.[97]

***Morocco***

In general, (Morocco) banks base risk evaluation on physical guarantees rather than guarantees offered by the market. (i.e. physical capital (equipment) or positive balance sheets vs. profit via energy savings) In some cases required guaranties can be as much as 300-400% of the original investment amount.[98] Banks require at least 20% of the project to be financed by the client and have only been known to financing long term projects in the wind sector with the back of ONE. They are said to seek to finance a good client, rather than a good project, meaning that even if an EE is technically sound and deemed profitable, if the client does not have a strong financial position and sufficient guarantees they are not likely to invest.[99]

Large industrial players from multinational companies usually engage in EE improvements for reasons of competition and respecting of international standards. They will usually provide financing internally. Most members of industry implement EE improvements that for low cost operations with investment requirements usually between €50-100K and short payback periods. Larger enterprises in particular will seldom seek external financing for larger investments (more than 4-5yr payback, larger than €1 million).

There are no banks that are directly targeting EE as an investment product or that actively invests in EE. The new financing mechanisms in Morocco are introducing financial institutions (mostly leasing companies) to investment opportunities in EE and RE. Banks and leasing companies that have been involved in projects in SWH are poised for EE capacity building as they have an advanced level of awareness for new "environmental" sectors.

Financial institutions involved in energy efficiency (including those active in financing SWH programmes) include:

- Wafa Salaf,
- Eqdom,
- BMCI Leasing (subsidiary of the BMCI),
- Sogelease filiale of the Groupe Société Group
- Maroc Leasing filiale de la Caisse de Dépôt et de Gestion (CDG)
- Union Bail
- Wafabail
- Maghrebail

[97] European Investment Bank
[98] European Investment Bank
[99] Enerplus

To date, banks such as BMCI and Société Générale have started engaging in renewable energy financing (largely in partnership with ONE and in the wind sector)

***Egypt***

A study on financing EE in Egyptian SMEs demonstrated the following characteristics for EE projects (2006):

- Loan repayment period will be three years on quarterly basis with a
- Grace period of 6 months
- Debt to equity ratio is 80:20, i.e. the client will pay 20% of the investment required.
- The loan interest rate is 14% based on the current commercial lending rates in the Egyptian market. The discount rate for calculating the net present value (NPV) is 14%.

The project lifetime is estimated according to the technology applied and the common code of practice, decreased by a varying period per project to establish a comfort zone in the capital budgeting analysis. The internal rate of return on equity was computed as a key indicator to the client as well as the project viability.
Calculations of the project cash flow and financial indicators include purchase of equipment as well as erection costs.

No direct investments are known to have been made in Egyptian EE projects with the exception of the small projects covered under the EEIGGR pilot loan mechanism, where simple technology is used (lighting) and there is very low risk. Banks involved as partners in the EE guarantee mechanism (thus have a general awareness of energy efficiency):

- ElMasrafia ElArabia international company Bank.
- Suez canal Bank.
- Misr Iran Development Bank
- Alexandria Bank
- El Mouasasa ElArabia ElMasrfia – Misr Bank
- Arab Investment Bank
- United Bank
- Delta International Bank
- Egyptian Industrial Development Bank
- Egyptian Development exports bank
- Misr Bank
- Credit Agricole – Egypt
- Commercial & Marine Alexandria Bank
- Egyptian Gulf Bank
- Barcyles Bank
- Development for Housing Bank
- Cairo Bank
- International Arab African Bank
- Egyptian Saudi Financing Bank

- Boheria wattani Bank for development
- Agriculture Bank for Development and guarantees
- Berious Bank
- Mashrek Bank
- Faisal Islamic Bank
- Greek National Bank
- Abu Dhabi Wattani Bank
- Bloom Egypt Bank

Although not involved in partnership with EE programmes, theEgyptian National Bank, National Societe General Bank and the Commercial International Bank have been sensitized to sustainable projects via technology transfer and bilateral lending for environmental aims. (EIB, KfW etc.) There are also several leasing companies active in the industrial sector, and although EE is not a focus, EE technologies would likely be eligible products for leasing. These companies include:

- Sogelease Egypt
- The International Company for Leasing SAE (Incolease)
- Xerox Finance Leasing
- ORIX Leasing Egypt SAE

Leasing companies would tend to be involved in cogeneration projects where profit is attractive and there is relatively low risk, and equipment leasing would be a logical financing solution. That having been said, there are few fiscal advantages for leasing projects of less than 5 years, therefore a solution is still needed for mid-longer term projects.

The EE guarantee mechanism has experienced a % default rate to date. This is largely due to the fact that the technologies and financial risk have been very low (largely EE lighting projects).

The volume of investment identified in the 189 audited members of Egyptian industry demonstrated that around two-third of the projects had an investment cost less than 100,000 LE ($USD 18,230). See table[100] below

**Table 8: Amount of investment required based on audit of 189 members of Egyptian industry**

| Required investment ($) | Identified EE improvements (%) |
|---|---|
| 0-100 000 | 61% |
| 100 000 – 500 000 | 14% |
| 500 000 – 1000 000 | 8% |
| > 1000 000 | 17% |

[100] Salamwy

## 10. Recommendations for Training Financiers for EE in EM+T

Given the lack of policy and regulatory preconditions for financing energy efficiency, it is only in Tunisia that the market for bank loans for EE is sufficiently mature to launch a comprehensive capacity building programme for financial institutions. Given the recent influx of financing programmes, including large amounts targeted for training financial institutions in the field of energy efficiency[101], a one-day seminar for Tunisia was deemed as not able to effectively contribute to a capacity building of financial institutions, would lead to duplication and not be the best use of project resources.

Morocco's dynamic banking sector will still require solid and applied legislation and awareness raising before it will fully engage. Despite this, pilot training activities for Egyptian and Moroccan financial institutions will be needed as new legislation is passed (framework law in Morocco and the new National Sustainable Development Strategy in Egypt ) projects will gradually be implemented that require external financing.

***Tunisia***

The case of Tunisia demonstrates that despite a relatively advanced EE regulatory framework, banks remain reticent to investing in energy efficiency projects due to their lack of technical knowledge and preference to investments involving production versus reduction (of energy costs). However in the case of PROSOL, it was clearly demonstrated that if the public sector supported a mechanism that provided incentive for the borrower and guarantee of payment to the bank via a secure payback scheme, they would be prepared to sacrifice some of their margin.[102] The experience from the financial institution training component of the GEF Energy Efficiency Industrial Sector programme demonstrates little motivation in the EE sector. Despite the large gammit of programmes and subsidies available in Tunisia, securing participation and interest of the financing institutions in a (subsidized) FI focused training programme proved to be a significant challenge.[103]

Since the passing of the The law on energy management, Tunisia has seen an influx of support to the creation of an energy efficiency market.

An AFD programme for EE capacity building for financial institutions that will accompany at EUR 40million credit-line for EE[104] was recently launched and for this reason a capacity buidling/training seminar within the ATSF project was not held in Tunisia. Further follow-up to the results of the AFD effort by UNEP/MEDREP and potential future collaboration will follow.

[101] An AFD programme for EE capacity building for financial institutions will accompany at EUR 40million credit-line for EE. The ADF support programme for capacity building for ANME and ANPE is for € 1.3 million, with ***at least*** € 250 000 alone being dedicated for banker training.
[102] European Investment Bank
[103] based on experiences of GEF project – working in partnership with consultants at Econoler International
[104] The ADF support programme for capacity building for ANME and ANPE is for € 1.3 million, with ***at least*** € 250 000 alone being dedicated for banker training.

***Morocco***

Despite contact with projects that facilitate financing such as the FOGEER guarantee fund, and other projects such as PROMASOL, banks still have very little knowledge and experience with investing in EE because the financial partners to date in these programmes have been limited to leasing companies. Dedicated credit lines for Morocco have been deemed difficult to compete with commercial bank loans unless there were motivational incentives and mechanisms such as interest subsidies, guarantees and margins for the banks. For this reason awareness raising and capacity building within the local banking sector is required.

As part this project, a training seminar entitled " Table ronde de haut niveau pour les institutions financières sur le potentiel des nouveaux marchés de l'efficacité énergétique au Maroc" in the financial capital of Casablanca on April 17, 2008. The full seminar report is found in appendix __ to this report.

The seminar was co-organised by the Office National de l'Électricité, and moderated by Econoler International VP Mr. Hakim Zahar, was attended by senior and executive bankers from the most important financial institutions in Morocco Recommendations for future capacity building for financing energy efficiency in Morocco should concentrate specific financial engineering and evaluation of EE projects. Given that EE markets information on and financing EE in general was also deemed as important it is recommended that next training activities be given over 2-3 days, a challenge given that the senior bankers are usually unable to dedicate large amounts of time to seminars. Appropriate marketing within the banks and a "champion" partner such as the ONE - a large client of the banks is key.

Below are the results of the evaluation question on future capacity building needs. Priority interests coming from participating banks were financial engineering, risk management and carbon financing.[105]

| **III. Prochaines Formations** | | **number** | **%** |
|---|---|---|---|
| **a)** | Montage Financier | 7 | 26% |
| **b)** | techniques d'évaluation de projet EE (due dilligence) | 4 | 15% |
| **c)** | gestion de risques financiers | 6 | 22% |
| | plus d'échanges/discussion avec les participants | 3 | 11% |
| **d)** | financement marché du carbone | 6 | 22% |
| **e)** | montage de solutions concrétes adaptées au marché marocain actuel pour le financement de projets EE | 1 | 4% |
| | | | |

[105] carbon financing was not addressed during the Casablanca seminar.

Recommendations and observations from the seminar trainer on financing energy efficiency in Morocco including future capacity building needs, based on the training that was given on April 17th are found below:

**Module I: Energy efficiency market in the World and in Morocco**

- As a first step for introducing energy efficiency projects financing, the roundtable has fulfilled its objectives and the motivation of the banks' staff was increased based on global and Moroccan facts that were developed for them.
- The discussions held during the Roundtable about Energy efficiency issues and benefits for clients and utility suggest adjusting the future training towards all the partners (not only the Banks) and focusing it based on case studies.
- The ONE was identified by most of the Banks as a major partner for development of innovative financial schemes applicable in Morocco. The ongoing auditing program: Optima can be a good catalyser for immediate interaction between the ONE and the Banks.
- Discussions were held regarding the increasing intensity ratio of Morocco (Total Primary Energy Supply/GDP in BTU/US$) and the actual requirements of the Moroccan Economy compared to the Global tendency of curving them down for most of the countries. This specific point will have to be detailed in the coming Roundtable for better understanding from the participants.
- Most of the participants showed interest to the carbon trading benefits as the programmatic approach and the bundling of small energy efficiency projects can bring a larger dimension for the sector development. Banks were interested to explore these opportunities in the near future.
- The participants realized the investment growth in ''clean energy'' during the last 5 years. Some of the Moroccan Banks have started the identification of opportunities through their international partners' financial institutions.
- The comparison of the Moroccan energy ratios to the Maghreb countries is a very sensitive subject and the participants showed increased interest for such a subject.

**Module II: Financial engineering and valorisation of EE projects**

- The participants agree that the audit format need to be adjusted to meet their requirements in terms of delivery and analysis (financial scheme, risk analysis, sensitivity tests, Measurement and verification protocol, etc.). A technical partner like ONE can help in performing the due diligence of the projects.
- The participants confirmed that it will be difficult for them to apply ''project financing scheme'' for energy efficiency projects. The standard collaterals will have to be provided by the client and/or third party in all cases.
- The mobility of the banks' staff and the lack of adequate trainings are among the largest barriers for EE projects financing schemes development in Morocco.
- The participants agree that the development of demonstration projects is essential for the involvements of all the Moroccan partners including the Banks.
- The criteria for the selection of financeable EE projects need to be retreated in a deeper way. The Banks need to develop a local assessment methodology for reducing the perceived risks for funding such a project.

• The participants consider that the Moroccan auditors/ESCOs are not qualified to develop adequate measurement &verification protocols. Most of the participants were never exposed to such a document in the past.
• Despite the fact that the ESCO concept was introduced several years ago in Morocco, most of the participants did never hear about it before the Roundtable. There is a need to involve the banks in the future trainings (this part of the presentation could not be developed adequately and the Banks may find difficult to understand it on their own).

**Module III: Case study**
• Most of the participants were not interested by the technical measures and their consistency. They keep working on the financial aspects only as any of their portfolio projects.
• The participants discussed the ESCO performance costs and agreed that it will be difficult to mobilise an insurance company for such a small market. The auto-insurance would work. Other potential alternative could be a Governmental Insurance product for all ESCO projects.
• Because of lack of time, the case study could not be discussed in a similar way than the two previous modules. Thus, the participants may not have understood all the details to be able to discuss them during the sessions.
• The Banks agree that the motivation of SMEs is a key factor for the development of the EE projects in Morocco. As a financial institution, they cannot motivate them for such projects.

## 1. Recommendations for next Steps

Based on the results of the performed roundtable, discussion and noticed interest of participants, it is recommended to continue the delivery of further roundtables in the aim to provide them with the necessary tools and opportunities to implement energy efficiency projects.

This roundtable is considered as an introduction to Energy Efficiency Project financing; the participants have better understanding about the development process and the methodology for conducting energy auditing and EE projects implementation. Participants have acquired the basic knowledge about energy efficiency financing that permits them to identify possibilities in their respective field and the needs for future development and potential projects. The next step is to provide them with the necessary training and knowledge to evaluate these opportunities and analyse the impact on the Energy Efficiency projects implementation.

Interest in Energy Services Companies (ESCO) and their role in the Energy Efficiency promotion and project implementation have been discussed and interest and request from participants to have more knowledge about the ESCO and their methodology in Energy efficiency project implementation.

It is recommended to proceed with more targeted training according the each field needs and specificities, especially for a utility like ONE and customer side. This will help to

identify all opportunities and potentials for energy efficiency project and the suitability of innovative technologies and programs to their specific operations and needs.

It is recommended that further training will focus on the following subjects:

- In depth training for conversion of energy audits into real pilot projects
- Introduction to Energy Services Companies and performance contracting
- Training on barriers for implementing Energy Efficiency projects and ways to overcome these barriers ( legal framework, financial and taxes incentives, etc)
- Carbon financing market and applicability to the EE field
- Visits and exchange experience with advanced countries in programs and strategy matters related to technology implementation

***Egypt***

As part this project, a training seminar entitled " **Fuelling the economy – emerging investment opportunities in the energy market of Egypt** " in the financial capital of Cairo on April 30, 2008. The full seminar report is found in appendix __ to this report.

Mr. Emad Hassan (a local expert in energy efficiency) together with Ms. Hala El-Barkouky a local financial expert prepared and moderated the discussions; Dr. Ibrahim Yassin, Project Manager of the EEIGR project prepared a review on a loan guarantee for EE projects and co-moderated the discussions. Mr. Hala Hafez, chairman of the Energy Efficiency Service Business Association (EESBA) an influential Egyptian businessman from the oil industry, champion of energy efficiency and sustainable development causes and the key speaker of the session prepared a presentation on the importance of the EE in Egypt and co-moderated the discussions.

The seminar received an overall evaluation as being positive and useful. Below are the results of the evaluation question on future capacity building needs. Priority interests for future capacity building needs coming from participating banks were financial risk management, financing mechanisms, carbon financing and project evaluation (due diligence).[106]

| **III. Capacity Building Needs.** | | **number** | **%** |
|---|---|---|---|
| **a)** | Financial mechanisms | 7 | 27.03% |
| **b)** | Energy efficiency project assessment procedures (due diligence guidelines) | 8 | 18.92% |
| **c)** | Financial risk management | 5 | 32.43% |
| **d)** | Carbon finance | 5 | 21.62% |
| **e)** | F) Other_____ | 0 | 0.00% |

[106] carbon financing was not addressed during the Casablanca seminar.

Recommendations and observations from the both the trainers, moderators and the participants on financing energy efficiency in Egypt including future capacity building needs, based on the training that was given on April 30th are found below:

- It was unanimously agreed that EE is relevant and part of the solution for the energy challenges that Egypt will face in the future and for continue supporting the economic development of the country.
- The bankers stressed that the ESCOs cannot yet be considered the entity to which banks lend money for EE projects, certain maturity and experience is still required in this sector.
- It was recommended an independent certified body be responsible for monitoring the ESCO, an equivalent of auditors that could give confidence to the financial sector.
- ESCO's need to be certified by meeting a set of criterion, to make them more trustworthy and reliable for the bank.
- The ESCO needs to have the ability to put together a bundle of projects for the bank in order to finance this kind of projects. (Bundling)
- The bank sees it as very important to standardise criteria and requirements according to which the ESCOS would be graded.
- The accountability and credibility of ESCOs has been questioned in the US, which resulted in the creation of a certifying body that ranks those ESCO's. (The programme in Tunisia also includes registering of ESCOs by ANME)
- In banks there has to be a borrowing entity, this borrowing entity is not well-defined for the banker in the ESCO model.
- Creating a "Special Purpose Entity" comprised of investors or banks, beneficiaries of credit facilities and exclusively opens a credit line and finances these projects in different corporations.
- ESCO's might also create portfolios with different budgets.
- Under the EEIGGR project (Energy Efficiency Improvements and Greenhouse Gas Reductions ) managed in part by Dr.Ibrahim Yassin, an ESCO certification process is being designed that will certify the ESCO's financial and technical viability. It was mentioned that EESBA could potentially be the entity in Egypt that certify and build the capacity of the ESCOS.

- It is furthermore important for the bank that a follow up committee is established, to monitor the ACTUAL process of "energy saving" in these corporations.

- It was highlight that raising knowledge and awareness of the end users, government and industry is a key factor for starting to give loans to such projects and starting to build the EE market in Egypt.
- From the bankers point of view the cement companies could be good clients to start lending to EE projects, because of the energy saving potential, energy intensity and the confidence of the banks.
- It was mentioned that probably in some years the possibility that the banks could require that the energy consumptions/electricity bills as one of the issues when assessing a loan. Energy consumption could be a key factor due to the energy dependency of a company and the electricity prices.
- A suggestion was that banks will be encouraged if means of payment are more clear and the massive risk of shortfalls in payment is eliminated
- It was suggested that the government needs to be directed towards subsidizing energy efficiency projects instead of subsidizing energy itself.
- National awareness among all actors needs to take place, making this concept a common one, then banks can find ways to facilitate lending an ESCO
- Comment made by banker: not a single client have approached any of the banks asking them to finance an energy efficiency project. Even in new cities and residential areas like “Madinaty” and “Uptown Cairo” do not have any intention of doing so.
- Arab investors that invest in Egyptian soil, being granted free pieces of desert land have to be pushed towards emphasising Energy efficiency investments.

## 5. Recommendations for Next Steps

Based on the discussions, recommendations and comments from the participants is recommended to continue supporting roundtable discussions in order to raise awareness of the different actors.

- It is recommended that in future seminrs, sessions with government authorities, key industry sectors, the utility and the financial institutions be included.
- It is recommended that targeted training according to the needs identified in the evaluation forms be implemented in a next phase.
- It is recommended that a programme, together with EESBA, government and the financial sector to develop, strengthen and certify the ESCOs in Egypt be developed.

## 11. Recommendations – Financing Mechanisms

A review of financing facilities for EE performed in a recent European Investment Bank (EIB) study provides the following lessons[107]:

Several successful lines of credit or support to bank credits include incentives for partner banks and final sub-borrowers, success fees, a bonus for beneficiaries when the project has been implemented, and technical assistance for identification, preparation and monitoring of projects.

- Successful lines of credit had interest rates adjusted to below market rates.
- Partial guarantees substantially contribute to making lines of credit attractive.
- Facilities dedicated to offering loans and possibly guarantees should be established with commercial banks, especially in countries where the banking sector is dynamic, which is the case of the three Mediterranean countries investigated.
- Similar financing solutions can be proposed for the residential sector.
- An investment fund should provide a combination of quasi equity, mezzanine finance, risk capital, and partial guarantees, at attractive conditions.
- Technical and financial experience of the consultants or company which will manage a fund is essential.

The same EIB research that effective EE/RE financing mechanisms should include the following:

Support to project promoters and market development: energy audits, feasibility studies, monitoring of implementation, financing of pilot and demonstration projects, dissemination of information, support to specialised associations;
Incentives for commercial banks to lend for EE/RE projects in local currency: soft interest rates, maturation, grace period, guarantees avoiding collaterals, success fee paid to banks related to performance.
A dedicated investment fund, with a revolving mechanism, which would essentially provide capital for medium size projects (3-5 to 15 M€): cogeneration, wind farms, gas conversion, solar thermal equipment. The detailed feasibility of such a fund could already been done in Tunisia, and might be considered in Morocco (and Egypt) when the regulatory framework is in place. An investment fund offering instruments of mezzanine type can be considered, provided that the overall cost is not significantly higher than a loan.

In the case of Morocco and Egypt, once the regulatory framework is in place, the initial financing mechanisms should include[108]:

Line of credit, when possible in local currency, slightly below market interest rates (a key issue for enterprise), potential to approve longer term lending (more than 5 years)

[107] European Investment Bank
[108] European Investment Bank

- a grace period (up to 3 yrs).
- Accompanying the line of credit with a guarantee facility will improve commitment by financial institutions.
- other concessional financing such as interest rate subsidies
- incentive fees for banks.

It is clear that the absence of financing mechanisms in Morocco and Egypt remain a barrier to investing in EE , however it remains clear that until legislation and supporting regulatory frameworks that support EE are in place, the local banking sector is not likely to be involved, nor would financing mechanisms likely be successful in stimulating the market. [109]

[109] European Investment Bank

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