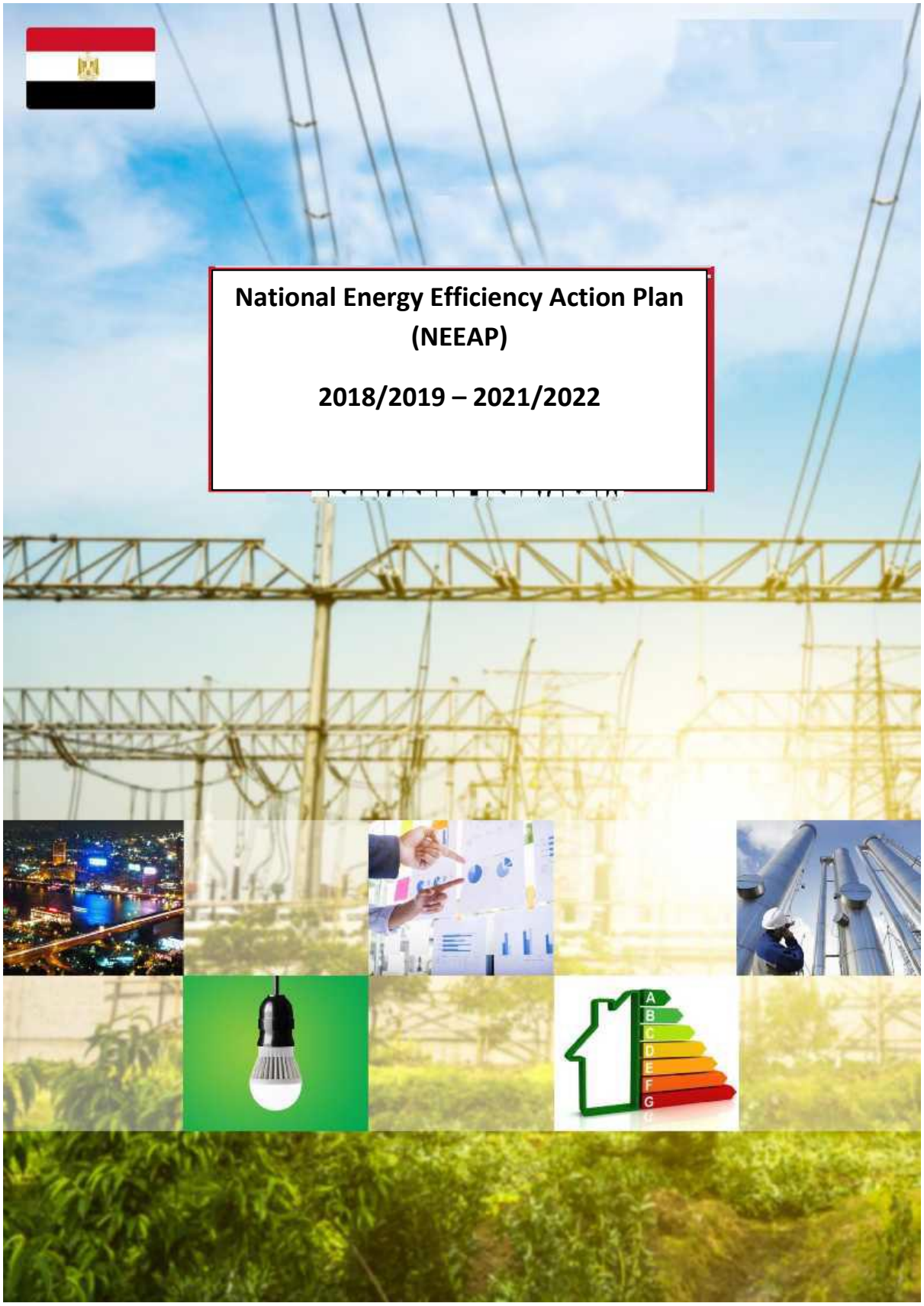
Second: National Energy Efficiency Action Plan (NEEAP)



National Energy Efficiency Action Plan (NEEAP)

2018/2019 – 2021/2022

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Executive Summary

This plan represents the second Egyptian National Energy Efficiency Action Plan (NEEAP) (2018/2019 – 2021/2022), which has been developed in compliance with the Arab Energy Efficiency Framework (AEEF) requirements and has taken into consideration the challenges faced when implementing the preceding plan in order to ensure achievement of the aspired outcomes. The NEEAP also complies with Egypt's Integrated Sustainable Energy Strategy (ISES) to 2035 adopted by the Supreme Energy Council (SEC) in October 2016, whereby it builds on ISES's vision and goals. Moreover, the NEEAP has taken into account the required short-term measures (2015 – 2020) set out in ISES and, at the same time, sets out to enforce the provisions of Electricity Law No. 87 of 2015 and its Executive Regulations issued in May 2016 based on the relevant energy efficiency improvement articles in such law.

Furthermore, the NEEAP is keen on developing the institutional structure of energy efficiency activities by completing, activating and empowering energy efficiency units across different economic sectors in compliance with the Cabinet's decree issued in 2009 for adoption of an Energy Efficiency Institutional Framework (EEIF) based on centralized planning and coordination, and decentralized implementation measures. A governance system was laid for energy efficiency activities in the NEEAP to ensure supervision, coordination, follow up and data exchange among the relevant stakeholders, as well as evaluation of results that would further guarantee efficiency and effectiveness of the measures taken and ensure performance accountability. Within this context, a Sustainable Electric Energy Steering Committee (SEESC) is to be established headed by the First Undersecretary of the Ministry of Electricity and Renewable Energy (MoERE) to oversee energy efficiency activities at the ministry. A detailed description of SEESC's tasks and composition is set out in the NEEAP, for which a decree will be issued by the Prime Minister, according to the requirements set out in Electricity Law No. 87 of 2015. Besides SEESC, the institutional structure will include SEESC, sectoral energy efficiency units and the Energy Efficiency and Climate Change Directorate (EECCD) at MoERE, which shall act as SEESC's technical secretariat, in addition to managing the different databases, particularly the energy efficiency register. It will also coordinate with stakeholders, in addition to its role of activating energy efficiency financing mechanisms, such as the Energy Efficiency Fund (EEF).

Specialized committees will also be set up, including a committee concerned with energy efficiency specifications and labels as well as a committee overseeing the energy efficiency code for buildings. The NEEAP further set up systems for energy managers, the energy efficiency register, and a follow up & verification system, in compliance with the requirements set out in Electricity Law No. 87 of 2015. Accreditation requirements and mechanisms for energy managers and auditors were also detailed in NEEAP, as well as tools for verification of data included in the energy record.

NEEAP sets out mechanisms for securing funding for energy efficiency projects through different tools such as the EEF, as well as a Credit Risk Guarantee Mechanism (CRGM) for energy efficiency projects, a mechanism for coordination between different agencies and funding programs for energy efficiency activities provided by international financial institutions and donors.

NEEAP adopts the necessary measures to ensure energy efficiency in terms of both supply and demand. Regarding the supply side, NEEAP provided a forecast of electricity savings owing to the implementation of the tariff restructuring program and pointed out the significance of having a realistic price indication of electricity generation, transmission and distribution costs. Furthermore, generation expansion projects were listed, as well as their impact on the qualitative development of means of generation, which would positively reflect on energy efficiency. The NEEAP estimates that the annual rationalization of fuel consumption used for electricity generation would be estimated at 12.9 million tons of oil equivalent. The NEEAP sets out measures for decreasing distribution network losses, developing control over such networks and using smart meters, which would increase the energy efficiency of networks. Also, the NEEAP sets out measures to be carried out by Electricity Distribution Companies (EDCs) for realizing energy efficiency among consumers as set out in the Electricity Law.

Concerning energy efficiency in terms of the demand side, energy efficiency improvement measures address the sectors of buildings, tourism, industry, public lighting and education, while focusing on a program that promotes the use of LED lightbulbs for the residential sector according to a mechanism developed to target first three tariff segments that form 50% of total consumers in such sector, for whom the cost of LED light bulbs formed a challenge in spite of the fact that their use would lead to savings due to the high contribution of the lighting loads in such tariff segments.

The NEEAP focuses on expanding the energy efficiency labels program, stipulating placing such labels on equipment and machines and adopted mechanisms for getting rid of non-energy efficient devices. Emphasis was laid on adopting measures for using renewable energy, whether for electricity generation or water heating in the sectors of buildings, tourism, industry, public lights and educational buildings. NEEAP sets out measures for deploying high efficiency electric motors in the industrial sector, besides measures for developing educational programs and school activities to raise children's awareness about energy efficiency procedures.

In addition, the NEEAP developed a set of measures for raising awareness and communicating with consumers, which is an essential factor for the success of energy efficiency measures in all sectors. These measures address NEEAP's second and third phases of the National Energy Efficiency Awareness Campaign (NEEAC), and the action taken by EDCs to launch specialized awareness campaigns to disseminate the uses of renewable energy.

In the field of training and capacity building, NEEAP identifies 10 training fields and adopted several tools for the implementation of training and capacity building programs, which include cooperation with universities and educational centres, in addition to mechanisms for accreditation of training centres, and developing specialized training programs in cooperation with energy efficiency sectoral units.

The NEEAP also sets out a cooperation plan with civil society organizations owing to the impact they have on raising awareness about improving energy efficiency and due to their flexibility and innovative implementation measures. NEEAP identifies three fields of cooperation including establishing an observatory body to detect energy misuse and raise awareness through holding seminars and communicating directly with consumers, in addition to participating in initiatives taken for distributing LED lightbulbs and eliminating of non-energy efficient devices.

It is stipulated in the NEEAP that an annual energy efficiency report should be issued to include the state's electricity consumption budget, energy efficiency evaluation in different economic sectors, based on available data in the energy register and on proper indicators. The report is to also reflect financing of Energy Efficiency Improvement Projects (EEIPs) and economic worthiness of such financing, in addition to training and capacity building programs, as well as evaluation of the results of such programs. In addition, the reports are to reflect cooperation programs with the civil society, and a broader evaluation of the impact of EEIPs, such as environmental and social impact assessment, including creating job opportunities, and the relevant costs, as well as the impact of energy efficiency improvement measures over the competitiveness of economic activities. NEEAP requires that an annual conference be held on energy efficiency where the energy efficiency report would be presented, as well as some successful EEIPs, that is besides holding seminars among stakeholders to discuss the challenges facing the development of this activity, in addition to establishing direct communication between agencies providing energy efficiency improvement services and the beneficiaries of such services.

Vision:

- Merging energy efficiency improvement policies into energy and environment policies to ensure secured energy supply by dealing with energy efficiency as one of the less expensive available supply sources that would ensure separation of the current correlation between GDP growth rates and the increase in energy consumption rates.

Mission:

- Achieving energy efficiency improvement without affecting growth or production rates in the sectors of industry, trade, services and agriculture, or affecting the wellbeing of consumers, whether in terms of residential or public uses.
- To raise the competitiveness of energy consuming sectors by improving the efficiency of energy use.

Chapter I- Introduction

1-1 Overview

The Arab Energy Efficiency Framework (AEEF) was approved at the 26th meeting of the Arab Ministerial Council for Electricity (AMCE) by virtue of Decree No. 195 dated November 23rd, 2010. AEEF set out a group of principles that can be summed up as follows:

- The importance of the public sector's pilot role;
- The significance of governance of the energy efficiency sector;
- Ensuring the availability of effective programs for energy management and auditing, as well as awareness programs about the significance of energy auditing;
- Ensuring the accuracy of energy accounts, explaining accounting methodologies and providing consumers with the necessary data;
- Confirming the responsibility of energy generation, transmission and distribution companies to provide data and follow the best practices to improve energy efficiency;
- Setting up qualification and accreditation mechanisms as well as related training programs for cadres and corporations working in the field of energy efficiency improvement; and,
- Setting incentives and other tools to overcome financing obstacles impeding the implementation of EEIPs.

Paragraph 2 of the aforementioned Decree states the following "to streamline the Arab Energy Efficiency and Rationalization Framework (AEERF) among consumers across Arab countries, to use it as a guide for developing NEEAPs, which requires identifying a focal point (organization/expert) in each Arab country to follow up the implementation of both AEERF and NEEAP."

1-2 Egypt's NEEAP (2012-2015)

According to the Decree issued by AMCE and in compliance with AREF, Egypt's NEEAP was set for 2012-2015, to include the following:

First: NEEAP's Indicative Goals

Second: Energy Efficiency Measures in Different Sectors, including the following:

- To use high energy efficiency lighting in the housing sector by distributing 12 million high efficiency light bulbs according to funding facilities through EDCs;
- Second phase of the Electricity Efficiency Specifications and Labelling Program (EESLP) for home appliances;
- Financing mechanism to deploy the use of solar heaters in the residential sector;
- Energy saving in public lighting;
- Second phase of EEIP in governmental buildings and public utilities.;
- Energy consumption rationalization in water and wastewater stations; and,

- Mechanism for deploying the use of solar water heaters at hotels in the Red Sea and Sinai (Egysol).

Third: Complementary Energy Efficiency Measures:

- Electricity generation projects using renewable and highly efficient traditional energy sources;
- Thermal efficiency and environment improvement measures to be taken at existing power plants; and,
- Energy efficiency measures to be taken by EDCs which include the provision information and energy efficiency services, participation to avail funding for consumers for some energy efficiency measures, launching awareness campaigns, decreasing network loss and studying the deployment the use of smart meters.

Fourth: Supporting Measures

- Awareness programs;
- Training and capacity building programs in solar water heating and energy efficiency fields;
- Revisiting legislations on the use of energy efficient appliances in buildings;
- Establishing a central laboratory for testing high energy efficient lighting items; and,
- Encouraging scientific research in the field of energy efficiency.

Fifth: Evaluation of Energy Efficiency Policy Development

- Energy efficiency standard specifications of electrical appliances;
- Energy efficiency codes for buildings;
- Reduce the use and production of non-energy efficient lighting devices; and,
- Avail financing sources for energy efficiency projects.

1-3 Important Remarks on the First NEEAP

Lack of an institutional framework that would ensure coordination and exchange of data and information among parties engaged in the implementation of NEEAP, especially those not in the electricity sector;

Absence of a mechanism for verification, monitoring & evaluation of NEEAP deliverables and lack of monitoring the implementation of the NEEAP's measures;

Establishment of energy efficiency units in economy sectors was not completed according to the EEIF;

NEEAP was designed based on the 'bottom-up approach', where NEEAP's measures were not linked to ISES's goals. NEEAP was also confined to sectoral goals or available funding, rather than required goals and funds;

The high efficiency lighting program in the residential sector was not applied over segments that would achieve higher economic feasibility for the program. Further, the program did not contain a mechanism for withdrawing non-energy efficient lightbulbs from beneficiaries;

The capacity building program was limited and some programs were not activated, such as those targeting elimination of non-energy efficient appliances and machines, as well cooperation with research agencies; and,

Absence of programs targeting school and university students.

1-4 Energy efficiency measures taken though not included in the NEEAP

During the implementation of the NEEAP, the following laws and measures were issued, which have a direct and an indirect impact on energy efficiency activities, which included the following:

a- Sustainable Development Strategy 2030

Energy Strategic Vision within Egypt's Vision 2030

By year 2030, the energy sector will be able to meet all sustainable development requirements, in terms of energy resources, and to achieve optimum use of its diverse sources (traditional and renewable), which would, in turn, lead to an effective contribution to achieving improved economic growth rates, national competitiveness, social justice, and environment protection, besides earning a pioneering role in fields of renewable energy, and good & sustainable governance of resources, in addition to acquiring the ability to innovate, forecast and adapt to local, regional and international developments in the energy field, within the framework of achieving global Sustainable Development Goals (SDGs).

Energy Strategic Goals within Egypt's Vision 2030

- Ensure energy security;
- Increase energy sector's contribution in the GDP;
- Maximize benefit from local energy sources;
- Enhance good governance and sustainability of the sector;
- Reduce energy consumption intensity; and,
- Mitigate environmental impact of emissions in the sector.

Key Performance Indicators (KPIs):

- Ratio of primary energy supply to forecasted total consumption (%);
- Ratio of residential, commercial and industrial units engaged in electricity services;
- Average electricity interruption period;
- Rate of change of energy consumption intensity;

- Percentage of energy sector's contribution in GDP;
- Percentage of primary fuels in the mix;
- Percentage of primary fuels' mix used for electricity generation;
- Efficiency of electricity generation;
- Efficiency of electricity transmission and distribution; and,
- Reduction percentage of greenhouse gases in the energy sector.

Energy Development Programs (Measures) up to 2030

- Develop an integrated medium and long-term energy strategy;
- Restructuring the energy sector;
- Revisiting regulatory legislations;
- Development of the sector infrastructure;
- Promote innovation in the energy sector;
- Qualify cadres required in the sector;
- El Dabaa nuclear power plant for electricity generation;
- Application of environment standards and expansion of audited measurements; and,
- Energy support management.

This comes within the framework of the United Nations 17 SDG's for 2030, where SDG No. 7 concerns the energy sector, which is to ensure that everyone has access to affordable modern reliable and sustainable energy services and includes the following:

- Ensure universal access to affordable modern reliable and sustainable energy services for by 2030;
- Largely increase the share of renewable energy in overall worldwide energy sources by 2030;
- Double the global rate of improvement of energy efficiency utilization by 2030;
- Enhance international cooperation to facilitate access to clean energy technology researches, including those relating to renewable energy, energy efficiency, advanced cleaner fossil fuel technologies, and to encourage investment in energy infrastructure and clean energy technology by 2030; and,
- Expand the scope of infrastructure and improve technology levels in order to provide universal modern sustainable energy services in developing countries, especially the least developed countries, small developing islands and non-coastal developing countries, according to the support programs of each by 2030.

b- Issuance of the Electricity Law

The Law includes a chapter on energy efficiency, stipulating the following:

- Electricity transmission and distribution companies will connect cogeneration units and distributed generation facilities, where energy surplus will be purchased from these units;
- Contracts will be concluded with consumers to reduce or shift loads;
- Subscribers with a contractual capacity of 500 KW or more will appoint an energy efficiency manager and will maintain an energy efficiency register;
- Transmission and distribution companies will lay and implement EEIPs targeting consumers;
- The government will expand the application of energy efficiency labels over electrical equipment and appliances, develop and implement programs for replacing non-energy efficient devices, and implement EEIPs for industrial and commercial buildings; and,
- Producers and importers of electrical equipment and appliances will place energy efficiency labels on them.

The Executive Regulations of the Electricity Law detailed executive measures for implementing the provisions of the Law, including the following:

- Identify the types of contracts for demand side management and the related contractual issues;
- The obligation of appointing an energy manager responsible for the energy efficiency measures at the facility as well as the qualification requirements based on what is set by SEESC;
- Identify the requirements of the energy register and how to monitor and verify such register;
- Identify the requirements of the policies and programs related to the energy efficiency labelling, disposal of less efficient appliances and the necessary programs to enhance energy efficiency in industrial and commercial facilities;
- The obligation of the public authorities, while drafting Terms of Reference (ToR) for the procurement of electrical appliances, to include the desired energy efficiency grading; and,
- Identify the necessary conditions, procedures and obligations to issue the energy efficiency labels.

c- Issuance of the Law that encourages the investment in electricity generation projects from renewable energy

In December 2014, the Law that encourages the investment in renewable energy power plants was issues, in which it included several measures amongst the following:

- Identify mechanisms for setting up renewable energy projects, such as FiT, commercial-basis plants and applicable systems in competitive bidding processes and state-funded projects;
- To allow renewable energy projects the priority of dispatch in the transmission and distribution networks and, accordingly, the contracts signed with the electricity grid are based on "take or pay" the generated energy;
- The Cabinet will be entitled to impose obligatory percentages on economic activities for the consumption of specific percentages of renewable energy among their consumption of electric energy; and,
- To develop "Certificates of Origin" system which may be circulated separately from the renewable energy, and may be used as a tool for settling liabilities and obtaining privileges that are granted to renewable energy users.

In October 2014, the Cabinet issued a decree setting FiT for each power plant using wind and solar energy using PV cells. Such decree set out targets of the two-year first phase as follows:

- To establish 2000 MW with capacity of 20-50 MW from wind power plants;
- To establish 2000 MW with capacity of 500 kW – 50 from PV power plants; and,
- To establish 300 MW with capacity below 500 kW from PV power plants for residential and different buildings.

In September 2016, a second phase of the FiT program was determined to complete the goals set for the first phase.

d- Electricity Tariff Re-structuring Program (ETRP)

June 2014 marked the beginning of ETRP as well as setting the tariff structure, which aims at the gradual elimination of electricity subsidization in order to reach the levelized cost of electricity over a 5-year span.

The ETRP took into consideration improving energy use efficiency through several pillars, including the following:

- The tariff would reflect the levelized cost of electricity, which gives a rapid promising indication of improving electricity efficiency for consumers. Accordingly, the complete program was announced for the upcoming five years.

- The tariff was designed to reflect types of usage, as the tariff includes a component for capacity and another for energy, as well as tariff at the Time of Use (ToU), for all types of subscribers with the exception of those using low voltages, which leads to a difference in the average cost for consumers, based on the type of usage (load factor, load time).
- Tariffs set for consumption segments identified as the neediest subscribers in the residential and commercial stores sector are restricted to them, such that other subscribers cannot benefit from these rates.
- Tariffs applied to the highest consumption segments in the residential and commercial sectors are calculated on basis of actual costs.

The accumulative increase of the average sale price of electricity to consumers in the residential sector reached 79.4% during the three-year period from the beginning of ETRP (2014 – 2017).

According to studies on the elasticity of the electricity demand in the residential sector prepared by EgyptERA, a 10% rise in sale price leads to a 1.5% decrease in electricity demand.

The government's decision to unpeg the EGP exchange rate in November 2016, resulting in a significant devaluation of the Egyptian Pound, required that ETRP be revisited for an additional period in order to contain the new increase in costs in EGP, which meant an additional rise of the electricity tariffs, which, in turn, led to a higher interest in realizing energy efficiency.

e- Establishment of energy efficiency units in different economy sectors

Energy efficiency units in different economy sectors began to be established, including the following:

- Industry sector: through the Egyptian National Cleaner Production Centre (ENCPC).
- Tourism sector: through the Tourism Development Authority (TDA).
- Housing sector: through the New Urban Communities Authority (NUCA).

According to the original plan, the remaining sectoral units were not completed, such as the unit for public buildings and utilities at the Ministry of Local Governance, as well as the unit for the transport sector at the Transport Research Institute.

The existing units need more empowerment to extend their activities to all entities under the umbrella of the sector, rather than being restricted to the activities of the entity in which the unit is situated.

The energy efficiency unit was established at MoERE.

The energy efficiency unit in the oil and gas sector has not been completed.

f- Establishment of specialized departments for renewable energy and energy efficiency at EDCs

Specialized departments concerned with renewable energy and improving energy efficiency in public EDCs were established to provide energy efficiency services to consumers and to contract with them for carrying out renewable energy projects using FIT of capacities falling below 500 kW.

Such departments have been equipped with qualified personnel through the certified energy auditors program in cooperation with EgyptERA and EDCs, where 90 trainees were qualified to carry out energy auditing tasks (9 persons in each EDC, besides the Egyptian Electricity Holding Company (EEHC)).

EgyptERA set up a database of energy auditors at EDCs, which is updated to include the energy auditing data, based on which requests for renewal of accreditation are submitted to the relevant accrediting entity every couple of years.

g- National Energy Efficiency Awareness Campaign (NEEAC)

NEEAC began in June 2016, funded by the Central Bank of Egypt (CBE) by a sum of EGP 50 million for one year and it's targeted to be implemented over three years.

A contract was concluded with a company for designing and implementing the campaign in cooperation with MoERE's energy efficiency unit.

The campaign was launched on the first day of Ramadan 2016.

A contract was concluded with a company to evaluate the impact of the campaign over subscribers.

h- Electricity production expansion plans

The nominal capacity of traditional power plants (thermal and hydroelectric) amounted to 37,966 MW (2,040 MW from power plants contracted according to Build, Own, Operate and Transfer (BOOT) system) up until July 2016.

That is in addition to renewable and hybrid power plants of a total capacity of 890 MW.

The qualitative rate of fuel consumption of thermal units reached 214.5 grams of fuel equivalent for each kWh in 2016.

It is expected to add 20,155 MW by 2020 such that the total installed capacity would reach 58,121 MW, out of which 34,449 MW would be produced by high efficiency combined cycle power plants, where fuel consumption rates would record an average of 170 gm of fuel equivalent per kWh (standard consumption rates in some power plants amount to 142 gm of fuel equivalent per kWh).

With regard to renewable energy, it is expected to add 6,960 MW from wind power plants by 2022 and 2,750 MW from PV power plants.

As of the financial year 2018/2019, the grid loads are expected to be secured mainly depending on combined cycle power plants, and hydro power plants using renewables, which means fuel consumption will be reduced to approximately 170 gm of fuel equivalent per kWh of thermal units instead of the current average of 214.5 gm of fuel equivalent per kWh, which will result in savings worth 20%.

i- Egypt's Integrated and Sustainable Energy Strategy (ISES) 2035

In October 2016, SEC adopted Egypt's ISES 2035.

ISES set a vision regarding the role of energy efficiency, based on which ISES identified the goals of the energy efficiency component and targeted energy rationalization, as well as a parcel of procedures to achieve such targeted rationalization.

The energy efficiency component in ISES included institutional measures and 13 parcels of procedures across the sectors of industry, buildings, tourism, public lighting and transportation.

ISES's goal is for rationalization to reach 18% of expected energy consumption by 2035, which is equivalent to 20 million tons of fuel equivalent.

j- Training and capacity building.

Training engineers at EDCs in cooperation with EgyptERA, GIZ and TUV Rein Land and qualifying 216 engineers to become energy auditors, including Training of Trainers (TOT) for 60 engineers.

Cadres were trained at EDCs on energy management & auditing, in addition to TOT as mentioned in the aforementioned point.

EDCs held seminars at schools led by energy saving engineers who received TOT courses delivered by EgyptERA and GIZ in cooperation with the EDCs, for raising awareness among students on energy saving.

EgyptERA's Board of Directors ratified the first edition of the Electric Energy Register Guidebook in May 2017, which was presented to VIP subscribers with capacities exceeding 500 kW.

1-5 Proposed NEEAP 2018-2019 – 2020/2021/2022

The AEFF divided NEEAP into the following:

- General framework: national rationalization goals.
- Energy efficiency measures in different sectors.
- Complementary energy efficiency measures.
- Common measures among the sectors.
- Evaluation of the development of energy efficiency policies.

Pursuant to the proposed upgrading of the national plans, the proposed measures were divided into the following four sets:

- Quantitatively measurable measures.
- Measures of legal, statutory or administrative nature.
- Capacity building measures.
- Measures for raising awareness and communicating with consumers.

Accordingly, NEEAP 2018/2019 – 2021/2022 has taken the following into consideration:

- Challenges faced by the previous NEEAP in order to ensure realization of the aspired results.
- To complete the establishment of energy efficiency units in the different entities, so as to complete the institutional development of the energy efficiency institutional structure, with special attention given to the energy efficiency unit at the Ministry of Local Governance, in order to achieve NEEAP's goals in the domains of public buildings and public lighting, and to expand the supervisory role of the energy efficiency unit at the Ministry of Housing to include utilities (water and wastewater stations).
- To put in place an industry governance system, which is essential for supervision, coordination, follow up and exchange of data among stakeholders, and to evaluate deliverables that would ensure achieving energy efficiency, effective procedures and performance accountability.
- Enforcement of the provisions of the Electricity Law, especially concerning the energy managers system, and the elimination of non-energy efficient equipment and devices, in addition to activating the role of EDCs in energy efficiency activities.
- Compliance of NEEAP with Egypt's ISES 2035 adopted by SEC, which renders it binding on all the state's sectors, especially with regard to the vision, mission, goals and the parcel of measures.
- Sectoral measures to be homogeneous and coherent with each other and with NEEAP's general goals, where such measures are not to be carried out in an isolated manner.
- NEEAP is to require developing local funding sources for its implementation, where the role of donors would be complementary.

- Enforcement of the provisions of the Law on co-generation and electricity generation from recovered energy, by starting to connect the network to the isolated as well as existing units that are unconnected to it, so as to increase their generation, which would allow for purchasing the surplus generation using a net-metering system. This would encourage different entities to establish such units, where coordination would take place with EgyptERA to this end.
- Cooperation with the educational sector by designing school activities and curriculum on energy efficiency, which is essential for reaching the required levels of awareness.
- Cooperation with universities and scientific research institutions in order to have the necessary studies conducted, such as those concerning the effect of daylight-saving time on energy rationalization, evaluation of the effect of demand elasticity on consumption tariff and integrated resources planning …etc.
- Taking into consideration NEEAC targeting the public, and the activities of EDCs in the field of raising awareness, there should be focus on issuing specialized messages that are tailored to suit the nature of the different sectors.
- Prior to ratification of NEEAP, consultations are to be held with concerned entities in order to ensure consensus and enforceability of NEEAP.

Within this context, NEEAP adopted the following:

- To include energy efficiency improvement measures in the state's general policies with regard to demand.
- To develop an effective institutional framework for improving energy efficiency that would qualify consuming sectors to reduce consumption rates.
- To set sectoral goals in line with the nature and aspired goals of each sector, and in conformity with the general goals of ISES and this NEEAP.
- To realize optimum use of available technical and financial support for energy consuming sectors to enable them to achieve their goals.
- To set binding sectoral indicators to be monitored through the energy register and to issue an annual report on them.

Chapter Two- Integrated and Sustainable Energy Strategy (ISES) 2035- Energy Efficiency Component

2-1 Background

On the backdrop of cooperation between Egypt and the European Commission, technical support was provided to upgrade Egypt's ISES 2035. A contract was concluded with an international consortium made up of three consultation firms for providing such technical support, which included 18 international professionals and 5 Egyptian experts. In addition, 20 ministries and authorities were engaged, besides energy companies, in the provision of data, reviewing studies and discussing outputs.

ISES 2035 is a dynamic strategy which developed an energy mathematical model that allows taking into consideration any developments that may arise and measuring the impact of such developments on ISES, besides allowing for upgrading ISES, whenever necessary, or considering additional alternatives.

ISES 2035 was prepared over three years, 740 days/ person (experts), in addition to 300 hours of training on the strategy mathematical program. ISES documents included the following:

a- Egypt's ISES 2035.
b- The Strategy white book, which includes policies and procedures emanating from the main Strategy.
c- A booklet for each of the following sectors: oil & gas, electricity generation from traditional energy sources, electricity generation from renewable sources, and the energy efficiency sector, where each booklet includes a general overview of the sector, and a document on the policies and required measures.

General consultations took place with competent authorities regarding ISES, which was ratified by SEC in October 2016, by virtue of a decree, which ratified the 4th alterative (b) of ISES as an obligatory alternative.

2-2 Upgrading ISES includes the following:

ISES identified the following four main pillars:

a- To secure energy supply.
b- To ensure sustainability of the energy industry.
c- To develop the institutional structure and governance of energy companies.
d- To develop energy markets in terms of competitiveness and empowerment of energy regulatory bodies.

Preparation of ISES involved collecting and processing the necessary data in all relevant fields and using it in proposing different alternatives for the energy sector in light of ISES's vision and expected challenges. Further, a set of performance indicators were set out to evaluate the different alternatives, and, in turn, to determine those that were more suitable, to lay a draft strategy in light of that, as well as to determine the following measures to be taken, such as the required policies and executive plans in order to achieve ISES's goals.

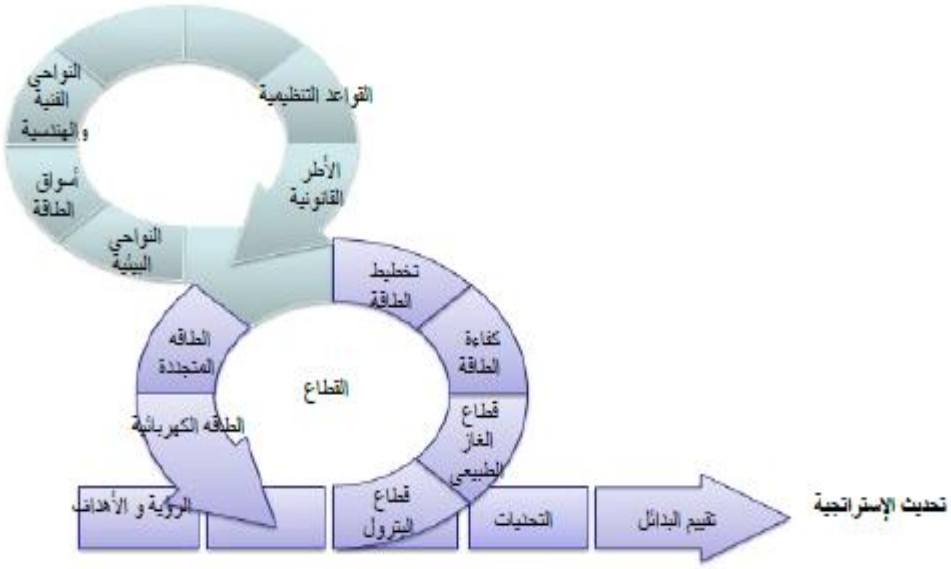


Figure 2-1 Different Fields Covered by ISES

Goals of the pillar of securing energy supply - Diversification of supply sources and increasing the percentage of renewable energy. - Improving energy efficiency. - Developing the infrastructure of the energy sector. - Encouraging the private sector's contribution to the energy industry.	**Goals of the pillar of developing institutional structure and governance of energy companies** - Enhancing governance of the gas sector and establishing an agency for developing the gas market. - Enhancing governance of the electricity sector. - Upgrading governance in energy companies. - Developing the energy planning system. - Developing EEIF.
To identify two pillars to ensure sustainability of the energy industry - To achieve financial sustainability. - To develop an energy support structure.	**Goals of the pillar of enhancing the competitiveness of energy markets and the empowerment of energy regulatory bodies** - International interconnection and engagement in regional energy markets. - Development of the gas market and relevant regulations. - Promoting development of the electricity market. - Promoting energy production from renewable sources. - Enhancing the level of services provided to consumers.

Figure 2-2 Four Pillars of ISES Goals

2-3 Relation between ISES and the Environment

ISES focused on linking ISES to the environment, taking into consideration the mutual effect between energy generation & utilization, and climate change, as well as the measures required to be carried out by the energy sector to mitigate climate changes, while taking into consideration indirect cost and return when evaluating the different alternatives of energy policies.

	Baseline Scenario		First Alternative			Second Alternative	Third Alternative	Fourth Alternative (Least Cost)*	
Oil and Gas Production	Oil & gas production according to the most likely scenario while conducting a sensitivity test of the optimistic production forecast scenario as well as the scenario in case of not realizing such forecasts		Like the baseline scenario			Like the baseline scenario	Like the baseline scenario	Like the baseline scenario	
Fuel subsidization	(a) Subsidisation support fixed at the value set in June 2014	(b) Reduction of subsidisation by 50% of the value set in June 2014 by 2020, and total lifting of subsidization by 2025	Alternative (b)			Alternative (b)	Alternative (b)	Alternative (b)	
Availability of coal for electricity generation	Available after 2020		Like the baseline scenario			Like the baseline scenario	Coal not used in electricity production	Like the baseline scenario but according to economic feasibility as compared with other technologies	
Nuclear power for electricity generation	According to the current plan (1.2 GW unit and in 2023, a similar one in 2025, a third in 2027 and a fourth 2029).		Like the baseline scenario			Five year delay compared with the baseline scenario	Nuclear energy not used in electricity production	(a) According to economic feasibility as compared with other technologies	* (b) Like the baseline scenario
Renewable energy	According to the current plan (participation percentage 20%)		(a) Like the baseline scenario	(b) Five years delay beyond the baseline scenario	(c) maximum technically possible participation	Five year delay compared with the baseline scenario	maximum technically possible participation	According to feasibility, like the baseline scenario, but according to economic feasibility, as compared with other technologies and up to alternative (c).	
Energy efficiency	Expected natural development of energy efficiency without taking an additional measure (expected rationalization of 8%)		Like the baseline scenario			Additional measures (18% savings)	Additional measures (18% savings)	Additional measures (18% savings)	

ISES has identified a group of basic criteria for evaluation of the alternatives, as set out hereinafter:

- Ratio of energy imports to total energy usage.
- Rate of CO_2 equivalent emissions per unit (EGP 1 million) of GDP calculated at the determined value in the base year (2010).
- Financial equivalent for the damages resulting from emissions of pollutants (besides CO_2).
- Net percentage of energy savings (energy efficiency).

- Rate use of primary energy sources (1,000 tons of fuel / EGP 1 million of GDP (at the value of the base year 2010).
- Energy consumption rate per individual.
- Total decrease in energy subsidization (USD 1 million in the base year).
- Value of assets calculated according to the value during the base year.
- Diversity factor of supply resources, whether primary sources or electricity production sources (Herfindahl-Hirschmann Index (HHI)).

The deliverables of each of ISES's alternatives were calculated using the mathematical model developed by the energy sector in Egypt, using the Times-Model developed by the International Energy Agency (IEA). Taking into consideration the evaluation standards of the different alternatives, SEC adopted the fourth alternative (b) as a basis for ISES 2035.

2-4 Energy Efficiency Component in ISES

A vision was set for the expected role of energy efficiency, in light of which ISES set out the goals of the energy efficiency component and the targeted energy rationalization goals, as well as a parcel of measures for achieving such targeted rationalization, as illustrated in figure 2-3.

Figure 2-3 Energy Efficiency Component in ISES

Sector	1 million tons of fuel equivalent	Decrease percentage (%)
Industry	6.8	18
Buildings	8.6	16
Transportation	4.6	23
Total	20.0	18

Vision

Goals

Target

Parcel of Energy Efficiency Measures

Vision

- Integration of energy efficiency improvement measures within energy and environment policies in particular, and public economic policies in general, so as to achieve optimum results from such policies.
- To achieve energy supply security by dealing with energy efficiency as one of the available supply sources that are least costly and which would lead to the necessary separation between the linked increase in GDP growth rates and the increase in energy consumption rates.
- To help Egypt gain a pioneering position in the domain of energy efficiency in the region that would enable it to lead the region towards following environmentally sound policies that advocate low CO_2 emissions

Sector	Parcel of Measures
Institutional	1- Institutional development of the energy efficiency industry.
Industry	2. developing EEIPs for intensive-energy-use industries.
	3. developing system and technologies program fit for application over different industries.
	4. development of the market of energy services serving the industry.
Buildings	5. Replacement of electrical appliances with energy efficient ones.
	6. Application of the energy efficiency building code over new buildings.
	7. Renovation of old buildings to achieve energy efficiency.
Tourism	8. Shift to green tourism.
Public Lighting	9. Use of high energy efficient lighting systems.
Transportation	10. Energy efficient vehicles.
	11. Energy-saving driving.
	12. Support of group and public means of transportation.
	13. Use of energy efficient means of transportation in shipping goods.

Goals

- To achieve energy efficiency without affecting growth or production rates in the sectors of industry, trade and services, and without affecting the wellbeing of consumers whether in terms of house uses or public use.
- To seek achieving highest rationalization and highest possible energy efficiency by using technically and economically feasible applications, calculated on bases of the life cycle of the application that would realize sustainable energy supply for all types of use at reasonable costs for consumers.

Figure 2-4 Energy Efficiency Component in ISES

The energy efficiency improvement component in ISES consists of institutional procedures and 13 parcels of procedures across the sectors of industry, buildings, tourism, public lighting and transportation.

ISES's goal is to save energy by 18% of expected energy consumption in 2035, which is equivalent to 20 million tons of fuel equivalent.

2-5 ISES Implementation Phases

Preparation Phase • Completion of institutional establishment. • Provision of financing mechanisms. • Completion of a data collection, verification & follow up system. • Capacity building. • Raising awareness on electricity efficiency. • Issuance of the first energy efficiency report.	**2015-2020**
Medium Term • Effectiveness of EEIF. • Availability of centres capable of providing standard and certified training activities. • Awareness campaigns for shifting towards sustainable activities that can reach different sectors. • Setting energy efficiency indicators covering all sectors. • Pilot measures and financing incentives. • Issuance of annual energy efficiency report.	**2020-2025**
Long Term • Setting up a national energy efficiency agency. • Developing tools for financing energy efficiency. • Opening the market to energy efficiency training activities. • Developing awareness activities to reach all levels. • Development of the measurement & verification system and developing KPIs.	**2025-2035**

Chapter Three- Institutional Development of Energy Efficiency in Egypt

3-1 Background

The current EEIF applied since 2009 is based on centralized planning and monitoring and decentralized implementation. This takes place through an energy efficiency central unit and sectoral units in all targeted sectors. The sectoral units include the sectors of industry, housing, utilities, tourism, transportation and local development.

In spite of the sound designing of the current EEIF, owing to not relying on a large administrative system and its flexibility in terms of implementation, nonetheless, there are yet some challenges, such as its incomplete application, the absence of an efficient mechanism for coordination among stakeholders and for activation of the governance system that regulates the industry cycle, while noting that activation, development and integration of Egypt's EEIF are among the most important requirements for NEEAP's success.

In 2013, the Energy Efficiency and Climate Change Directorate (EECCD) was established at MoERE to be responsible for the energy efficiency industry in the electricity sector.

Electricity Law No. 87 of 2015 represents the legal framework regulating the energy efficiency industry. The Law states that the Council of Ministers will determine a body that would be in charge of laying energy efficiency policies in collaboration with concerned entities, in order to realize the following:

- Expand the application of energy efficiency specifications and labels over consumers' electrical equipment and devices.
- Replacement of non-energy efficient devices and equipment in accordance with the Executive Regulations of the Law.
- Improving energy efficiency in industrial and commercial systems.
- The Law states that establishments with contractual capacities exceeding 500 kW will assign an energy manager to be in charge of energy efficiency measures and will keep an energy register.
- The Law mentioned that the Executive Regulations will regulate such requirement, which states that the energy efficiency register will be subject to supervision and monitoring by the body determined by the Cabinet.

The Executive Regulations of the Electricity Law gave a detailed description of the mandates of such supervisory body, in cooperation with relevant ministries, authorities and entities, which include laying the necessary policies and regulations for the replacement of non-energy efficient devices. The most important mandates are as follows:

- Setting the Terms of References (ToRs) for granting licenses to laboratories for conducting the required tests to verify the energy efficiency of electrical equipment and devices.
- To conduct studies on the expansion of the application of energy efficiency specifications and labels over equipment and appliances.
- To propose incentives to encourage the replacement of appliances.
- Evaluation of EEIPs in industrial and commercial establishments, as well as in public and administrative buildings.
- Evaluation of programs concerned with the replacement of non-energy efficient appliances.
- To conduct studies on cooperation with the Ministry of Finance and financial organizations to establish funds for securing the required funding for replacing non-energy efficient appliances within the framework of improving energy efficiency.

3-2 Energy Efficiency Institutional Framework (EEIF)

Taking into consideration the foregoing facts, NEEAP has undertaken developing EEIF to meet the necessary requirements for governance of the industry, raising performance efficiency, coordination among stakeholders, exchange of data & information, and coordinating decrees.

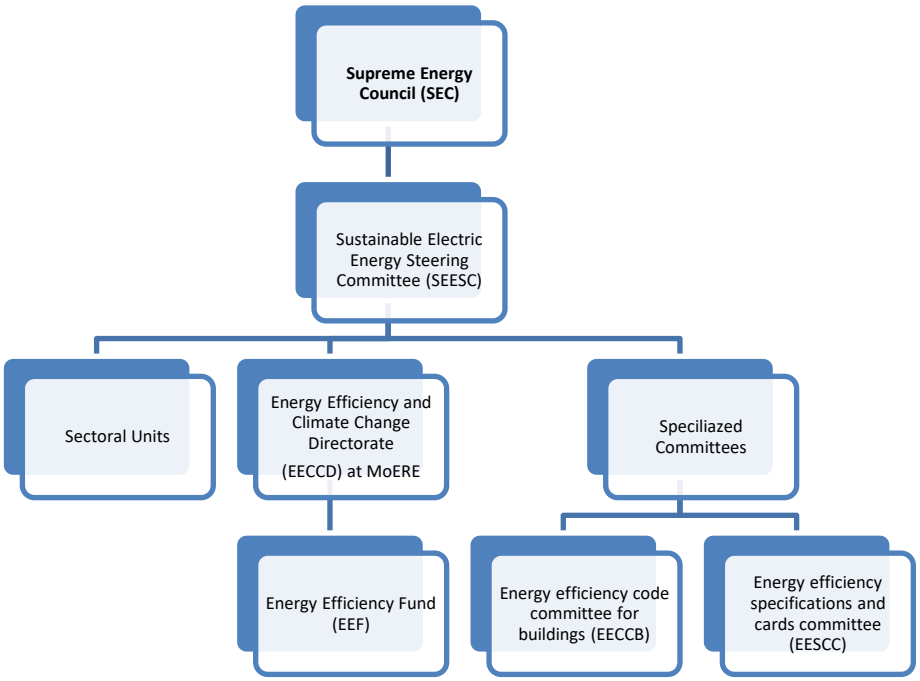


Figure 3-1 Energy Efficiency Institutional Framework (EEIF)

3-2-1 Supreme Energy Council (SEC)

SEC was established in 1979 and was restructured pursuant to Decree No. 1395 of 2006 issued by the Prime Minister. SEC is represented by a ministerial committee comprising the ministers in charge of the sectors of energy supply and energy demand, as well as sectors of financing and competent authorities, in addition to foreign policy, defence and national security; that is since energy security is one of the components of national security.

Table 3-1: SEC Composition

Prime Minister			
Energy Supply	**Energy Demand**	**Financing and relevant bodies**	**Foreign policy and other bodies**
Ministers of Electricity & Renewable Energy, Petroleum & Mineral Wealth Environment	Ministers of Industry and Trade Housing & Utilities Transport	Ministers of Finance Planning & Administrative Development Investment	Ministers of Foreign Affairs Defence General Intelligence

SEC's Mandates:

- To oversee the development of ISES in support of the state's socio-economic development plan and to meet efficiency standards in the use of resources.
- To guide the restructuring process of energy markets and address development taking place in this regard.

3-2-2 Sustainable Electric Energy Steering Committee (SEESC) (development plan for PV power plants – electrical energy efficiency plan)

- SEESC is chaired by MoERE's First Undersecretary and in charge of all energy efficiency activities, will be appointed as deputy head of SEESC. Further, SEESC will include the first undersecretaries in charge of energy efficiency units at their ministries which are engaged in the implementation of NEEAP, including the ministries of Industry & Trade, the Public Business Sector, Housing & Utilities, Tourism & Local Development, Education, Transport, and Youth & Sports in addition to the managing directors of EgyptERA, EEAA, EEHC and other relevant experts.
- SEESC is established by virtue of a decree issued by the Prime Minister.
- SEESC is concerned with coordination and follow up with sustainable plans and programs for electrical energy (development plan for PV power plants and electrical energy efficiency plan) on the national level.

- SEESC shall prepare a report including the outcomes, every three months, and present it to the minister of electricity and renewable energy.
- The minister of electricity and renewable energy shall present the abovementioned report on the SEC every six months.
- Four experts in the field of energy efficiency improvement and financing.
- EECCD at MoERE will undertake the technical secretariat works of SEESC, which will be presided by a secretary general.
- SEESC may extend invitations to heads of energy efficiency units at ministries or any of the competent authorities or experts, as deemed necessary, for attending meetings.

SEESC will carry out all necessary works to ensure the effective implementation of NEEAP, and will particularly have the following mandates:

a- To supervise the implementation of NEEAP, as ratified by SEC.
b- To supervise EEF and to ratify the support provided thereby for the implementation of the measures outlined in NEEAP and to facilitate related works, as SEESC deems fit.
c- To ratify EEF's planning budget and closing account.
d- To coordinate between stakeholders and those engaged in the implementation of NEEAP.
e- To supervise and follow up the implementation of plans for eliminating non-energy efficient appliances.
f- To take the necessary measures to remove obstacles that may arise during implementation of NEEAP.
g- To approve capacity building programs and secure the necessary funds for them.
h- To supervise NEEAC.
i- To prepare semi-annual reports on the implementation progress of NEEAP, and any obstacles or requirements for its implementation to present them to SEC.
j- To coordinate with MIIC to determine sources of financial and technical support provided by international partners to support capacity building and implementing activities in the sectoral units.
k- To make available and disseminate information and data that would assist all entities and consumers to improve energy efficiency.
l- Ratification, updating and streamlining of energy efficiency indicators.
m- To issue the annual energy efficiency report and to supervise the convention of the annual energy efficiency conference.
n- To supervise preparation of NEEAP 2022-2024.

3-2-3 EECCD's Role in MoERE for NEEAP Implementation

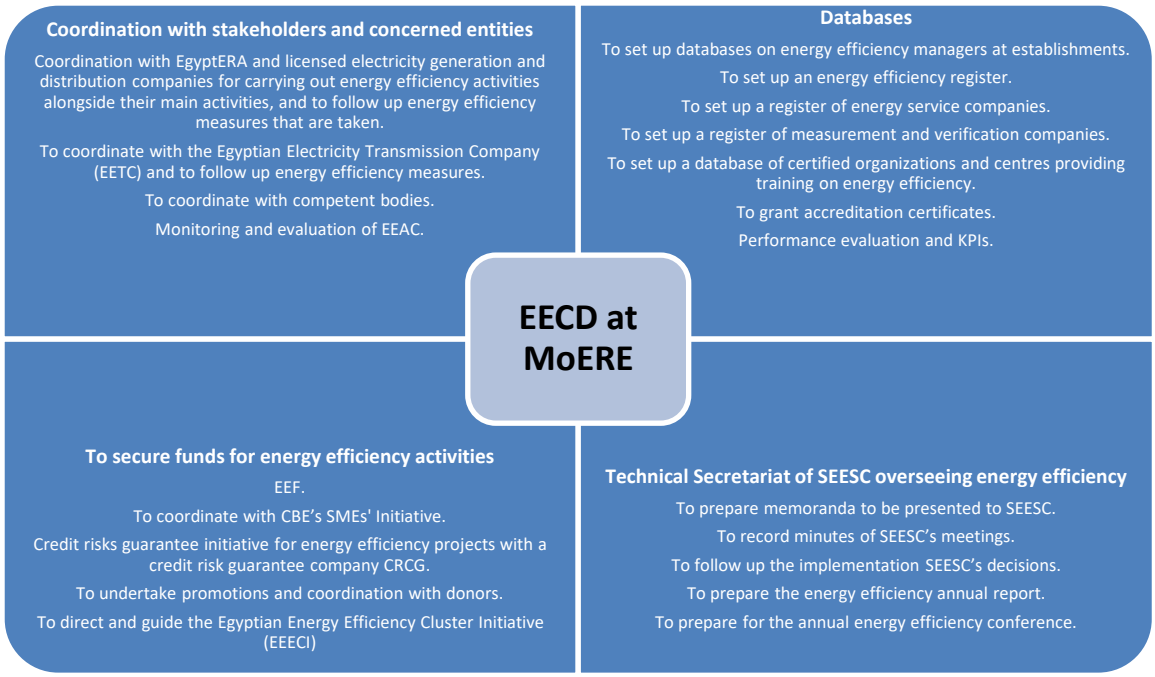


Figure 3-2 EECCD's Mandates

Hereinafter are some of EECCD's of priority mandates:

EECCD will carry out the following, whether by itself or by contracting with the specialized entities:

a- In the field of securing funds:

1. To draft the proposed statutes of EEF and to have it ratified by SEESC.
2. To set up a credit risk guarantee mechanism (CRGM) for energy efficiency projects in cooperation with credit risk guarantee companies in order to secure funds for financing energy efficiency projects and to have them ratified by SEESC.
3. To coordinate with CBE's Initiative to provide soft loans to SME's in order to include energy efficiency projects, and to expand the Initiative to provide funds to any entity that contracts with SME's for the provision of energy efficiency improvement services.
4. To set up a database of financing initiatives made available by financial institutions, whether directly, or in cooperation with donors, complemented with the special conditions of each initiative, to render them available, in cooperation with such entities, for the segments targeted by each initiative, and to follow up the progress of each initiative.

b- In the field of establishing systems for energy managers, energy records, and follow up, verification & accreditation

1- To propose timeframes for completing the energy managers system in establishments mentioned in the Electricity Law, as well as their databases and qualification & accreditation system.
2- To design or select economically feasible programs after developing the energy record, and to contract with them to provide secured database storage for the energy record, which will be ratified by SEESC.
3- To propose minimum requirements for registration of energy service companies, and companies providing measurement & verification services, as well as training centres that would provide training on qualifying energy managers, to be ratified by SEESC.
4- To design and implement the energy efficiency indicators program for different activities.
5- To lay the annual training program for capacity building in the field of energy efficiency in cooperation with stakeholders.
6- To set a mechanism for the enforcement of legal measures relating to obligating establishments to appoint energy managers, to accredit them, and to complete the energy register data according to Article 75 of Electricity Law No. 87 of 2015.

c- Minimum energy consumption requirements, energy efficiency labels, and getting rid of non-energy efficient appliances:

1- To propose ToRs for granting licenses to laboratories to conduct the required tests for verifying the efficiency of equipment and appliances.
2- To conduct studies on expanding the application of energy efficiency specifications and labels over equipment and devices.
3- To propose incentives for encouraging the replacement of non-energy efficient devices.
4- To evaluate programs concerned with the replacement of non-energy efficient devices.
5- To conduct studies on cooperation with the Ministry of Finance and financial organizations for establishing a fund for securing the required funds to replace non-energy efficient appliances within EEIF.

   Such proposals will be submitted for approval and for laying the execution and follow up measures by EESCC.

d- In the Field of Communications:

1- To establish an administration website for the provision of data, information and databases for beneficiaries, to announce the development of energy efficiency activities in different sectors as well as the decisions issued by SEESC and the specialized committees, thereby exhibiting maximum levels of transparency.
2- To launch the Egyptian Energy Efficiency Cluster Initiative (EEECI) among establishments providing energy efficiency services, research & consulting firms, financing entities and beneficiary clusters, such as the Federation of Egyptian Industries (FEI) and the Egyptian Trade Union Federation in order to exchange information and lay the necessary initiatives to promote energy efficiency activities.
3- To design, issue and make available the annual energy efficiency report by providing stakeholders with hardcopies and giving them access to softcopies through the administration website and stakeholders' websites.
4- To prepare for the annual energy efficiency conference.

3-2-4 Energy Efficiency Specifications and Labels Committee (EESLC)

First: EESLC Mandates

1- To review the proposals made by EECCD and any other concerned entity to expand implementation of the minimum energy efficiency specifications program for electrical equipment and appliances, as well as the energy efficiency lables system, to identify required studies and to request that EECCD contract with specialized entities for implementation of the above programs after obtaining EESLC's consent.
2- To guide programs for replacing non-energy efficient appliances and to set incentives to encourage users to follow such programs.
3- To identify requirements to be met by pilot laboratories for conducting energy efficiency tests on electrical equipment and appliances.
4- To review the requirements (that would be recommended to be ratified by EECCD) for awarding the licenses to laboratories and testing facilities that implement the required tests and verify the energy efficiency of equipment and appliances.
5- To propose standards for ceasing the production and importation of non-energy efficient devices, and the proper timeframes for users to adjust accordingly.
6- To supervise awareness raising programs on the importance and advantages of energy efficient equipment and devices, and energy efficiency labels.
7- To coordinate with merchants and stores selling electrical equipment to promote energy efficient equipment and appliances.
8- To supervise awareness-raising programs among merchants and personnel working at commercial stores that sell electrical appliances in order to raise awareness among purchasers about the advantages of high efficiency appliances, and to make available the necessary information for stores to prepare helpful printed material and guidelines in this regard.

9- To lay mechanisms for market regulation, and for monitoring and verifying that energy efficiency labels are placed on electrical appliances in an apparent place, and that they comply with appliances' specifications, according to ministerial decrees issued in this regard, and to issue proposals for amending such decrees, as deemed necessary.
10- To develop mechanisms to enforce Article 76 of Electricity Law No. 87/2015 on the violation of Article 51 of the Law, which requires placing energy efficiency labels on electrical appliances and abidance by the Executive Regulations of the Law, as well as ministerial decrees issued in this regard.
11- To follow up everything relating to initiatives taken for promoting the use of energy efficient electrical appliances and promoting programs for elimination of non-energy efficient ones, to prepare a monthly progress report on such programs, obstacles faced and proposals to overcome them, and to present such reports to SEESC to take the necessary action.
12- To supervise contracting with competent entities to conduct surveys to evaluate awareness levels and to observe changes in consumption norms on a regular basis and to deduce key results for developing plans and programs to this end.

Second- Constitution of EESLC

EESLC will comprise representatives of heads of the following:

- Egyptian Organization for Standards and Quality (EOS)
- Industrial Control Authority (ICA)
- General Organization for Import and Export Control (GOEIC)
- Consumer Protection Agency (CPA)
- Markets Monitory Department, Ministry of Supply.
- Federation of Chambers of Commerce.
- Chamber of Engineering Industries at the Federation of Egyptian Industries.
- EECCD Committee at MERE.

EESLC will be headed by Head of EOS. EESLC will be entitled to request the assistance of any experts it wishes for realizing its goals.

Contracting will take place with organizations specialized in conducting studies and surveys while some tasks may be delegated through EECCD.

3-2-5 Energy Efficiency Code Activation Committee for Buildings (EECACB)

First- EECACB will have the following mandates:

1- To identify legal, institutional, technical and economic challenges and to propose solutions to activate the energy efficiency code for buildings.
2- To lay a roadmap for activation of the energy efficiency code for buildings and a priorities plan, to include:

a) New buildings.
b) Renovation of existing buildings and those under construction, such that the plan will include the following:
    - Governmental and public buildings.
    - Commercial buildings.
    - Residential buildings.

3- To develop a training program for capacity building for those in charge of activating the energy efficiency code in buildings and those in charge of implementation and monitoring.
4- Coordination among relevant stakeholders.
5- To propose a plan for raising citizens' awareness about the importance of activating energy efficiency codes for buildings.
6- To prepare a semi-annual report to be presented to EESLC on the progress achieved and key challenges, as well as to propose required decisions and mechanisms to face such challenges.
7- To supervise contracts with competent authorities to conduct surveys, to evaluate awareness levels, to observe/ track changes in building norms on a regular basis, and to deduce the most important results for developing plans and programs in this regard.

Second: Constitution of EECACB

EECACB will be constituted of the following:

- First Under-Secretary of the Ministry of Housing will be appointed as Head.
- First Under-Secretary of the Ministry of Local Development.
- Deputy Head of the Housing and Building National Research Centre.
- Deputy Head of NUCA.
- Director of EECCD.
- Representatives of the Governors of Cairo, Alexandria, Gharbeya, Ismailia, Assuit, Qena and Aswan.

EECACB may appoint any experts it deems fit for achieving its objectives. Contracting will take place with specialized entities to conduct studies and surveys and to assign some works through EECCD.

EECACB will convene once a month or whenever deemed necessary, provided that it convenes within one week at least prior to the convention of SEESC. Head of EECACB will report work results to SEESC.

3-2-6 Sectoral Units

The institutional framework is based on central planning, coordination and follow up, and decentralized implementation of procedures through specialized sectoral units. Energy efficiency units began to be established in different economic sectors. However, existing units are not originally energy efficiency units, but are crosscutting ones, such as cleaner production in the industrial sector, sustainable cities in the housing sector, and green tourism in the tourism sector, as illustrated in table 3-2. Further, the fact that the units are not situated inside the ministries has limited the scope of their work to the entity in which they are situated or according to the lending terms granted thereto by the relevant donor.

According to the original plan, the rest of the sectoral units were not completed, such as the unit of public buildings and utilities at the Ministry of Local Governance, as well as the unit concerned with the transport sector.

Table 3-2: Energy efficiency units already existing in different ministries

Sector	Ministry in Charge	Entity to which the Unit is Affiliated
Industry	Ministry of Trade and Industry	Cleaner Production Technology Centre
Buildings	Ministry of Housing and Utilities	Central Unit of Sustainable Cities and Renewable Energy (CUSCRE) and the Electricity Department at NUCA
Tourism	Ministry of Tourism	Green Tourism Unit

First- Development of the Sectoral Units System

NEEAP aims to complete the establishment of sectoral units, such as energy efficiency units inside the following ministries: Local Development for public lighting and buildings, Transport for public lighting on main roads and electric means of transportation and their facilities (stations, workshops...etc.) and Public Utilities (water & wastewater sector) as illustrated in figure 3-3.

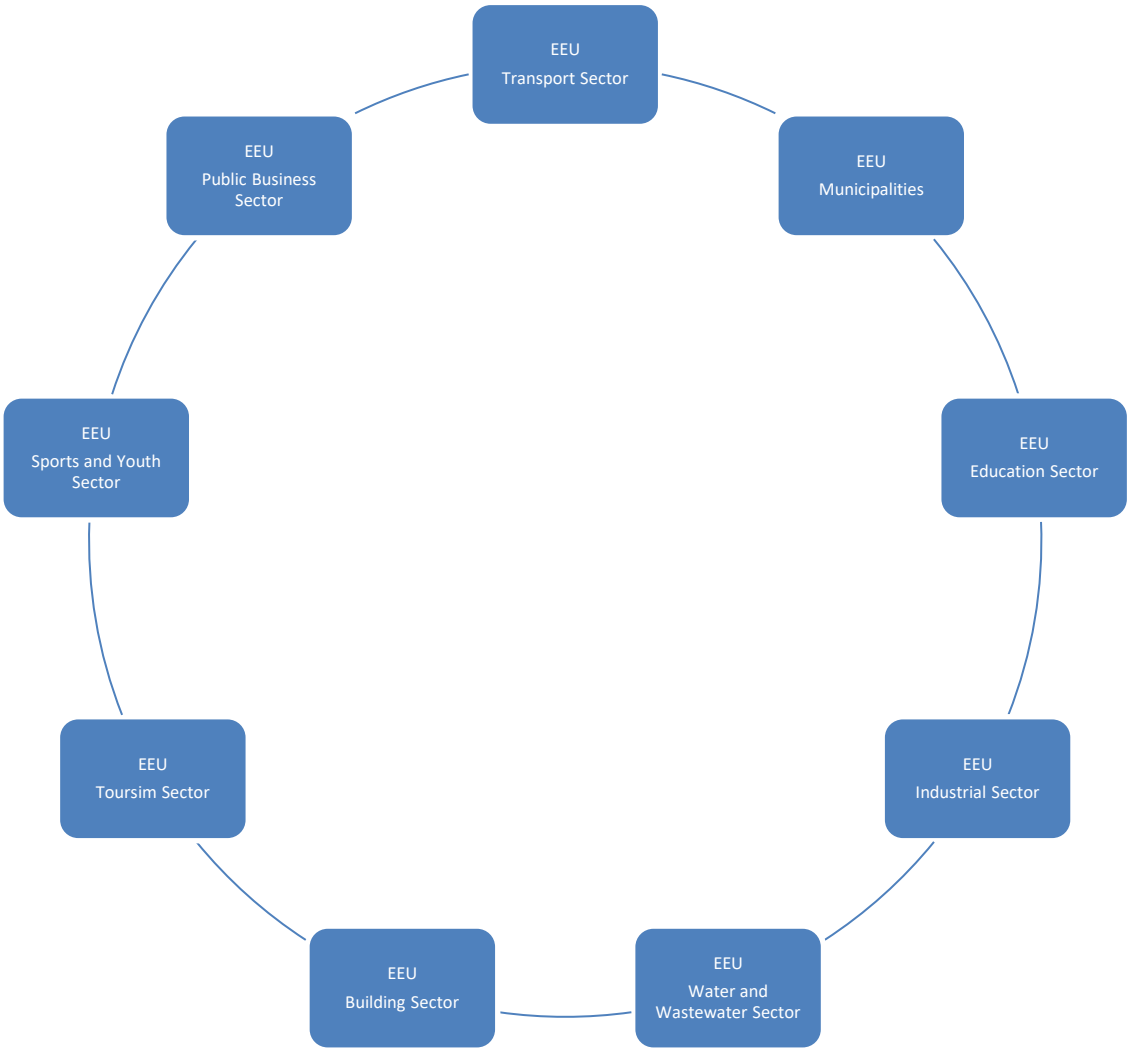


Figure 3-3 Targeted Energy Efficiency Sectoral Units

In addition to the empowerment of existing units and focusing on energy efficiency, as well as establishing new units in the Ministries of Education, Public Business Sector, and Sports & Youth; the competent minister will issue a decree for the establishment of the energy efficiency unit in the sector he/she is in charge of and will determine its mandates in coordination with MoERE.

Second- Mandates of Sectoral Units

1- To develop capacity building programs within the sector.
2- To forecast the development of demand growth rates in the sector, while taking into consideration expansion plans and market conditions.
3- To develop a map illustrating opportunities for improving energy efficiency within the sector.

4- To follow up carrying out cost effective measures for improving energy efficiency, and adopting suitable energy efficiency technologies and systems, while focusing on low cost or no cost measures as a first phase.
5- To evaluate the impact of energy prices on the economic feasibility of energy efficiency applications.
6- To propose appropriate energy efficiency indicators that would suit the nature of the sector and to ensure the availability of adequate and reliable information for measuring these indicators.
7- To recommend developing and enhancing policies and programs applied for achieving EEIPs.
8- To evaluate results of energy efficiency programs and measures previously applied in the sector.
9- To communicate with the sector stakeholders to evaluate their needs of energy efficiency services and to evaluate the level of their awareness and requirements for developing same.
10- To help link between energy efficiency service demanders and providers, and programs that secure required funds.
11- To issue bulletins and success stories within the sector, to develop the suitable energy efficiency guidelines and programs for the sector, and to disseminate them over all printed and electronic mediums.
12- To prepare a semi-annual report on the status of energy efficiency in the sector, progress achieved, challenges faced, and proposals to overcome them, in order to provide them to SEESC.
13- To exchange data and experience with other sectoral units and EECCD.

Table 3-3 Work Scope of Sectoral Units for Improving Energy Efficiency

SN	Unit	Sector	Required Energy Efficiency Fields of Improvement within the Sector
1	Cleaner Technology Production Centre	Industry	Systems run by electric motors (compressor systems, fluid pump systems, air fan systems, chilling/ cooling systems, automatic speed drives and control). Improvement of power factor. Demand Side management. Energy efficient lighting. Cogeneration and recovery of lost energy to be used for electricity generation. Solar energy applications used for industrial heating. Solar cells used for electricity generation.
2	* Energy Efficiency Improvement Unit in Public Business Sector Companies	Industry	
3	Energy efficiency improvement unit in the buildings sector (CUSCRE, Renewable Energy and Electricity Management-NUCA).	Buildings & Public Utilities	Energy efficiency code for buildings High efficiency lighting. Use of solar water heaters. Roof-top solar cells on buildings for electricity generation. High efficiency public lighting (high efficiency light bulbs, control systems, use of solar cells). High efficiency equipment.
4	* Energy efficiency improvement unit in municipalities.	Public Buildings and Utilities	Energy efficiency code for buildings. High efficiency lighting. Use of solar water heaters. Roof-top solar cells on buildings for electricity generation. High efficiency public lighting (high efficiency light bulbs, control systems, use of solar cells).
5	* Energy efficiency improvement unit in utilities (Water & Wastewater Sector).	Public Utilities	Energy efficient electrical motors and speed drives. Improvement of power factor. Measurement systems and losses measurement meters. Demand Side management. Energy efficient lighting. Reduction of water leakage. Energy efficient ventilation system in waste water stations. Solar cells for electricity generation. Use of sewerage sludge and gasses for electricity generation.
6	Energy efficiency unit in the tourism sector (Green Tourism Unit)	Tourism	Energy efficiency code in buildings and establishments. Energy efficient lighting. Use of solar water heaters. Use of solar cells for electricity generation. Energy efficient public lighting (energy efficient light bulbs, control systems, use of solar cells). Energy efficient equipment.
7	* Energy efficiency unit in the transport sector	Public Utilities	Energy efficient lighting for roads. Energy efficient lighting for underground metro stations. Energy efficient ventilation system in underground metro stations
8	* Energy efficiency unit in the educational sector	Education	Energy efficient lighting in schools and educational & administrative buildings. Improvement of power factor. Roof-top PV power plants on buildings and schools. Curriculum on energy efficiency. School activities on energy efficiency.

* units targeted to be established.

3-2-7 Energy Efficiency Fund (EEF)

- A fund will be established for financing energy efficiency activities ("EEF") where SEESC will act as EFF's Board of Directors.
- SEESC will select a manager with banking experience and will determine his salary. The manager and his assisting team will coordinate with EECCD and will present matters to SEESC for disbursing required funds.
- EFF will be financed through payment of fees in consideration of energy efficiency improvement services to be added to the electricity tariff at the rate of EGP 1/1000 per kWh of electricity sold to consumers after obtaining EgyptERA's approval.
- Electricity companies will deposit the amounts collected in favour of EEF in an account established for this purpose at CBE. In case of delayed payment, interests will be charged as per the annual rate announced by CBE. EgyptERA will be advised to take the necessary measures for safeguarding EEF's rights.
- SEESC will determine fields of disbursement from EEF, will ratify its planning budget and closing account and will provide incentives to establishments with distinguished performance, as determined by SEESC
- SEESC will appoint a manager with banking experience and will determine his salary. The manager and his assisting team will coordinate with EECCD and will present matters to SEESC for disbursing required funds. SEESC will act as EEF's Board of Directors. EEF will keep the annual surplus and will forward it from one year to another. SEESC will be represented by a separate entity, thereby allow for flexibility of EEF's work.
- EEF will be subject to auditing by MoERE's financial auditor prior to disbursement and by the Accountability State Authority (ASA) after disbursement.

3-3 Governance of Energy Efficiency Activities

First: A decree will be issued by the Prime Minister promulgating EEIF based on the proposal presented by the Minister of Electricity and Renewable Energy.

Second: SEESC

- A decree will be issued by the Prime Minister for the formation of SEESC and will determine SEESC's mandates for the period of three years.
- SEESC meetings will be validly constituted if attended by the majority of its members (half+one), the president or his deputy, and the minute keeper.
- Subjects concerning a specific sector will not be discussed at the meeting unless attended by a representative of that sector.
- In case of changing the supervisor overseeing energy efficiency activities in the sector, the new representative will replace the preceding one at SEESC by virtue of a letter issued by the competent minister overseeing that sector to Head of SEESC.

- The sector's representative will be replaced if he/she is absent for three consecutive meetings without justifiable reason that is accepted by Head of SEESC.
- Resolutions will be adopted upon agreement. In case of disagreement, Head of SEESC will present the subject to SEC for deciding on the matter.
- The Minister of Electricity and Renewable Energy will ratify SEESC's decisions.
- The Minister of Electricity and Renewable Energy will present the semi-annual report to SEC.
- SEESC will convene at least once a month or whenever deemed necessary.

Third: Specialized Committees

- EESLC and EECABC will convene once a month or whenever deemed necessary, provided that the meeting is preceded by SEESC's meeting.
- Head of the committee will present its proposals to SEESC, which will be recorded in the minutes of meeting.
- Head of the committee will be in charge of the implementation of SEESC's decisions with the assistance of EECCD.

Fourth: Transparency

The following comes prior to presenting NEEAP to SEC:

- EECCD at MoERE will consult with the competent entities.
- The draft NEEAP will be published on the websites of MoERE and EECCD for fifteen days for receiving feedback and remarks from the public. This will be indicated in a newspaper.
- SEESC's decisions will be published on EECCD's website.
- EEF's closing account will be published on EECCD's website.

3-4 Tracking, Verification, Follow Up and Performance Indicators (PI) System (TVFPIS)

3-4-1 Overview and Mission

- The Tracking, Verification, Follow Up and PI System (TVFPIS) is operated by certified energy managers in establishments with contracts for a capacity of 500 kW or more. Its mandate is to provide the necessary data for the energy efficiency register published on EECCD's electronic portal, in order to measure energy efficiency indicators and conduct performance evaluation of each activity separately, and of all activities together. TVFPIS will include databases of certified energy managers, databases of subscribers to electricity companies, and verification & measurement experts in charge of conducting energy audits and verifying the accuracy of the data and information recorded on the energy efficiency register.

- The mission of TVFPIS is to measure the indicators of different activities according to the international classification activities, to evaluate the status of energy efficiency in Egypt, to provide the necessary data for the annual energy efficiency report, to list opportunities and evaluate EEIPs in different establishments.

3-4-2 Legal Framework Regulating Energy Efficiency Managers and Records at Establishments

Article 48 of the Law on Electricity states the following:

- A subscriber whose contractual capacity exceeds 500 kW will appoint an officer to be in charge of improving energy efficiency and will keep an energy efficiency register.
- The Executive Regulations of the Law states the following:

"A subscriber whose contractual capacity exceeds 500 kW will appoint an officer to be in charge of improving energy efficiency at the establishment and will have the following mandates:

- To inscribe the required data on the energy efficiency register and to update it periodically.
- To monitor energy consumption at the establishment and to develop the necessary proposals for improving energy efficiency.
- To conduct technical and economic feasibility studies on energy efficiency improvement applications.
- To follow up contractual measures EEIPs at the establishment.
- To prepare annual calculations of energy KPIs.
- To raise awareness and train personnel at the establishment on energy efficiency improvement measures.
- To carry out measurement & verification tasks to ensure the feasibility of EEIPs.

The Executive Regulations also state that the energy efficiency register will contain all data and information relating to energy in the facility, particularly the following electricity-related data:

- Electricity load measurements at the facility distributed over lighting/ electromotive forces.
- List of the electric equipment and devices in the facility and the operating voltage and power of each.
- Average operating hours per day within a month for each equipment, device or means of lighting.
- Amount of electricity consumed monthly for lighting and electromotive forces.
- Amount of energy saved monthly.

- Category of each equipment, device or means of lighting used at the facility, as indicated on their energy efficiency labels.
- List of the sources of electricity (traditional/ renewable) and the percentage of each.
- List of the training programs provided in the field of energy conservation monthly.
- List of studies and researches conducted at the establishment in support of energy efficiency technologies.
- Facility's energy saving plan.

It should be noted that there will be more than one type of register, based on the facility type (industrial, commercial, administrative, hotel, therapeutic, educational, water treatment…etc.) according to international classification activities, besides data concerning the facility, such as its address, date of its inception, manager in charge, type of activity, monthly production, distribution of electricity consumption over the products or services, if multiple, the number of personnel, its standard capacity and its area, including total or built area…etc.

3-4-3 Abidance by Implementation Requirements and Data Accuracy Verification

To ensure compliance of facilities addressed by the Law, whether to appoint an energy manager, maintain an energy register or enter the necessary data regularly and accurately, Article 75 of the Law states that "any person in violation of Article 48 of the Law or enforcing decrees will be subject to a fine of EGP 50,000 at the most, which will be doubled in case of repetition of the violation."

To verify accuracy of the data included in the registers, the Executive Regulations of the Law states that the energy efficiency registers will be subject to supervision and monitoring by the entity appointed by the Cabinet through the following steps:

- An electronic register will be developed where each subscriber with a capacity exceeding 10 MW will record the establishment's energy data.
- A softcopy and a hardcopy of the energy register, ratified by the energy manager, will be retained.
- Reports will be prepared on measurement standards and performance indicators of energy efficiency improvement.
- The entity assigned by the Cabinet will verify the accuracy of the data included in the register, which may, in turn, assign specialized entities to carry out this task.

3-4-4 Relative importance of consumers required to have an energy efficiency manager and energy efficiency register according to the Law

The number of facilities addressed by the Law for the financial year 2015/2016 are 6,192 facility out of a total number of 32,430,637 subscribers.

Total electricity consumption by these facilities is 48,566.9 GWh.

The percentage of consumed energy in facilities addressed by the Law is 31% of the total energy consumed by all consumers in 2015/2016.

Most categories of consumers that are not obligated to have an energy manager and an energy register, according to the Law, have regular consumption norms with the exception of the category of consumers with contractual capacities below 500 kW (SMEs), where consumption accounts for 31% of the consumed electricity, and they are precisely 883,637 subscribers.

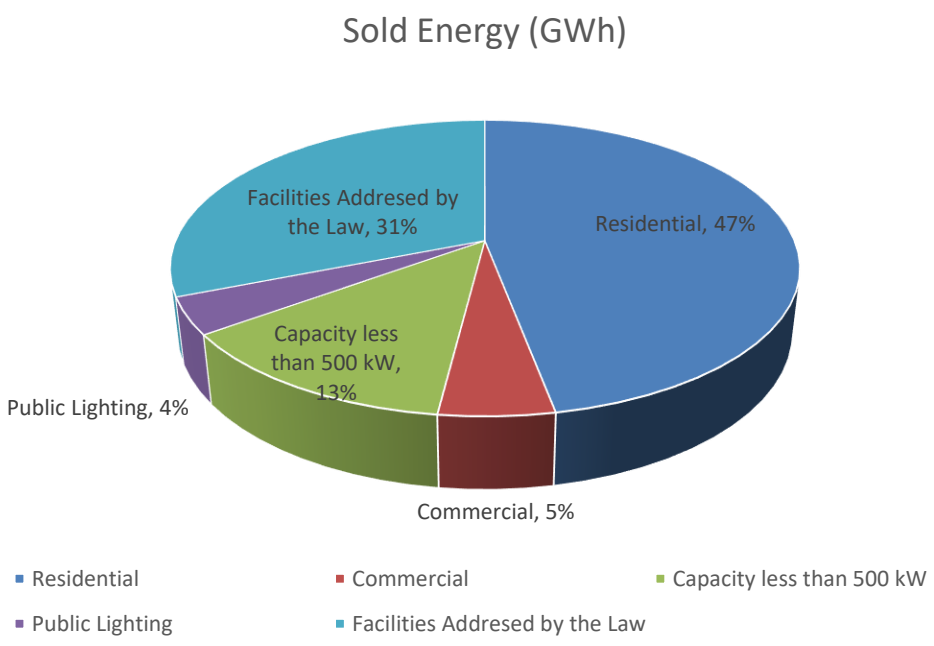


Figure 3-4 Percentages of Sold Energy in the different sectors

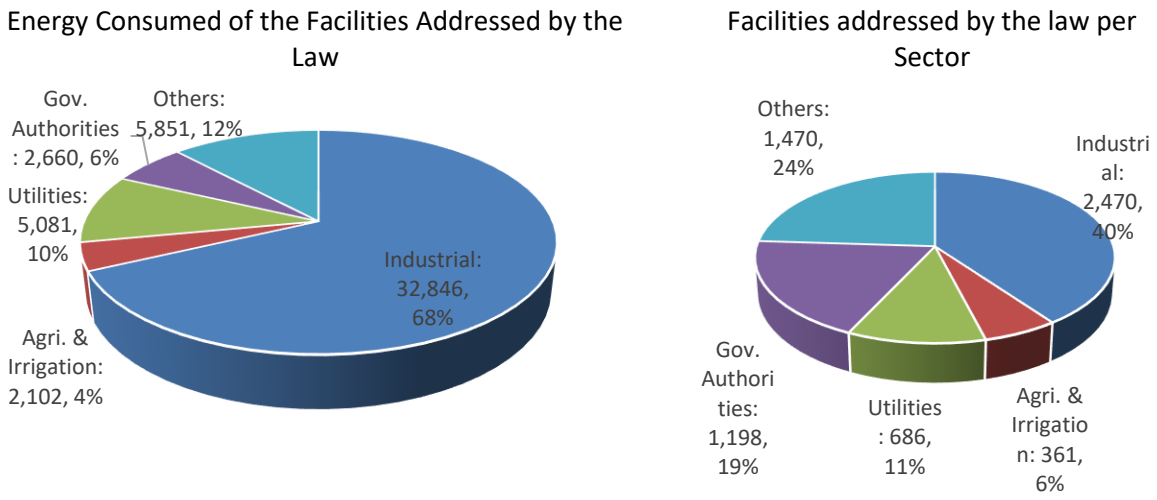


Figure 3-5 Statistics of consumers required by the Law to have an energy manager and an energy register

3-4-5 Energy Manager Qualification System

It is stipulated that energy managers at establishments obtain certified certificates from one of the following accredited entities:

- CEM certificate, a program certified by the American Association of Energy Engineers; AAE: ANSI/ISO/IEC Standard 17024 for Personnel Certification Bodies.
- European Energy Managers (EUREM) certificate.
- Certified Energy Management Professional (CEMP) certificate. This program is prepared through the Economic and Social Council of the League of Arab States in cooperation with the Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) to qualify certified energy managers in the Arab World in accordance with Article 7 of AEEF.
- Any certificate which EECCD will deem equivalent to the aforementioned certificates in the future, in coordination with the Engineers Syndicate.

EECCD will develop a database of local entities and centres authorized by accrediting organizations to provide qualification training courses for taking qualification tests. Such entities will bear the cost of the energy efficiency manager certificate for its personnel.

EECCD will seek support from donors to secure 2,000 grants for obtaining energy efficiency manager certificates. The first certified 2,000 establishments will apply for qualification prior to the date set in the qualification timetable.

3-4-6 Timetable for Completing the Qualification of Energy Managers in Facilities

Table 3-4 sets out the timetable for qualifying energy managers

Facility's Contractual Capacity	Period for Compliance	In case of violation or early qualification
10 MW or more	By the end of the first year of the plan at the most	Article 75 of the Law will apply for each six months of delay beyond the set period.
1 MW or more up to 10 MW	By the end of the second year of the plan at the most	A grant is provided for qualification in case of application and completion of qualification during the first year. Article 75 of the Law will apply for each six months of delay beyond the set period.
500 kW or more up to 1 MW	By the end of the third year of the plan	A grant is provided for qualification in case of application and completion of qualification during the first or second year. Article 75 of the Law will apply for each six months of delay beyond the set period.

3-4-7 Energy Efficiency Register

a- EECCD, in cooperation with EOS, will draft the ToRs for setting up an energy efficiency register and will present them to competent entities.
The register will be placed on EECCD's portal. Contracts will be concluded for reserving adequate storage space and for securing the information included in the register.

b- Each entity will have an account with a username and password for the entity's page on the register.

c- Article 75 of the Electricity Law will apply if the energy manager at the facility fails to update the facility's data on the register on a semi-annual basis.

d- All data and information on the register will be subject to laws regulating data confidentiality and will not be used for any purpose other than that of the register.

e- If there is any doubt with regard to the accuracy of the data or information added to the register by the relevant entity, EECCD will be entitled to assign one of the registered measurement and verification companies to review the entity's data, as well as the required energy data, in order to have the inaccurate information corrected.

f- If the entity does not permit the energy auditor to carry out his task, Article 75 of the Electricity Law will apply, and the establishment will bear the auditor's fees if the data included in the register is proven to be inaccurate. The auditor's fees, in this case, will be paid on instalments over a six months' period along with electricity bills. Otherwise, EECCD will bear the auditor's fees.
g- EECCD will conduct a spontaneous energy audit sample of 5% at the most of the entities registered annually to verify the soundness of the registered data.
h- TVFPIS's fees and expenditures will be charged to EEF.

3-4-8 Energy Auditors

MoERE's EECCD will set up a register of energy auditors who will carry out the verification and measurement tasks in the following cases:

1- If there is doubt with regard to the quality of the data and information added to the register by the establishment.
2- The annual auditing of a spontaneous sample of the establishment's data included in the register.
3- If any of the facilities or EECCD wishes to provide technical support to some facilities to improve the data quality.

EECCD will, through appointing a specialized entity, lay a standard model of the energy auditing report that includes several models/forms based on the nature of the facility's activities. In addition, a standard value will be set for conducting an audit, which will take into consideration the size of the establishment, which value will be regularly updated based on price developments.

It is stipulated that experts/ professionals in charge of the auditing tasks, who are registered on EECCD's database, must have a certified energy auditor certificate from one of the organizations accredited by EECCD.

3-4-9 Measurement and Performance Evaluation Indicators

The energy efficiency register will take into account the classification of facilities according to the activities international classification, as well as the size of the facility and the type of technology used.

The register will classify facilities with similar activities and production capacities into groups, each having specific indicators.

Upon comparison of the indicators, the level of efficiency will be determined, which may be excellent (inside group Q1), acceptable (in group Q3) or requires energy efficiency improvement.

EECCD will cooperate with competent entities to connect between the facility and the organizations providing energy efficiency services, and donors to cooperate with the establishment on raising its energy efficiency.

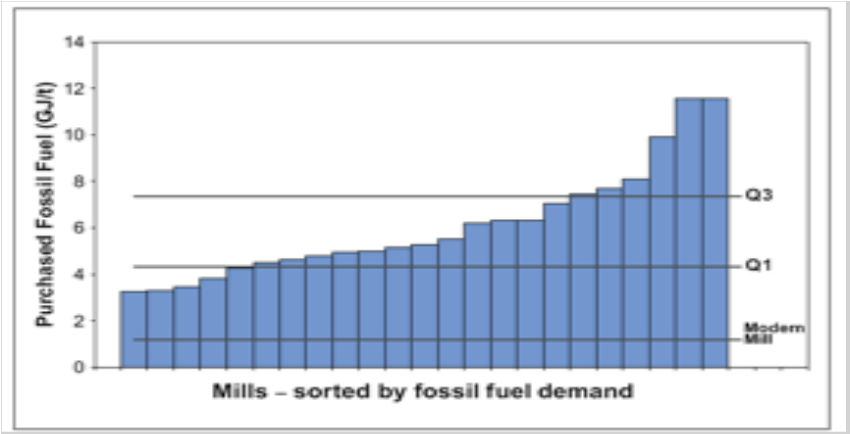


Figure 3-6 Comparison of performance indicators of each establishment based on energy efficiency levels

Chapter Four- Financing Tools for Energy Efficiency Activities

4-1 Overview

The aim of EEIPs is to reduce electricity consumption or to reduce the average increase in consumption below the expected rates, in cases where no energy efficiency improvement measures are taken; that is without affecting the level of services provided to consumers or their level of satisfaction. Consumers will benefit from this by reducing their payments in consideration of electricity consumption.

If programs are put in place for restructuring the electricity tariff to reach economic prices, then energy efficiency improvement will reduce the impact of such programs on consumers. As such, EEIPs are deemed an important tool that facilitates the implementation of ETRPs.

On the other hand, EEIPs and demand side management among consumers, lead to a decrease in electricity consumption of marginal cost, which usually has a higher cost than the average tariff. Further, improving energy efficiency for consumers benefiting from subsidization, helps reduce the subsidization they benefit from. In all cases, although EEIPs reduce the sales of electricity companies, nonetheless, they help increase their profits.

In terms of other indirect advantages and benefits, raising energy efficiency, will lead to reduced consumption of natural resources and less pollution resulting from electricity generation activities, besides the ability to redirect investments from electricity production, transmission and distribution to other fields that would lead to better quality of life, such as education and health.

As the implementation of EEIPs is for a cost, however, in terms of cost and return, the cost of saving 1 kWh is usually less than the cost of its generation within a range between 1:7 and 1:14, according to prevailing rates of generation costs and saving costs.

4-2 Financing EEIPs

As consumers are basically the beneficiaries of energy efficiency activities, whether directly or indirectly, and since more than 99% of the Egyptian population are connected to the electricity grid, accordingly, adding a fee for energy efficiency services is justifiable since consumers will be benefiting both directly and indirectly on basis of the principle of the equal distribution of burdens over citizens.

European countries have applied this principle, as around 1-4% of the tariff value is added in consideration of energy efficiency improvement services. Further, in some countries which have advanced electricity markets, they use what is known as “white certificates” where each certificate is equivalent to 1,000 kWh of saved energy.

These certificates are circulated among entities that achieve efficiency levels higher than requested levels, measured against obligatory saving percentages, and the percentage failing to reach such obligatory percentages according to the applicable market rates.

Taking into consideration the level of advancement of the Egyptian electricity market, a fee in consideration of energy efficiency improvement services will be added to the electricity tariff paid by consumers. Even if this market begins to be liberalized, such fee will be collected in addition to the market price from the electricity end-user.

4-3 Energy Efficiency Fund (EEF)

EEF will be established where SEESC will act as its Board of Directors. EEF will be financed from the fees paid in consideration of energy efficiency improvement services, to be added to the electricity tariff at the rate of EGP 1/1000 per kWh of electricity sold to consumers after obtaining EgyptERA's approval.

Electricity companies will deposit the collected amounts in EEF's account which will be opened for this purpose at CBE. In cases of delayed payments, an interest will accrue according to the annual interest rate announced by CBE which will be notified to EgyptERA to take the necessary measures to safeguard EEF's rights.

SEESC will identify areas of disbursement from EEF and will approve EEF's planning budget and closing account.

A manager with banking experience will be selected by SEESC, which will also determine his salary. The manager and his team will coordinate with EECCD to present to SEESC matters concerning disbursement of the required funds. SEESC will act as EEF's Board of Directors. EEF will retain and forward surplus from year to another. SEESC will have a separate personality, which will allow for flexibility of EEF's work.

EEF will be subject to auditing by MoERE's financial auditor prior to disbursement and to auditing by the Accountability State Authority (ASA) after disbursement.

Table 4-1 Electricity consumption per subscriber sectors in 2015/2016 and relevant energy efficiency improvement fees

Transmission Subscribers	Annual Consumption 2015/2016 KWh	Energy Efficiency Improvement Fees (EGP 1,000)
Ultrahigh power	13,737.18	13,737.18
High power	7,486.57	7,486.57
Medium power	473.22	473.22
Total	21,696.97	21,696.97
Distribution Subscribers		
Houses	7,3361.2	7,3361.2
Commercial stores	8,215.42	8,215.42
Over medium power (less than or equal 500 kW)	26,869.97	26,869.97
Less than 500 kW	19,277.87	19,277.87
Public lighting	5,293.03	5,293.03
Total distribution	133,017.49	133,017.49
Gross Total	**154,714.46**	**154,714.46**

4-3-1 EEF Expected Revenues

The Electricity Law states that EgyptERA will be the agency responsible for calculating and deciding the electricity tariff for subscribers based on sound economic principles and within the framework of equality, justice and transparency adopted by the Cabinet.

As a first phase, EGP 1/1000 will be added per kWh as a fee in consideration of energy efficiency improvement services. It will be agreed with EgyptERA to include this among the tariff calculation rules, which will be equally applied over all consumers and segments.

The fee in consideration of energy efficiency improvement services will be added as of the financial year 2018/2019.

According to electricity consumption in 2015/2016, which amounted to 154,714 kWh, and which is expected to increase by 5% annually during the upcoming period, EEF's annual proceeds are expected to be as follows:

Financial Year	Proceeds (Million EGP)
2018/2019	168.951
2019/2020	177.399
2020/2021	186.268
2021/2022	195.582

4-3-2 Fields Financed by EEF

- Provision of necessary funds for setting up, management and development of the energy register.
- High efficiency lighting programs for small consumers (less than 200 kWh/month)
- EEIPs at schools.
- EEIPs in governmental buildings.
- Deploying the use of solar water heaters.
- Appointment of energy auditors to audit the accuracy of the data and information included in the energy register.
- To provide financial support for the elimination of non-energy efficient house appliances by re-purchasing old ones at encouraging rates.
- Awareness campaigns.
- Training and capacity building.
- Setting up reference laboratories for checking equipment and devices.
- Incentives granted to facilities qualified to adopt the demand side management system according to ISO 50001.
- contributation to the CRGM.
- Issuance of the annual energy efficiency report.
- Arrangement and convention of the annual energy efficiency conference.
- Consultation services provided by EECCD or the entities forming the EEIF, as ratified by SEESC.
- Any other disbursement fields which SEESC deems necessary to be financed.

4-4 Credit Risk Guarantee Mechanism (CRGM)

On basis of the pioneering project of EEHC for improving energy efficiency and reducing greenhouse gasses, which is financed by the Global Environment Facility (GEF), the UNDP and the CRCG, CRGM was established in 2005.

The purpose of the mechanism is to provide access to required financing for energy service companies to implement EEIPs for customers, without having to bear the burden of securing guarantees to obtain loans for financing their projects, based on which the concept of credit is shifted from customer finance to project finance.

CRFM identified three fast return technologies (a simple recovery period of less than three years) and easy application, namely high efficiency lighting, enhancement of power factor and energy system management.

CRGM's funds comprise the sum of USD 280k from the energy efficiency improvement and greenhouse gas reduction project (equivalent to approximately EGP 1.5 million in 2005), which was completed with financial leverage provided by the CRCG at the rate of 70% for the project and 30% for the company in order to provide the required guarantees for projects, such that each entity would bear the risk guarantees in proportion with its participation percentage, provided that the first phase of three years is followed by a second phase during which the financial leverage provided by the company would amount to 50% of the guarantee value, while the project would bear 50% of the risks, and the other 50% would be borne by the company.

The purpose of CRGM is to provide credit for projects of a value four times the value of the deposit provided by the energy efficiency improvement and greenhouse gas reduction project during the first four years at least.

The financing structure of projects benefiting from CRGM will consist of an advance payment of 10-20% of the project cost, including the profits of the energy services company, to be paid by the beneficiary of the EEIP (the client) to the energy services company. In light of this, the energy services company will be entitled to obtain a bank loan guaranteed by the CRGC worth 75% of the remaining value of the project after settlement of the advance payment, assuming that the energy services company will gain profit from the project raging between 15-25% of the project value, then the said company would have obtained funds that covered the entire investment cost of the project, or may need to complete it by injecting funds of 5-10% at the most of the investment cost, provided that the value of the guarantee provided for the project does not exceed EGP 1 million (which means that the investment cost of the project for the client may reach EGP 1.5 million).

The instalments paid by the client to the energy services company will cover the instalments required for settlement of the loan in addition to the profits of the energy services company.

86 projects have benefited from CRGM with total funds (investment costs) of EGP 48.4 million with guarantees worth EGP 31.5 million during the period from 2005 to 2015.

4-4-1 Development of the Credit Risk Guarantee Mechanism (CRGM)

NEEAP aims to expand CRGM through the following steps:

a- To inject additional funds of around EGP 50 million to be repaid after the establishment of EEF over two years to increase CRGM's capital, in coordination with EEHC and the CRCG.

b- To expand CRGM's objective to include the following:

- To get rid of non-energy efficient appliances by purchasing new energy efficient assets over instalments in cooperation with suppliers, associations and syndicates, and to provide consumers with funds for replacing their old appliances.
- To provide funds to companies producing non-energy efficient devices so that they may develop their products to become energy efficient (conversion of ordinary light bulb factories to LED ones…etc.)
- To provide funds for purchasing solar water heaters and solar heating applications as well as electricity generation systems that use solar energy.
- To finance the activities of energy service companies.

CRGM Development will include the following:

- Financial leverage provided by the CRCG equal to 50% of the guarantee value in consideration of EECCD's 50% contribution, where the financial leverage will increase by 10% every couple of years to reach 30% for EECCD and 70% for the CRCG.
- If the projects are in default, both parties will equally bear the risk of failure to pay.
- The ceiling of guarantee provided to one entity will not exceed EGP 10 million.
- A qualified entity will be contracted with to conduct a feasibility study (CRGM consultant) for the projects, to promote CRGM and to prepare the periodical and annual reports on its activities.
- In cooperation with the program consultant, the CRCG will prepare a request for receiving proposals from banks, in order that they submit their best lending conditions to CRGM and the best investment vehicles for the deposit amount submitted by EECCD to achieve the highest safe return on the deposit and to contract with two banks offering the best conditions.
- The consultant's fees and CRGC's commission (2% of the guarantee amount) will be financed from the interest on EECCD's deposit (EGP 50 million) and the remainder will be added to the deposit amount.

- CRGM may contribute to payment of the interest due to the entity financing some projects of priority and impact, out of the interest accruing on the deposit or from EEF, provided that the approval of SEESC is obtained.
- There will be a supervisory and guidance committee for CRGM, formed of the representatives of EECCD, the CRGC, the program's consultants, and representatives of the engaged banks, to decide on financing priorities, to follow up the project conditions and to approve the periodical reports submitted by CRGMs consultant.
- EECCD Director will submit periodical and annual reports on CRGM's work to SEESC.

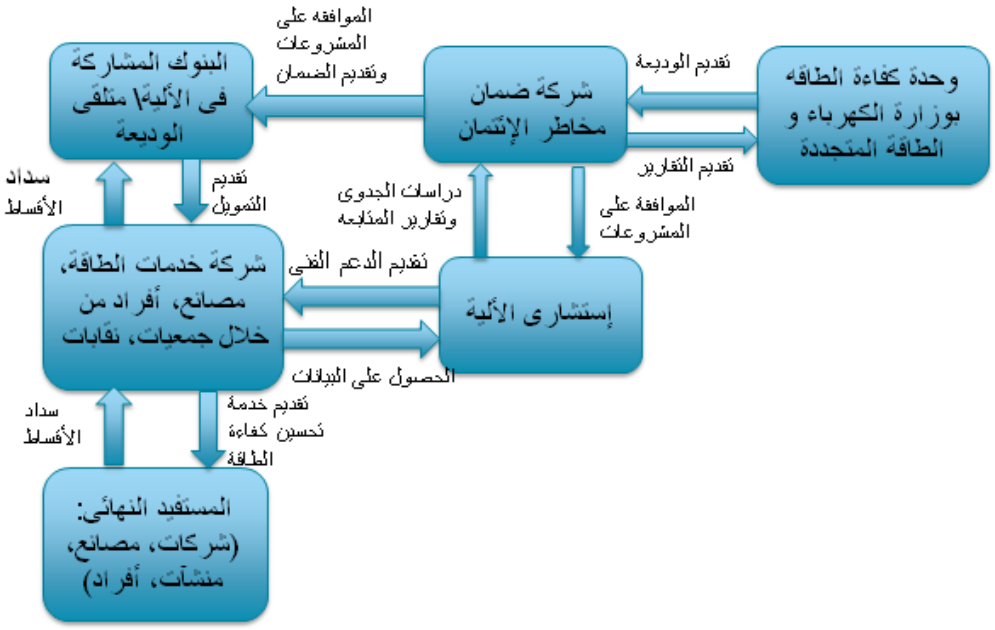


Figure 4-1 Credit Risk Guarantee Mechanism (CRGM)

4-4-2 Timetable for CRGM's Activities

Year	Procedure
2018/2019	To complete negotiations concerning the CRGC, to prepare the ToRs for selecting the program's consultant and to contract with him, to issue a request for proposals in order that concerned banks submit their offers and to contract with the selected banks.
2019/2020	To pay the first instalment from the deposit amount and to commence CRGM's activities.
2020/2021	To pay the second instalment from the deposit amount.

4-5 CBE's Initiative to Support SME's

CBE announced an initiative that is implemented via commercial banks to support SME's by offering loans worth EGP 200 billion over three years with the following general conditions:

- Existing projects with annual sales/revenues ranging between EGP 1 million to EGP 50 million and new projects with capitals from EGP 50k to less than EGP 5 million for industrial facilities and less than EGP 3 million for other than industrial ones.
- Beneficiary projects include all small companies and facilities, including single person entities (new and existing ones) in all economic sectors.
- Purpose of financing is to contribute to financing investment requirements, including fixed assets and operation costs.
- Payment and grace period: 10 years at the most including a maximum grace period of one year.
- Interest rate: 5% (five percent) annual simple reducing interest without commission.
- The client's self-contribution will be at least 10%, to be determined on basis of economic feasibility.

CRGM aims to benefit from loans provided through the Initiative, to include EEIPS, by identifying the best type/form of projects to benefit from CRGM and the Initiative's conditions.

One of the conditions for contracting with a bank via CRGM is the bank's participation in CBE's Initiative to support SME's and its presentation of the means of executing the loans through CBE's Initiative.

4-6 Databank of Available Credit Tools

EECCD will develop a database on the programs made available by the banking system and donors providing assistance to EEIPs in cooperation with CBE and MIIC. This data will be accessible by all establishments and entities wishing to apply for funds to finance EEIPS according to the special conditions of each program. Links will be made to the websites of each program on EECCD's page.

Cooperation will take place with donors for setting up a guidance unit to assist companies and establishments to select the best program that suits the conditions of each.

Chapter Five- Restructuring of Electricity Tariff

5-1 Overview

The state has adopted a program for restructuring the economic sector, which includes decreasing subsidization allocated to the energy sector. The state announced a 5-year plan in 2014 to eliminate subsidization allocated to the energy sector by the end of the financial year 2018/2019, while noting that the program provides for continued cross subsidization among subscribers worth EGP 9 billion in support of segments worthiest of support. The program aims at the following:

- To cover the actual cost of electricity generation, transmission and distribution, in addition to providing customer services over the period of five years.
- To increase the financial efficiency of electricity companies.
- To apply the principles of fairness and equality among subscribers.
- To gradually eliminate subsidization provided to the sector concerning subsidizing fuel prices.
- To apply transparent rules for calculating and applying electricity tariffs over subscribers.
- To raise the efficiency of electricity use by issuing a price indicator of the real electricity cost.
- To protect the most vulnerable segments of society.

The program also includes developing the tariff structure, taking the following into consideration:

- The effect of consumption norms over cost (in consideration of capacity - in consideration of energy- in consideration of customer services).
- The program period will not exceed five years to ensure commitment and will be fully announced.
- To take into consideration low income citizens such that the total amounts spent thereby over electricity does not exceed 4% of one's expenditures based on the Income and Disbursement Study issued by CAPMAS.
- Subscribers unworthy of subsidization may not benefit from the electricity tariff set for the targeted segments.
- Subscribers with high consumption rates will bear the marginal cost of electricity, which is currently equivalent to the cost of renewable energy.
- To merge the categories of low voltage subscribers to housing, commercial and other purposes/ categories and to gradually eliminate the category of irrigation and public lighting.
- To merge residential segments to become four segments (those worthy of support- low income- remaining consumers- high consumers).

As the program was applied over the period of three years, the average increase in sale costs to subscribers of different categories in 2016/2017, as compared with the year preceding commencement of the restructuring program in 2013/2014, was as follows:

Feeding Voltage/ Category of Subscribers	Total increase percentage over the three years as compared with the base year 2013/2014
Extra High Voltage	65.1%
High Voltage	92.5%
Medium Voltage	96.2%
Subscribers in the housing sector	79.4%

In November 2016, a decree was issued liberating the exchange rate, which led to devaluating the Egyptian Pound from EGP 8.88 to EGP 18 against the USD by the end of the financial year 2016/2017. This led to an increase in subsidization granted to the electricity sector in order to face the increase in the prices of natural gas, where the price of gas supplied to the electricity sector was calculated at USD 3 per million BTU. Hence, the price of gas in EGP, which is the currency of payment by subscribers, was doubled. This also applied over the electricity sector's liabilities in foreign currency, such as the payment of loan instalments and interests, and payments for covering equity shares in investments required to be paid in foreign currency. This rendered it necessary to expand ETRP to address such increase in a manner that could be borne by subscribers.

As the electricity prices were announced at the beginning of the financial year 2016/2017, prior to the liberation of the exchange rate of the EGP, which was announced on 4 November 2016, prices remained unchanged and the tariff was not increased during the financial year. The state, in fact, bore the increase in cost during that year, which led to an increase in subsidization provided to the sector from EGP 29 billion to over EGP 62 billion.

5-2 Upgrading the Electricity Tariff Restructuring Program

As of the financial year 2017/2018, the state will gradually reduce subsidization to the electricity sector in order that electricity prices reach their economic cost. This will take place upon extending and upgrading the ETRP for an additional three years in order to achieve this goal. The subsidization is to be gradually eliminated while containing the elevating cost during these years. Subsidization elimination will be variable based on the subscribers' categories, which will take into account the subscribers' ability to pay, by tying the increase rate of the residential sector subscribers to the actual percentage (4%) of spending on electricity, while paying due regard to those worthiest of support, such that they receive most of the subsidization, while cross subsidization for these segments that will not exceed 20% of the subscribers.

The annual increase rate will be determined on basis of several factors, including the following:

1. Subsidization reduction rate.
2. Change in exchange rate.
3. Increase of cost including the change in gas prices.
4. Increased efficiency of gas use in stations, operation efficiency and reduced losses.
5. Increase rate of loads and demand for electricity.
6. Not exceeding the margin percentage of expenditures in the residential sector.
7. Impact on competitiveness of Egyptian exports.
8. Size of cross subsidization to protect the segments worthiest of support.
9. The shift towards a competitive market and a transitional plan to this end as per the requirements of the Electricity Law.

Upon taking these factors into consideration, it is expected that prices will increase for consumers by around 100% of current prices by the end of the restructuring program, i.e. after the lapse of five years (in 2021/2022) which represents an average and compound increase of 15% annually. However, the restructuring plan will be reviewed annually to take into consideration any unexpected changes in the aforementioned factors. It is important to point out that fuel prices are expected to increase for the electricity sector from the current rate of USD 3 per million BTU to around USD 4.2 per million BTU.

By 2022/2023 due to the expected increase in the cost of extracting gas, as well as transmission and distribution costs based on studies concerning the restructuring of gas prices.

However, it is essential to point out that the impact of the above on the tariff will be contained through the increase of the average fuel use efficiency inside the sector, as illustrated in the chapter on energy efficiency improvement in electricity production. The qualitative fuel consumption rate is expected to improve from 192 gm of oil equivalent per kWh in 2015/2016 to 142 gm of oil equivalent per kWh in 2020/2021, which accounts for a 27% improved efficiency of fuel use.

Taking into consideration the demand elasticity in the residential sector, where prices have increased by 10%, this will lead to a decrease in the demand for electricity by 1.5%. Since housing demands represent 47% of the total amount of energy consumed, it is expected to lead to a decrease of 1% on average of the total annual increase rate of demand for electricity over the coming five years (savings may differ from one year to another according to the increase/decrease of price escalations as compared with average prices). The average increase in consumption over the previous ten years from 2006/2007 to 2015/2016 has amounted to 6.4% after excluding the years 2012/2013, 2013/2014 and 2014/2015, due to the shortage in generation during these years as a result of the increased demand for electricity.

As for other than residential sector, it is difficult to expect the decrease in demand. On one hand, increased prices will lead to a tendency towards energy efficiency improvement due to the economic feasibility of energy efficiency applications, while, on the other hand, there will be an attempt to pass over the additional cost to consumers, which depends on the flexibility of the price of goods and services provided by these sectors.

Taking into consideration the decrease resulting from the demand elasticity in the residential sector, it is expected that the annual increase of demand for electricity will fall by 5.4% owing to ETRP, based on which expected savings are as follows:

Year	Demand for electricity in case of a growth rate of 6.4% (GWh)	Demand for electricity in case of a growth rate of 5.4% (GWh)	Expected saving of electric energy (GWh)	Average cost of Electricity Generation (EGP/kWh)	Annual savings (in million EGP)
2017/2018	210,932	207,379	3,553	0.786	2,292.6
2018/2019	224,432	218,577	5,855	0.732	4,133.6
2019/2020	238,795	230,381	8,414	0.816	6,509.2
2020/2021	254,078	242,821	11,257	0.921	10,367.7
2021/2022	270,339	255,934	14,406	1.08	15,558.1
Total (2018/2019- 2021/2022)			39,931		36,568.5

Expected savings as a result of the ETRP amount to an equivalent of USD 746 million according to the prevailing exchange rate of EGP 18: USD 1.

Chapter Six- Energy Efficiency on the Supply Side

6-1 Expected growth rates for peak load and generated energy

Due to the correlation between GDP annual growth rate and the annual maximum load increase rate during the period from 2005/2006 to 2016/2017, taking into consideration the expected average GDP growth rate for the period between 2017/2018 and 2019/2020, estimated at 4.5%, it is expected that the average annual increase of the maximum load will be around 4.5%.

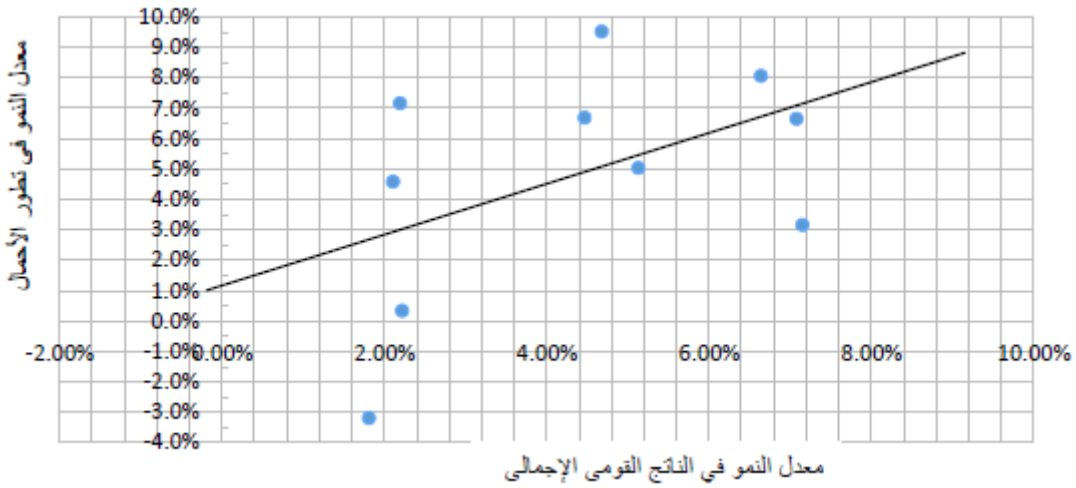


Figure 6-1- Annual increase rate of the peak load (%) as a result of the change of the annual GDP growth rate (%)

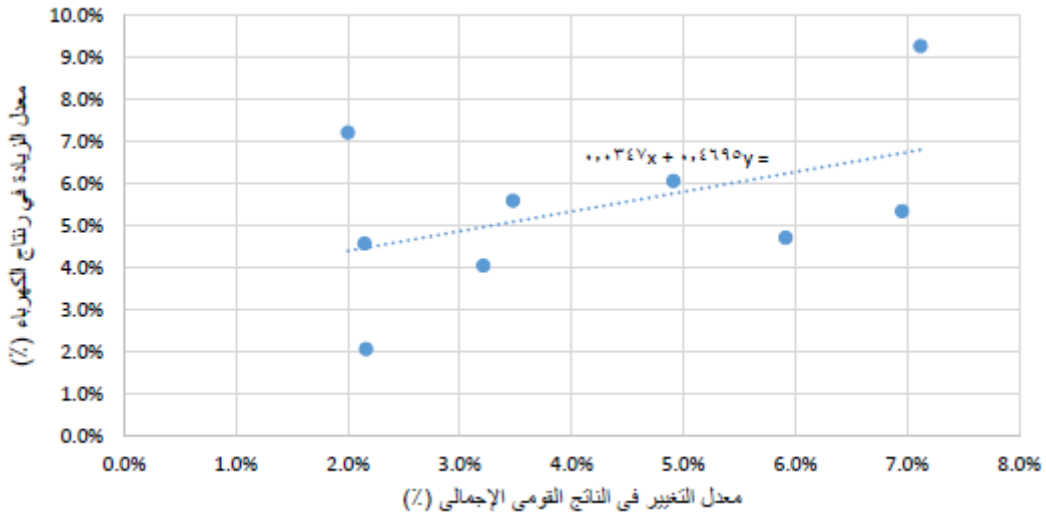
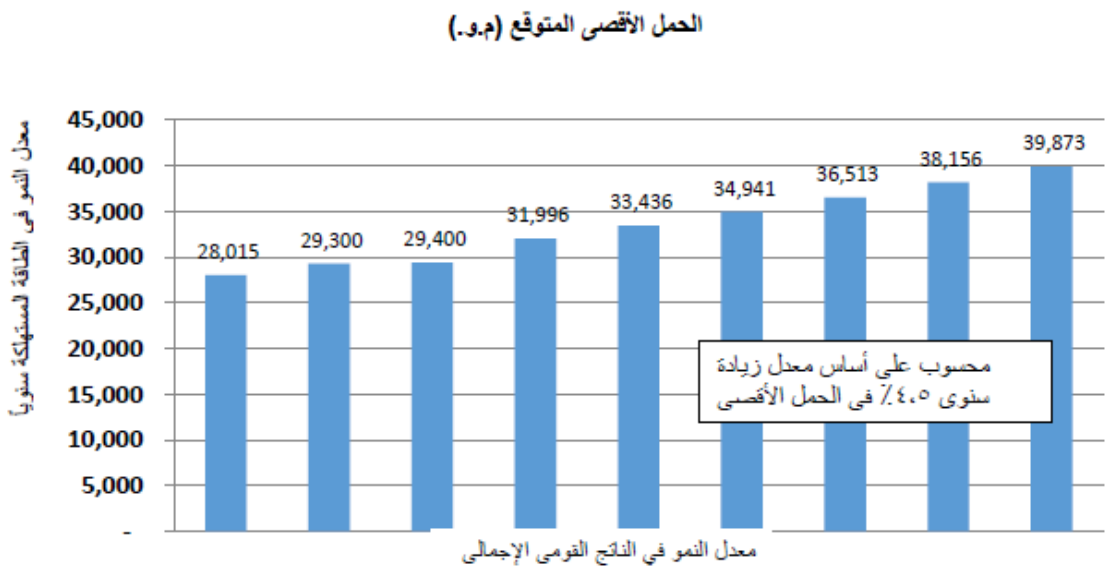


Figure 6-2 Electricity generation growth rate along with the GDP increase rate



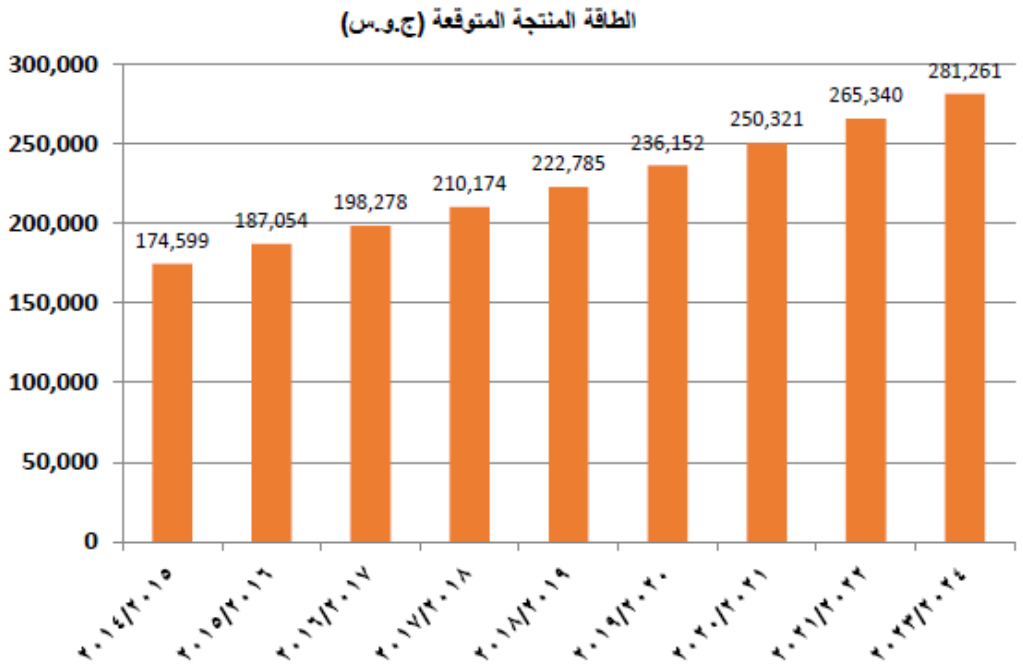


Figure 6-3 Expected increase of the peak load and generated electric energy

6-2 Power Plant Expansion Plans

To achieve the highest efficiency of the use of resources, power plant expansion plans include four pillars:

a. Conversion of gas (simple cycle) turbines established during the urgent plans of 2010/2011 and 2014/2015 to combined cycle power plants, whereby an additional capacity of 1,840 MW can be added and enhanced efficiency of fuel use can be achieved at an average rate of 50% before 2020.
b. The addition of three mega combined cycle power plants (4.8 GW per plant) of a total capacity of 14.4 GW and a standard efficiency that may reach up to 143 gm of oil equivalent per kWh before May 2018.
c. The addition of 650 MW supercritical steam units and 5x60 MW subcritical steam units, of an efficiency up to 213 gm of oil equivalent/kWh.
d. The addition of capacities from renewable energy sources such as wind and solar energy, such that the total capacities of these power plants would reach 7,240 MW and 28,200 MW respectively (including 300 MW from roof top PV power plants on buildings) until 2022/2023.

Table 6-1 Expansion plans for power plants according to ratified plans

Technology (of Plants)	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	
Added capacity as a result of conversion from gas units to combined cycle	---	1,250	590	---	---	---	---
Combined cycle	5,600	8,800	---	---	---	---	---
supercritical unit	650	1,300	650	1,300	---	---	---
Wind *	200	340	950	11,650	1,700	1,150	350
Solar cells *	---	170	1,050	1,220	---	---	---
Concentrated Solar Power (CSP)	---	---	---	---	50	---	---

* power plants established through NREA, competitive bidding, commercial (IPP) and feed-in tariff systems

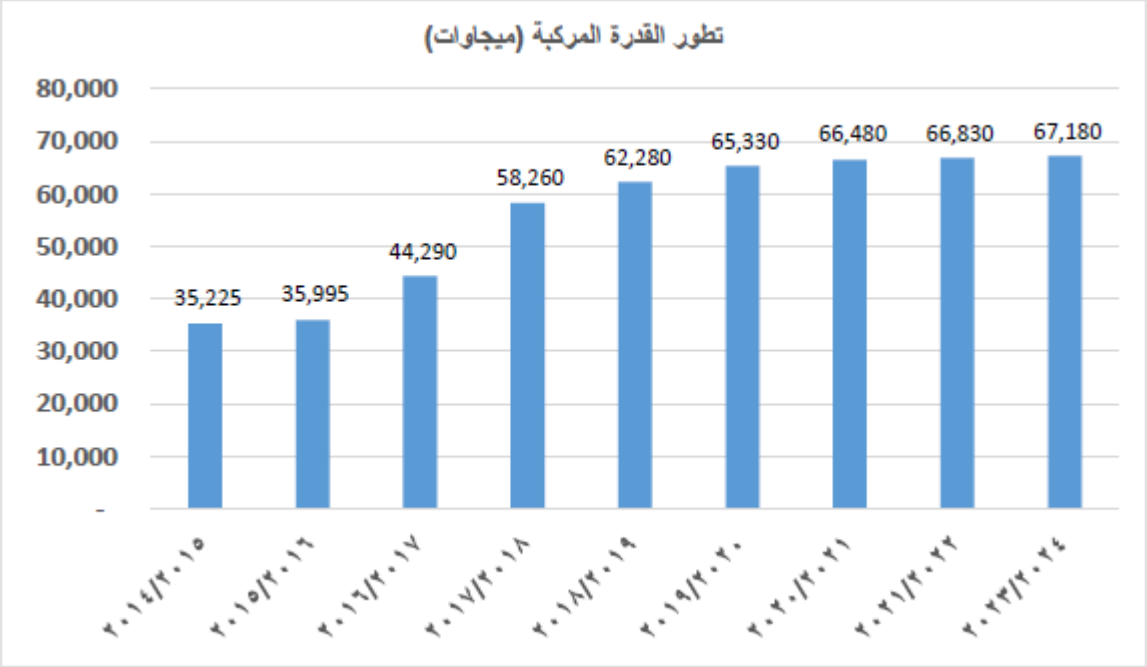


Figure 6-4 Development of installed capacity including thermal and renewable energy sources during the next 7 years according to the ongoing generation expansion plans

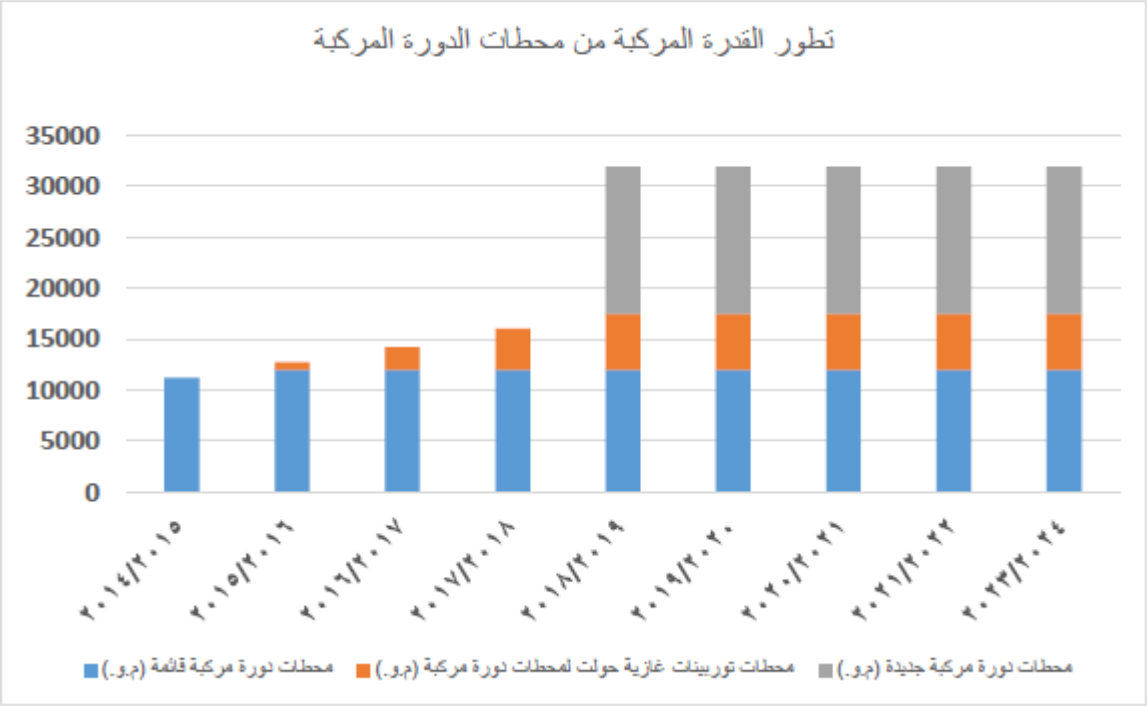


Figure 6-5 Development of installed capacity from combined cycle power plants

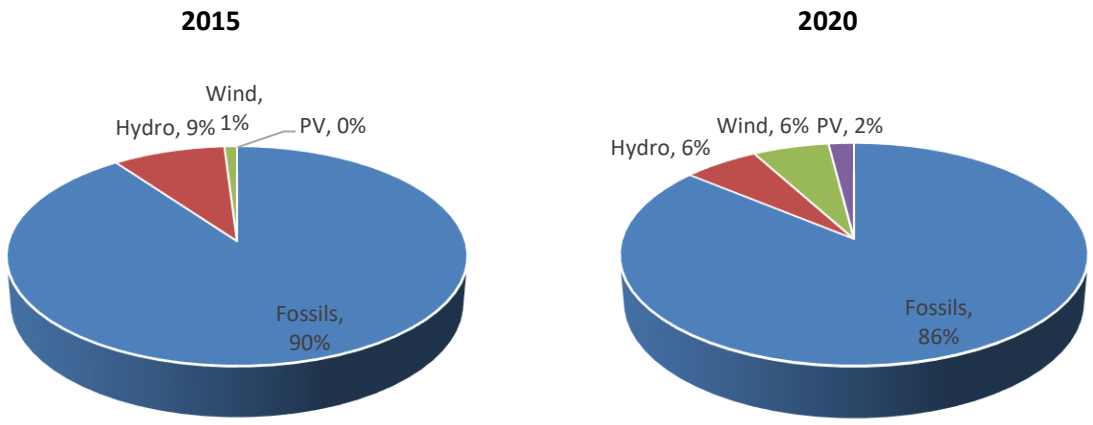


Figure 6-6 Development of contribution of power sources in overall generated electric energy

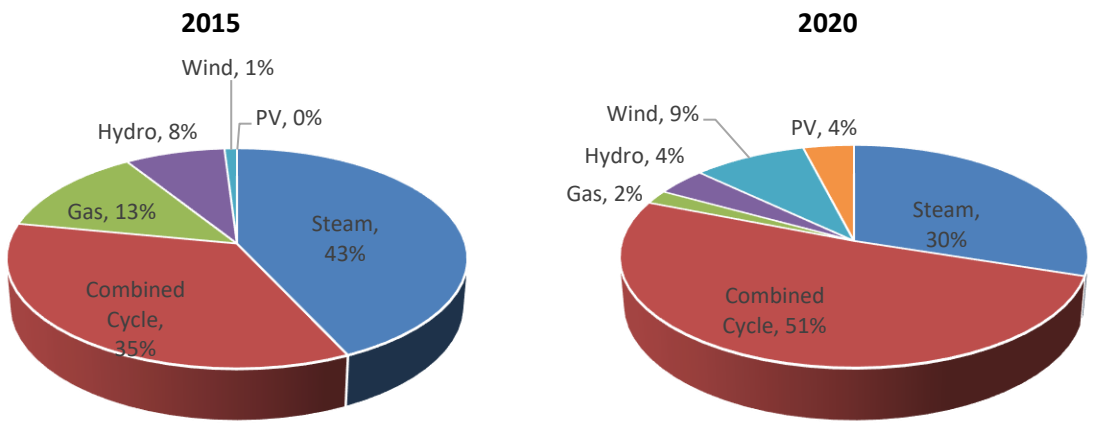


Figure 6-7 Development of percentage of installed capacity using electricity generation technologies out of the total installed capacity

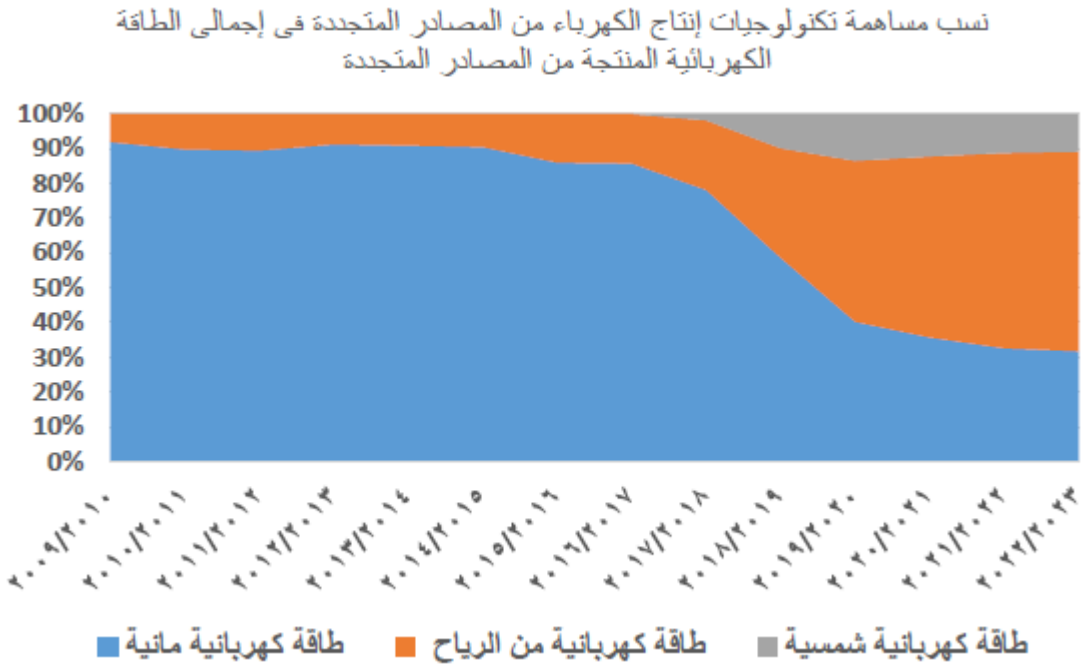


Figure 6-8 Development of the electricity generation mix from renewable energy sources

6-3 Egyptian Saudi Interconnection Project

The project will set up interconnection of a dual polar direct current of 500 KV and a capacity of 1,500 MW per pole (totalling 3,000 MW) for a distance of approximately 1,300 Km connecting between an inverter station of an Alternating Current (AC)/Direct Current (DC) in Badr City, Egypt, and an inverter station of an AC/DC located in east of El Madinah El Minawarah in KSA passing across an AC/DC station in Tabuk, KSA, for exchanging 3,000 MW between the grids of both countries in other than their peak times.

The objective of the project is to benefit from the different peak times in both countries by exchanging energy where the peak time in KSA is in the afternoon, while the peak time in Egypt is during the evening, with a minimum separation time of 3 hours in between both peak times, which allows for securing and exchanging energy.

Solar stations in Egypt can benefit from the project operation methodology, where electricity generated from them in the morning can be exported, and can be recovered at night during peak time in Egypt, which is an indirect means of storing energy.

The first phase of the project is expected to be implemented in 2020 and to be completed during the following year.

Figure 6-9 Map illustrating the Egyptian Saudi Interconnection Lines

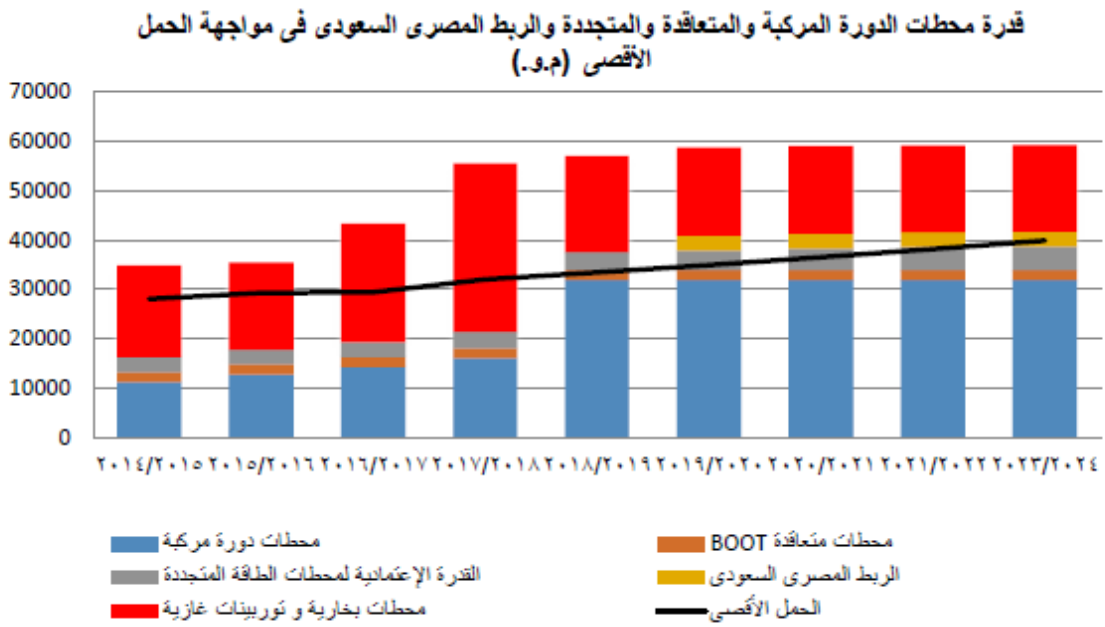


Figure 6-10 Capability to face increase in maximum peak by using high efficiency power plants and those run by renewable energy

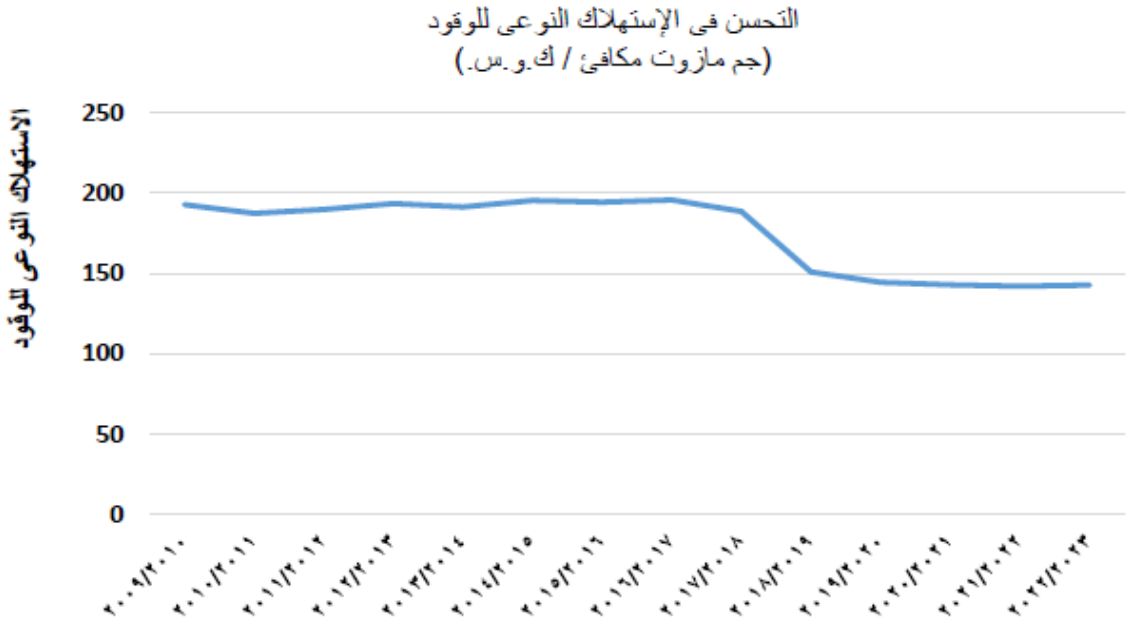


Figure 6-11 Average qualitative fuel consumption rate in the plants used

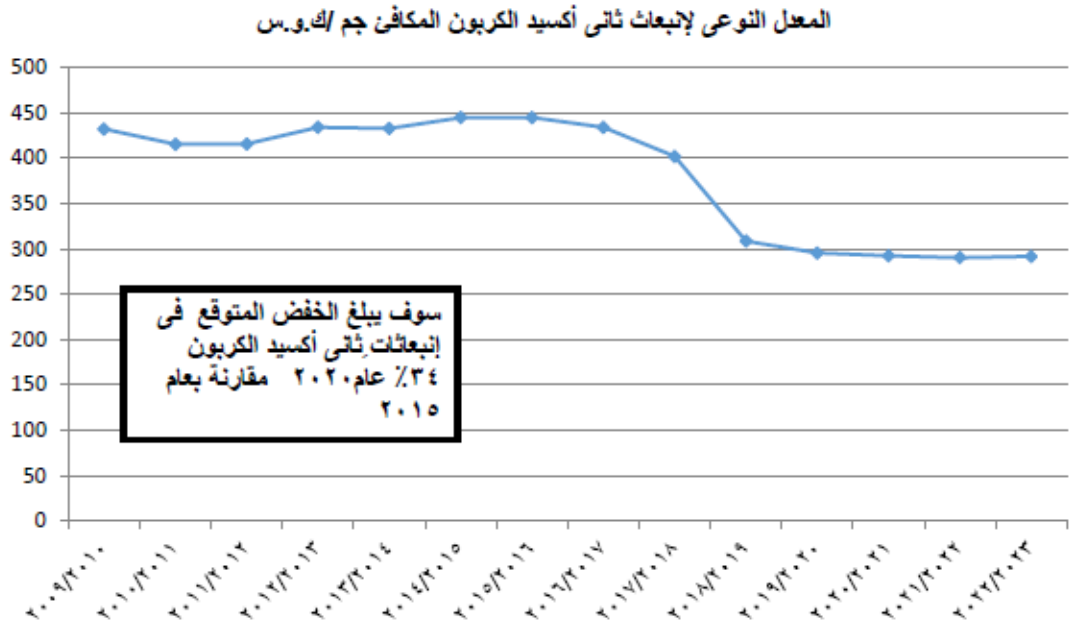


Figure 6-12 Development of qualitative rate of CO_2 emissions

6-4 Deliverables of Energy Efficiency Improvement Measures on the **Generation** Side

The following can be deduced from the aforementioned figures:

a. It is expected that the most likely scenario of the expected peak load would record 39.9 GW in 2023/2024, which represents an increase of 42% compared with the maximum load recorded in 2014/2015.
b. It is expected that produced energy will reach 281 TWh by 2023/2024, which is equivalent to an increase of 61% as compared to 2014/2015.
c. According to ratified generation expansion plans, it is expected that the total installed capacity from thermal and renewable energy power plants will reach 67.2 GW, representing an increase of 90% of the installed capacity in 2014/2015.
d. Taking into consideration the capacity credit of renewable energy power plants, the installed capacity will be equivalent to 59.2 GW of traditional capacities.
e. It is expected that the total installed capacities of combined cycle power plants as per contracts and renewable energy, will exceed the expected maximum load as of 2018/2019, to which will be added afterwards the available capacity from the Egyptian Saudi Interconnection Project, amounting to 3,000 MW, starting with the first phase (1,500 WW) in 2020/2021, which will allow for reliance on these power plants alone for meeting the full demand for electric energy from 2018/2019 to 2023/2024.
f. This will lead to a decrease in the average qualitative consumption of fuel from 192 gm of oil equivalent/kWh to 142 gm of oil equivalent/kWh, representing savings of 27%, accounting for annual savings of 12.9 million tons of oil equivalent in 2020/2021, compared to 2015/2016.
g. The rise in fuel use efficiency will be accompanied by a qualitative shift in the type of fuel used, as the electricity production system will rely on natural gas and renewable energy sources only instead of diesel (heavy fuel), which will lead to the expected decrease in CO_2 emissions of 37.3 million tons in 2020/2021 as compared to 2015/2016.

6-5 Reduction of Losses in Electricity Distribution Networks

6-5-1 Overview

- The Japanese International Cooperation Agency (JICA) submitted an offer for financing a project for reducing waste, minimizing CO_2 emissions and improving the electricity performance network for three EDCs (North Cairo- Alexandria- North Delta) which was ratified by Japan's Official Development Assistance (ODA).
- The consultations firm TEPSCO conducted a feasibility study for this project from July 2009 to March 2010 concerning the three EDCs.

a- The project comprises the following:

1. Replacement and renewal of the networks.
2. Installation of smart meters and automatic controls over the areas covered by the network (zones).

3. Establishment of a control centre in each company (including 2 control centres each in North Cairo and South Cairo EDCs) totalling 11 control centres.
4. Elimination of bottlenecks (improving services for subscribers) by extending cables to bottleneck zones- replacement of transformers- distributors.
5. Installation of filters over the network and on the demand side, such as ceramics, glass, and iron & steel plants.

- Unified specifications have been prepared for the transformers and network components through EEHC, as outlined hereinafter:

a. Distribution management systems:

- Future planning of support and improvement requirements.
- Determination of equipment and tools that need reparation.
- Communication systems used and communication system regulations.

b. Smart meter systems:

- Quality and availability of meters in the Egyptian market.

c. Distribution transformers:

- Specifications of distribution transformers in the Egyptian market.
- Distribution transformers installation plans for each company.
- Possible formation of partnerships between Egyptian and Japanese companies.
- Use of modern technologies in the transformers.

d. Improvement of the imbalance of low power lines.

e. Anti-theft measures:

- Impact of reduced theft incidents upon using smart meters.
- Proposal of comprehensive anti-theft measures.

f. Determination of total cost of projects.

g. Proposal of purchase procedures.

h. Environmental and social impact assessment.

- Study the possibility of applying the Special Terms Economic Partnership (STEP) programs.
- The project will be divided into two groups, the first will be turn-key via a contractor and the other will be through the supply of required equipment and material. EDCs will carry out the installation, testing and operation works.

6-5-2 Summary of Action

Table 6-2 Decrease of electricity network losses in three zones covered by three EDCs

SN	Action Title	Decrease of electricity network loss in three zones covered by three EDCs
1	Objective	JICA submitted a study on improving energy efficiency by reducing electricity network losses in three zones covered by three EDCs (North Cairo- Alexandria- North Delta) financed by a loan granted by ODA.
2	Description	- Establishment of control centres and advanced communication systems to ensure energy availability during peak times, to apply automatic cut-off and connection commands, and to reduce outage periods, where the three control systems will be established as follows: • a control centre for North Cairo EDC including 44 distributors. • a control centre for Alexandria EDC including 56 distributors. • a control centre for North Delta EDC including 42 distributors. - After completing equipping the control centres and the communications system of the smart meters, 9,65k meters will be installed in the zones covered by the three EDCs as follows: • 490k meters within North Cairo EDC zone. • 300k meters within Alexandria EDC zone. • 175k meters with North Delta EDC zone. - The consultations firm TEPSCO will prepare the ToR of the smart meters and control centres in compliance with the specifications ratified by EEHC. - Installation of high-technology small-losses distribution transformers. - Other EDCs will benefit from the transfer of minimizing-losses and energy efficiency technologies applied for the project. - Project implementation zones have been divided as follows: • North Cairo EDC: El Helmeya Networks Sector (El Helmeya- El Mataria- El Marg- El Khanka) • Alexandria EDC: West Alexandria Sector. • North Delta EDC: Damietta- North Dakahlia.
3	Implementing Agency	The three EDCs in collaboration with JICA.
4	Stakeholders	All subscribers in the electricity sector.

SN	Action Title	Decrease of electricity network loss in three zones covered by three EDCs
5	Focal Points	Eng. Manal Fathelbab Hassan- Head of the Sector Eng. Wafaa Abdelrahman Ibrahim.
6	Source of Financing	A loan financed by JICA.
7	Implementation Costs	-On 17/1/2015, the Japanese government agreed to provide a loan worth JPY 267.24 billion through JICA, which is equivalent to USD 843.258 million (local component + foreign component) for financing the foreign component of the aforementioned project according to the following financing terms: * Borrower: EEHC. * Loan Term: 40 years, including a 10-year grace period. * Interest Rate: 0.3% for procurements and 0.01% for consultation services. * Front end fee: lump sum 0.2% to be paid within 60 days as of the date of signing of the loan agreement. - The rest of the project funding, equivalent to JPY 7.51 billion, will be financed out of the own sources of the three EDCs mentioned hereinabove according to the share of each in the project cost.
8	Total Costs	Local component of USD 15.048 million (provided by the three EDCs) in addition to the foreign component amounting to USD 243.3 million (provided by ODA).

SN	Action Title	Decrease of electricity network loss in three zones covered by three EDCs
9	Estimated Savings across Sector	The following table illustrates the difference between reducing commercial and technical losses without implementing the project (* based on the cost of service report issued by EgyptERA for 2014/2015) and upon implementing the project (**based on the consultant's report)

	Zone	* without implementing the project	** upon implementing the project by (2019)
Technical Losses	Alexandria EDC (West of Alexandria)	3.18%	2.82%
	North Delta EDC (North Dakahlia)	5%	4.5%
	North Cairo EDC (El Helmia)	5.91%	5.15%
Commercial Losses	Alexandria EDC (West of Alexandria)	6.7%	4.9%
	North Delta EDC (North Dakahlia)	5.86%	3.65%
	North Cairo EDC (El Helmia)	6.85%	6.51%

6-6 Use of Smart Meters

6-6-1 Overview

On 25/5/2010, a grant agreement was signed with the United States Trade and Development Agency (USTDA) worth USD 416k for financing a feasibility study for the use of smart meters in Egypt that would detect the theft of and tampering with meters.

An American consultation firm (KIMA) was contracted in 2011 to conduct the economic feasibility study for using smart meters in the residential sector in Egypt.

The consultation firm conducted field visits to the premises of South Cairo EDC (SCEDC) and Alexandria EDC (AESC) to become familiarized with the control system of the network, steps for collecting meter readings and collecting fees, the complaints centre, the maintenance centre, the smart meters systems, pre-paid meters used by both companies, and to visit EgyptERA as well.

In June 2013, the study concluded that the project was of economic feasibility and would realize revenues for the EDCs since it would reduce the amount of losses, enhance collection percentages and ensure accurate meter readings.

In 2016, based on the study, EEHC held a tender for the procurement of 250 k smart meters, for which technical and financial evaluation of the offers was completed in March 2017.

The meters are to be distributed over the following six EDCs : NCEDC, SCEDC, Canal Electricity Distribution Company (CEDC), AEDC, South Delta Electricity Distribution Company (SDEDC), and Middle Egypt Electricity Distribution Company (MEEDC))

The meters would be installed for all types of subscribers (commercial, residential, industrial, etc.) following whole zone methodology. All meters were to be changed, whether of medium or low voltages in the targeted areas. The whole zone method was adopted in order to maintain balance and determine how to manage the phase with the existence diverse consumption norms.

The meters have a 3-year guarantee period.

The phase will be evaluated after one year from signing the contract.

Second phase includes 1.5 million smart meters within one year after the complete installation of the 250 k meters.

Price per meter is approximately USD 200 paid over 5-year instalments.

6-6-2 Summary of Action

Table 6-3 Implementation of Smart Meters Project in the EDC Zones

SN	Action Title	Implementation of Smart Meters Project in EDC Zones
1	Objective	Within the framework of the plan adopted by the sector of electricity and renewable energy for securing high quality electric energy for all types of usages and applications via advanced technological solutions and using smart meters for management of the electricity grid, to achieve the following goals: • To reduce electricity theft incidents. • To raise meter accuracy levels, faster network performance analysis and identification, more accurate analysis of loads over the network. • More efficient management of loads over the network. • Enhance degree of reliability. • Eliminate obstructed and delayed readings and raising the percentage of readable meters. • Detection of meter theft and tampering cases. • Elimination of subscribers' complaints from increased consumption as a result of employees' wrong readings. • The possibility of obtaining technical reports on transformers, including transformer loads, peak load, power factor, and analysing such data to benefit from it in electricity grid planning, reducing outages and demand side management. • The possibility of benefiting in the future from the smart network applications.
2	Description	The ToR was prepared for the implementation of such smart meters' project through procurement, installation and operation in the zones covered by 6 EDCs, to develop data analysis bases and rules, whether on technical, financial or funding levels for implementation of the project. The procurement, installation and operation of 250 k smart meters will take place as a pilot phase within the zones of 6 EDCs, which will include supply of meters and a data management system, to be completed within one year as of signing the contract. In case of the success of the pilot phase, the experience will be streamlined. The second phase will include 1.5 million smart meters within one year after the installation of the 250 k meters.

SN	Action Title	Implementation of Smart Meters Project in EDC Zones
3	Implementing Agency	EEHC, EDCs- supplier company
4	Focal Points	Eng. Shereen Fouad- Technical Affairs Consultant
5	Stakeholders	EEHC, EDCs- the company that will be contracted with.
6	Implementation Cost	Approximately USD 50 million, including operation, maintenance and taxes.
7	Total Costs	Approximately USD 50 million.
8	Source of Financing	Self-financing
9	Financial Incentives	Price of meter will be paid over instalments.
10	Awareness	Consumers will become aware of the importance of smart meters through media campaigns on saving electricity and through seminars and workshops.
11	Evaluation & Monitoring	The meters will be connected to a central unit at EEHC which will monitor the sale of meters via monthly reports that indicate the number of meters sold.
12	Timeframe	250 k meters will be distributed over the period from July 2017 to July 2018 as a pilot project. Then 20 million meters will be distributed over 10 years, 1.5 million of which will be distributed during the first year.
13	Estimated Savings across Sector	A feasibility study was conducted by a consultations firm, which determined the cost and expected return of the project as a result of reducing losses, enhancing collection and reading accuracy of meters, where the project was found to achieve an international rate of return (IRR) of 18% if all meters are replaced.

6-7 Activation of the role of EDCs in achieving energy efficiency improvement for subscribers

6-7-1 Overview

In July 2015, the Electricity Law was issued, and Article 47 thereof stated that electricity transmission and distribution companies had to implement annual EEIPs that would encourage the use of renewable energy by consumers, where each company would design its own plan that must be approved by EgyptERA, provided that the plan includes the following in particular:

a. Management of demand for electric energy.
b. Improving the use of electric energy.
c. Promotion of renewable energy uses.
d. Increase awareness about energy efficiency.

EgyptERA is responsible for verifying what has been accomplished out of the annual plan at the time of issuing the license renewal certificate.

Accordingly, EgyptERA provided technical support to electricity companies for setting up a department in each company specialized in improving energy efficiency and encouraging the use of renewable energy for consumers. Nine employees in these departments, in each of the companies, were qualified as certified energy auditors.

As of the financial year 2016/2017, EgyptERA started to request the authorized EDCs to submit their plans according to the Law, which were deemed as one of the required papers for license renewal. EgyptERA supported these companies in preparing these plans on basis of the capabilities of each company. A monthly meeting was is held between EgyptERA and these companies to exchange experiences.

6-7-2 Summary of the Action

Table 6-4 Plans of EDCs for improving efficiency of electricity use by subscribers

SN	Action Title	Energy Efficiency Improvement
1	Objective	Article 49 of the Electricity Law of 2015, which states the following: - The network operator or an authorized EDC will implement the annual plan proposed thereby, ratified by EgyptERA, for executing projects or programs targeting consumers in the following fields: • Management of the demand for electric energy. • Electric energy efficiency improvement. • Promoting the use of renewable energy. • Raising awareness on energy efficiency. EgyptERA will verify the accomplishments achieved out of the annual plan at the time of issuing the license renewal certificate.
2	Description	- A survey will be made of the scope covered by the 9 EDCs to determine the number of subscribers for which energy efficiency improvement measures will be implemented, as outlined hereinafter. • NCEDC: around 120 subscribers by June 2022. • SCEDC: around 48 subscribers by June 2022. • AEDC: around 192 subscribers by June 2022. • NDEDC: around 256 subscribers by June 2022. • SDEDC: around 80 subscribers by June 2022. • MEEDC: around 152 subscribers by June 2022. • CEDC: around 24 subscribers by June 2022. • Upper Egypt EDC: 48 subscribers by June 2022. • El Beheria EDC: did not send any data.
3	Implementing Agency	EgyptERA
4	Focal Point	Dr. Kamelia Youssef, Eng. Shereen Abdullah
5	Stakeholders	Heavy consumption subscribers 6000 subscribers, investors, EDCs.
6	Saving Calculation method	Not identified as no actual steps have been taken to improve energy performance within the establishments as we are still in the awareness raising phase.
7	Value of Savings upon Action Implementation	------

Chapter Seven- Energy Efficiency Procedures in the Buildings Sector

7-1 Brief Overview on Implementation Phases of Energy Efficiency Improvement Measures as per ISES 2035

ISES 2035 includes a parcel of policies that took into consideration costs and returns. Each group of policies includes a number of procedures within a coherent framework that is linked to the expected development of the institutional structure of the energy efficiency industry, the demand for energy efficiency services and the development in supplies and pricing policies. These policies were divided over ISES's time-span to include short-term policies (2015 – 2020) which are related to the completion of corporate procedures and awareness raising, medium term policies (2020 – 2024) targeting the availability of energy efficiency services and long-term policies (2025 – 2035) which target developing demand for energy efficiency services and enhancing their quality.

The short-term phase of energy efficiency in the buildings sector includes preparation activities to raise awareness among consumers for deploying the use of energy efficiency labels for home appliances, reviewing energy efficiency codes for buildings, and developing a parcel of executive procedures to activate energy efficiency codes for new buildings.

Table 7.1: Targeted procedures according to ISES for energy efficient appliances

Short term	
Purchase vouchers as incentives to buy energy efficient appliances (category A and above)	1 million vouchers
No. of replaced appliances (obligatory implementation starts with appliances of economic feasibility)	1 million units
Medium term	
Non-energy efficient appliances removed from the market	10 types
Non-energy efficient replaced appliances	3 million appliances
Investments allocated to manufacturers to support investment during the transitional phase	Euro 10 million
Total investments with manufacturers	Euro 50 million
Long-term	
Elimination of more non-energy efficient appliances	10 types
No. of replaced non-energy efficient appliances	10 million appliances
Develop a database of sold energy efficient appliances and preparation of relevant statistical studies	1

Medium-term procedures include the adoption of incentives to encourage the enforcement of construction laws and to define the best technologies for sustainable buildings and to have them gradually introduced in legislations, while giving priority to new buildings.

On the long-term, there will be reliance on photovoltaic (PV) power plants on rooftops and other energy efficiency technologies encouraged by appropriate incentives provided by the state, and the adoption of procedures for the renovation of existing buildings to meet energy efficiency standards.

Table 7-2: Targeted procedures to renovate buildings in Egypt according to ISES

Short-term	
Soft loans (50% of Euro 37 million) to cover the investment for PV systems on rooftops of exiting buildings	30,000 units
Medium-term	
No. of existing buildings over which the best economic technologies are applied	30,000 units
Long-term	
No. of residential buildings obliged to implement the best economic renovation technologies	500,000 units
No. of commercial and public buildings obliged to use PV systems	200,000 units

7.2 Procedures included in NEEAP

Below are the proposed procedures for NEEAP according to ISES:

7.2.1 Energy Efficiency Specifications and Cards Program (EESCP)

Household appliances consume 70% of total household consumption, which accounts for 44% of total consumption. This means that household appliances consume 31% of the overall consumption in the country, while the application of the EESLP aims at saving 10% of the total consumption of these appliances.

First: Achievements during the previous period

In 1999, a program was implemented in cooperation with UNDP to increase the efficiency of household appliances, where the following has been accomplished:

- As of 2000, a survey is conducted concerning the residential and commercial sectors to determine mostly used appliances that can lead to highest energy consumption savings. This survey is updated regularly (the latest survey was conducted in 2015).
- Local manufacturing capabilities were evaluated through a survey of household appliance manufacturers and producers to determine production volume, appliance specifications, technical manufacturing capabilities and export capabilities of each company, and their compliance with energy efficiency specifications.
- An evaluation was made of saving potential after improving energy efficiency through applicable studies conducted in cooperation with manufacturers to estimate expected savings after adopting energy efficiency improvement technologies and the required capital costs for each manufacturer.

- Energy efficiency specifications were developed through committees made up of all technically-specialized stakeholders as well as the execution phase was developed for the application of these specifications.
- An Egyptian (simplified) energy efficiency label was designed including five energy efficiency levels A, B, C, D, & E.
- Several specialized training programs were delivered, in addition to media awareness campaigns to introduce the importance of energy efficiency specializations and cards and how they are to be used by the manufacturer, producer and consumer.
- Three certified reference laboratories were established in NREA according to the ISO1702 standard for measuring the energy efficiency of refrigerators, washing machines and air conditioners, in addition to laboratories to test energy savings in the lightbulbs. A laboratory management agreement was signed with EOS and NREA. The cost for setting up the testing labs was USD 4.2 million.
- The necessary ministerial decrees were issued by the Minister of Industry and Trade setting minimum consumption standards and stipulating placing energy efficiency labels. The first Decree No. 266 dated 16/2/2002 was issued by the Minister of Industry and Technological Development, obligating all producers and importers to follow Egyptian standards set for refrigerators, freezers and air conditioners (window and split types). The second decree No. 180 dated 30/7/2003, was issued by the Minister of Industry and Technological Development, obligating all producers and importers to follow Egyptian standards set for household electric washing machines. The decree also obligated all producers and importers to place energy efficiency labels in an apparent part of their devices, giving them a three-month period to adjust their statuses and place energy efficiency labels on their appliances.
- In light of practical experience, ministerial decrees on compliance with standard specifications and placing energy efficiency labels, were amended to explicitly impose penalties on cases of non-compliance. Ministerial Decree of 2011 was issued to set penalties for violations concerning energy efficiency labels, such as not placing the labels, their non-compliance with the appliances' specifications or placing them in an unapparent part of the appliance.
- In 2015, Electricity Law No. 87 of 2015 was issued, requiring the government to expand the application of energy efficiency labels over electricity appliances and equipment, to develop and implement programs for the replacement of non-energy efficient appliances, to implement IEEPs in industrial and commercial establishments and require manufacturers and importers to place energy efficiency labels on their appliances and equipment.
- In addition, the Executive Regulations of the Electricity Law were issued stipulating that public entities determine the required energy efficiency category when drafting ToRs for the procurement of electrical appliances. The Executive Regulations also set out the conditions, procedures and obligations for issuance and placing of energy efficiency labels.

- Internal monitoring of products by the Ministry of Industry and Foreign Trade became more strict to ensure conformity of specifications and the placing of energy efficiency labels on products. Tests were to be conducted at reference laboratories to determine the efficiency level of appliances, sampling percentages and the frequency of tests.
- Energy efficiency specifications were set for components of the end-product of refrigerators, washing machines and air conditioners, (for which energy efficiency specifications were determined) such as engines and compressors as well as imported components of energy saving lightbulbs.
- Government agencies were required to purchase energy efficient equipment for their tenders.
- A database was developed on the current market situation and the volume of annual sales of electrical appliances for which ministerial decrees were issued to monitor and evaluate the program deliverables.
- Energy efficiency testing laboratories were upgraded and developed, and their capacities were raised to be able to test more devices at the same time.
- Standards were set for forecasting expected savings from using (replacing) household appliances.

Second: Energy efficiency specializations and Labels Procedures (EESLP) included in NEEAP

These measures include raising the efficiency of EESLP for household appliances as well as the expansion of the energy efficient lighting program for houses and public buildings.

Table 7-3 Activation of EESLP

SN	Action Title	Activation of EESLP
1	Objective	- Rationalization of electricity consumption as EESLPs have proven to realize savings of 10% of consumption. - Compliance with legislations on EESLP application (Electricity Law and its Executive Regulations - ministerial decrees - obligatory specifications). - Conducting tests to ensure that the appliances comply with the values stated in the labels according to standard specifications. In case of non-conformity, coordination is to take place with regulatory bodies for sampling.

SN	Action Title	Activation of EESLP
2	Description	- Developing standard energy efficiency specifications for electrical appliances: A) Ministerial decrees are in the pipeline for devices for which specifications have been set. ▪ Development of minimum energy efficiency specifications for refrigerators and freezers and preparation of their energy efficiency cards (the second amendment is underway). ▪ Television. ▪ Energy efficient air conditioning with inverter compressor. B) Devices for which specifications are being prepared: ▪ Water pumps. ▪ Electric motors with capacity less than 1 kW. C) Devices for which specifications will be developed (based on electrical device pattern consumption studies) such as satellite receivers, electric water heaters and water boilers. - Completion of the establishment of energy efficiency laboratories to verify efficiency levels as per energy efficiency labels in a number of entities: D) Laboratories being established under the plan at EOS, to include: ▪ Televisions. ▪ Electric fans. E) Laboratories to be established during the plan GOEIC: ▪ Water pumps. ▪ Electric motors of a capacity of less than 1 kW ▪ Air conditioners with inverter compressors.
3	Implementing Agency	EEIP - EOS - Test Laboratories - Control Bodies - Ministry of Supply - CPA - ICA - GOEIC- NREA.
4	Focal Points	EEIP (Dr. Ibrahim Yassin – Eng. Viola)
5	Stakeholders	EEIP - EOSQ - Testing Laboratories – Regulatory Bodies - Ministry of Supply - CPA - ICA - GOEIC
6	Implementation Costs	Separate statement of costs for establishing each lab.

SN	Action Title	Activation of EESLP
7	Source of Financing	EEF – CRGM - Grant from EEIP through GEF and UNDP for laboratory items, provided that the concerned entity will undertake providing the required facilities for these items.
8	Financial Incentives	EEF - CRGM - grants from international bodies for the elimination of non-energy efficient appliances
9	Awareness	- Through seminars - publications distributed to emphasize the importance of energy efficiency labels and to provide explanations. - Train sellers to understand the program. - Outreach to buyers in outlets in cooperation with major chains selling electrical appliances through publications, brochures and discounts. - Raising awareness among manufacturers about the importance of testing.
10	Evaluation and Monitoring	Monitoring mechanism implemented by EOS through the energy efficiency unit and regulatory bodies.
11	Saving Calculation Method	According to the standard, the corresponding consumption is determined for each level of efficiency, which, however, depends on the market size of each level of efficiency and replacements (constraints: lack of database on the volume of sales) EEIP (the funding mechanism for laboratory items)
12	Estimated Saving across Sector	MoERE's EECD in cooperation with EEIP

7.2.2 Elimination of non-energy efficient equipment

Table 7-4 Elimination of non-energy efficient equipment

SN	Action Title	Elimination of non-energy efficient equipment
1	Objective	- Abidance by legislations stipulating execution of the program (Electricity Law and its Executive Regulations- ministerial decrees- obligatory specifications). - Reduce consumption of non-energy efficient equipment, especially refrigerators which consume one third of residential consumption.
2	Description	- Replacement of one million non-energy efficient devices (refrigerators) with energy efficient ones through financial facilities provided by EEF, CRGM and grants provided by international organizations. - Provision of financial facilities for purchasing one million house-use appliances of level A or above. - Establishment of companies for transporting appliances and dispose of them safely, which tasks shall be as follows: • To verify soundness of the device. • The refrigerator owner is to be granted a discount coupon worth EGP 1,000 for purchasing a refrigerator of level A or above. • To transport it to the centre for its disposal safely. - An agreement will be reached with participating outlets on prices (prior agreement on a price list).
3	Executing Agency	EECCD in agreement with any other agency for managing the program.
4	Focal Points	EECCD Director.
5	Stakeholders	Device suppliers, outlet owners, NREA, GOEIC
6	Implementation Costs	EUR 50 million
7	Financing Source	EEF- CRGM- grants provided by international organizations for the elimination of non-energy efficient equipment
8	Financial Incentives	The refrigerator owner will receive a discount coupon worth EGP 1,000 for purchasing a refrigerator of level A or above.
9	Awareness	- Media campaign over the television & radio and the social media to raise awareness about the significance of the program, means of appliance replacement, refrigerator receipt & examination mechanisms. - Raise awareness among purchasers about sale outlets in cooperation with big chains for selling electric appliances through the use of publications, posters and discounts.

SN	Action Title	Elimination of non-energy efficient equipment
10	Evaluation and Monitoring	Through EECCD, monitory bodies and sale of devices.
11	Saving Calculation Method	KWh of old refrigerator minus kWh of new refrigerator
12	Estimated Saving across Sector	2,520 GWh by the end of 2021/2022 upon replacement of one million refrigerators.

7-2-3 New mechanism for the distribution of LED lightbulbs

The overall framework of this program includes the following components:

According to the budgets of electricity companies for the year 2015/2016, the number of consumers with monthly consumption of 200 kWh or less, was as follows:

Consumption Segment	No. of Consumers 2015/2016
Less than 50 kWh per month	3,538,743
From 50 – 100 kWh per month	2,894,502
From 0 – 200 kWh per month	7,663,146
Total	**14,096,391**

The program targets the distribution of 2 lightbulbs per subscriber, with a total target of 28 million lightbulbs during the NEEAP duration.

To ensure non-energy efficient lightbulbs are replaced with energy efficient ones, a lightbulb of a capacity of at least 4 times the energy efficient lightbulb is to be handed over.

Emphasis is placed on low-consumption consumers (less than 200 kWh) for the following reasons:

- There is a higher chance that high efficiency lightbulbs will be used during peak times as the main loads used by such consumers are for lighting. They also use a small number of lightbulbs, which will result in using the same lightbulbs for longer periods.
- Reduced subsidization to these consumers.
- The possibility of reselling the energy saved to customers in other segments, leading to financial gain for electricity companies.

The companies and suppliers participating in the program are selected through public competitive bidding process, that includes at least the following:

- Commitment to agreed sale prices to consumers through public bidding at a standard closing price for each set of 5 million lightbulbs. Bidding is held periodically until the target number (28 million lightbulbs) is completed.
- Companies and suppliers are required to provide at least two years' guarantee on the lightbulb and to change it free of charge in case it is combusted during the warranty period.
- Commitment to sell lightbulbs over 18-month instalments to target groups.
- Contribute to financing the media campaign to raise awareness among consumers about the program.
- Commitment of companies and suppliers to the program terms is one of the qualification requirements for applying in following tenders.

Manufacturing and distribution companies are assigned to distribute lightbulbs for the following reasons:

- Their marketing capacity.
- Giving advice to consumers on where to fix the lightbulbs to ensure high participation rate at peak times.
- Provision of warrantees on lightbulbs and replacement of damaged lightbulbs, which will better serve customers.
- Electricity companies will not have to bear cost of lightbulb purchase, storage space or sale procedures.

EDCs will provide support for each lightbulb sold upon the delivery of the corresponding non-energy efficient lightbulb, which would be equivalent to 60% of the saved annual subsidization provided to the benefited consumers.

EDCs will collect instalments paid for lightbulbs from consumers and will hand them over to suppliers.

A mechanism will be developed to assess the impact of the program through the following:

- Distribution of lightbulbs through campaigns, including predefined load centres, while carrying out measurements before and after distribution, to measure reduced load rates, the amount of energy consumed, and the electric current quality.
- Develop a database of distributed lightbulbs.
- Conduct measurements on consumer samples before and after use.
- Prohibit the production and importation of incandescent lightbulbs gradually over a maximum period of three years.
- Issuing labels for energy efficient lightbulbs with strict control over production quality as well as compliance with standard specifications by both local producers and importers.

Table 7-5 Distribution of 28 million LED lightbulbs for the housing sector

SN	Action Title	Distribution of 28 million LED lightbulbs for the residential sector
1	Objective	Rationalization of electricity consumption by the end user.
2	Description	- To contract with companies producing and supplying LED lightbulbs to collect their dues from lightbulb sales over 18-month instalments added to electricity bills. - To provide loans from the credit guarantee program to these companies to finance the sale of these lightbulbs over instalments. - To disburse the decided financial support from EDCs for purchasing the lightbulbs for deserving categories, as well as the decided support for collecting non-energy efficient lightbulbs upon advising of the sale process, to effect payment through electricity bills, and to hand over the collected lightbulbs.
3	Implementing Agency	EEHC and affiliated EDCs
4	Focal Points	Energy Efficiency Units (EEUs) in the EDCs
5	Stakeholders	Houses and governmental buildings
6	Total Costs	Approximately EGP 1,120 million.
7	Source of Financing	Consumers will receive a financial facility equivalent to 60% of the subsidy provided for each kWh of electricity to be saved by these consumers. The credit guarantee program will provide the guarantee required for supplying companies to finance payment of lightbulb costs over instalments, while consumers are to pay the remaining price of the lightbulb over monthly instalments.
8	Financial Incentives	Financial support equivalent to 60% of the saved annual subsidy provided to the beneficiary.
9	Awareness	Launch a media campaign in cooperation with suppliers to promote the program over different means of the media.
10	Evaluation and Monitoring	Monitoring supplies with suppliers.
11	Saving Calculation Method	Calculate maximum load saved, consumed electricity and fuel.
12	Estimated Saving across Sector	The expected annual saving is 1,028 GWh and a decrease of 856 MW over 4 years.

7-2-4 Improving the efficiency of lighting systems in public and private buildings

This project aims at rationalizing electricity used in lighting or the operation of equipment and devices in public governmental buildings to minimize electricity loss and increase its usage efficiency.

First: Achievements over the past period

A total of 22 pilot projects were implemented to improve the efficiency of lighting systems by replacing traditional lighting systems with energy-saving ones and using LED technology in some buildings (government, hotels, banks, consumer complexes, private residential complexes) with investments estimated at EGP 7.5 million and energy saving of about 9.5 million kWh, equivalent to EGP 5.6 million.

Outcomes of the pilot rationalization projects showed that savings realized according to actual readings of electricity bills, were estimated between 25% and 40% of total electricity consumption in the facilities in which the pilot projects were implemented, and that the savings realized in the places where central air conditioning systems were used, exceeded expected results due to low temperature in buildings using LED lighting technology. The results showed that the payback period is linked to the electricity tariff of each building and the type of technology used, thereby ranging from six months to one year and a half in most facilities.

Based on the positive results of these projects, some institutions have already begun to deploy the experience in all of their buildings, at their own expense. For instance, Commercial International Bank (CIB) has signed contracts to replace all lighting systems in its 160 branches by a LED lighting system at an investment cost of over EGP 15 million. NUCA, affiliated to the Ministry of Housing, started replacing the lighting systems in its main building in El Sheikh Zayed with LED technology and is deploying this process in all of its buildings. Mansour Group is following the same trend (in its factories, 100 branches of Metro Market, Khair Zaman, administrative offices in Cairo & Alexandria and storehouses).

Traditional lighting systems have been replaced with an energy efficient LED system that realizes 50% savings in MoERE's main building. EDCs have implemented a number of energy rationalization projects to change traditional lighting systems with rationalization systems within their own buildings and other government buildings under their scope zones, totalling to 28,203 buildings, thereby realizing energy savings estimated at around 173 MWh.

MoERE's EEIP funded by GEF and UNDP has contributed to the provision of technical assistance and financial contribution for financing 50% of the total cost of pilot projects for improving the efficiency of various lighting systems (worth up to EGP 250,000) within the context of shifting the Egyptian market to energy-saving lighting.

All lighting systems for 8 government buildings were replaced by LED lighting systems with total investments of EGP 9.1 million and a saving value of 1,700 MWh annually costing EGP 700,000 per year. The project aims to implement 15 projects by the end of this year with an increase of support to EGP 500 k per project. The project also conducted 200 energy review processes in mosques under the protocol signed with the Ministry of Endowment.

Second- Procedures for improving the efficiency of lighting systems in public and private buildings

MoERE has required that all ministries change their lighting systems with financial contribution from the grant allocated to EEIPs for lighting systems and household electrical appliances, where 50% of the total project cost will be covered, up to EGP 500 k of the total value of the contract. The 13 ministries have issued their consent, for which investments worth around EGP 11 million will be paid, that will result in energy saving of 12 million kWh.

Table 7-6 Procedures for improving the efficiency of lighting systems in public and private buildings- Phase II

SN	Action	Procedures for improving the efficiency of lighting systems in public and private buildings- Phase II
1	Objective	- Lighting in public and private buildings consume 40% of their total electricity consumption. - Lighting represents 15-20% of total consumption on the national level and constitutes a major component of peak load.
2	Description	The program includes: - commercial sector: banks – administrative buildings – governmental buildings – hotels. - The program includes a number of governmental buildings for which technical and financial support will be provided. - Private buildings will be provided with technical support.
3	Implementing Agency	EEIP
4	Focal Point	Dr. Ibrahim Yassin- Dr. Kamilia Yousef – Eng. Viola
5	Stakeholders	Beneficiaries – Chambers of Commerce
6	Total Costs	Current expected total cost (50% support to governmental buildings with a ceiling of EGP 500 k for 16-25 projects)
7	Source of Financing	EEIP through the grant.

SN	Action	Procedures for improving the efficiency of lighting systems in public and private buildings- Phase II
8	Financial Incentives	- Technical support - Material support from EEIP - Coordination with other donors
9	Awareness	- 2 energy rationalization courses (one for engineers working at media agencies and the other for engineers participating in projects) - Awareness seminars
10	Saving Calculation Method	- Calculation of consumed power and energy in the current lighting system. - Calculation of consumed power and energy in the proposed lighting system. - Definition of work hours/ day, work days/ year. - Calculation of savings using the current lighting system – using the proposed lighting system. - After the end of the project, saving is calculated based on monthly electricity bills.

7-2-5 Pilot Projects

These projects include:

- Lightbulbs replacement project and the introduction of solar air-conditioning technology in the Ministry of Environment's buildings.
- The deployment of solar heaters in the residential sector and governmental facilities.

Table 7-7: Lightbulbs replacement project and the introduction of solar air-conditioning technology in the Ministry of Environment's buildings

SN	Action	Lightbulb replacement and the introduction of solar air-conditioning technology in the Ministry of Environment's buildings
1	Objective	The Memorandum of Understanding signed between the National Development and Reform Commission of the People's Republic of China and the Egyptian Ministry of Environment for the supply of energy-saving goods by the Chinese side to cope with climate change, with a grant of CNY 20 million (equivalent to USD 3 million) to help Egypt overcome climate change.

SN	Action	Lightbulb replacement and the introduction of solar air-conditioning technology in the Ministry of Environment's buildings
2	Description	- Replacement of traditional lightbulbs with other energy saving lightbulbs and the introduction of solar air conditioning technology at EEAA (main Building - local branches - cultural centre "Cairo House" – natural reserves, etc.). - Installation of 10,000 of capacity 7 W ball lamps. - Installation of 15,000 T8 tubes 9 W/22 lightbulbs. - Installation of 15,000 T8 tubes 18 W/22 lightbulbs. - Installation of 450 of capacity 20 W street lamps. - Installation of 1,185 of capacity 40 W street lamps. - Installation of 150 of capacity 50 W street lamps. - Installation of 50 of capacity 60 W street lamps. - Installation of 1,000 of capacity 60 W PV cells. - Installation of 106 1 HP air conditioners. - Installation of 200 1.5 HP air conditioners. - Installation of 300 2HP air conditioners. - Installation of 300 3HP air conditioners.
3	Implementing Agency	Energy Rationalization Unit at EEAA
4	Focal Point	EEAA's representatives
5	Stakeholders	EEAA – local branches – reserves – Cairo House
6	Implementation Costs	Grant of CHY 20 million (USD 3 million)
7	Total costs	Grant of CHY 20 million (USD 3 million) + technicians' wages
8	Source of Financing	Grant from China
9	Financial Incentives	Grant
10	Evaluation and Monitoring	Progress reports on installation works issued by bodies affiliated to EEAA and presented by the latter to SEESC.
11	Estimated Saving across the Sector	96.4 GWh by the end of the plan.

Table 7-8: Deployment of solar water heaters in the residential sector and governmental facilities

SN	Action	Deployment of solar water heaters in the residential sector and governmental facilities
1	Objective	Support using solar energy in water heating in houses and governmental facilities and saving energy, in addition to proposing a mechanism for funding the purchase of solar heaters.
2	Description	MoERE, represented by NREA, adopted the proposition to deploy 5,000 solar heaters over a 3-year period.
3	Implementing Agency	MoERE (NREA)
4	Focal Point	General Manager of Testing Department– NREA
5	Stakeholders	1. Phase 1: governmental facilities and ministries. 2. Phase 2: public schools 3. Phase 3: residential sector (new cities)
6	Implementation Cost	Euro 2.5 million (average cost of solar water heater is EGP 9,000, where 1 Euro = EGP 18)
7	Total costs	Euro 2.875 million
8	Source of Financing	Funding is required
9	Financial incentives	Funding 80% of the total cost through concessional loans from local banks with a maximum annual interest rate of 5% and a 3-year repayment period (36 months) to be recovered by charging it to electricity bills. Funding 20% of the total cost through available international grants or from EEF as to be agreed with SEESC.
10	Awareness	Organize programs for capacity building of technical cadres working in solar water heating systems and training them on the installation, operation, and maintenance of solar water heaters.
11	Saving calculation method (math equation)	Power saved annually by one solar heater of 2 m^2 = 5.23 kWh/ day per heater * 320 days/year = 1,674 kWh. Total energy saved = 1,674 * 5,000 * 3 = 25,110,000 kWh
12	Estimated Saving across Sector	25.11 GWh

7-3 Adjustments to the organizational frameworks of new buildings

7-3-1 Targeted procedures in accordance with the strategy of energy efficiency in buildings

This includes a group of short-term procedures (2015 – 2020), medium-term procedures (2021-2024) and long-term procedures (2025 – 2035).

A- Short-Term Procedures

First- Building codes application

Three buildings codes have been issued in Egypt; the first code for residential buildings, the second code for non-residential buildings, and the third code for public buildings. The responsibility of enforcing most laws and regulations lies with more than one entity, especially on the local level (municipalities).

Therefore, the strategy's objective, on the short-term, is to provide capacity building of specialists in municipalities to be able to inspect buildings and determine their level of compliance with codes set during the design phase and after implementation. Such procedures include:

- Documents to be submitted by real estate professionals and construction contractors during the implementation and design phase.
- Inspection and ratification of such documents.
- Developing an electronic registration system of the database of new buildings over which codes are applied, in parallel with the development of the energy information system.
- Issuance of energy efficiency performance certificates for new buildings (that show the building's level of compliance with the code and energy efficiency procedures), inspired by successful experiences and following EU models.
- Apply penalties in case of non-compliance with documents submitted by real-estate contractors.

  Developing procedures to be followed in new buildings, to take into consideration works, supplies, and services to facilitate contractors' and bidders' role in the implementation of the "green procurement" system. This system takes into consideration energy efficiency to develop technological innovation for tenders in the construction sector. The EEU in the buildings sector will be responsible for this initiative.

Second- Determine economically optimal technologies:

Energy efficiency controls in buildings include the selection of best technologies such as identification of solar shade, energy efficient air conditioners, large thermal storage area in the building's structure, the level of thermal isolation, and ventilation systems, taking into consideration the availability of such technologies in the international market, their technical and economic feasibility, climate conditions in Egypt, as well as the extent of their suitability and acceptance by the end user.

Economically optimal technologies will be selected based on the economic cost of the technology life cycle (LLC), where the outcome will form the inputs for a parcel of policies and procedures in the medium-term phase.

Third- PV and solar thermal electricity-production systems on rooftops of the buildings:

As an initial step for developing standard specifications for solar panels on existing buildings, is to coordinate among and consult with architects, engineers, administrators, senior management, academics, city planners, contractors, and end users. Solar heating systems are to be placed on top of new buildings. These procedures will continue during the medium-term phases while PV panels on rooftop of the buildings will be encouraged through FiT application.

Decree No. 2532 of 2016 was issued by the Cabinet determining FiT for a total of 300 MW for capacities less than 500 kW, and 2,000 MW for capacities exceeding 500 kW, which was expired on 28/10/2017. Amendment of Circular No. 1 of 2017 was issued to promote electricity production using PV power plants using net metering system for capacities up to 20 MW.

Connection and billing will be carried out by EDCs affiliated to EEHC.

B. Medium-Term Procedures

First- Application of economically optimal technologies:

Optional technologies that were applied on the short-term and have been proven to be both technically and economically feasible, will be included in building codes as obligatory procedures for new buildings, and priority buildings will be supported by soft loans.

Second- Incentives for solar heating systems

Establishment of a revolving fund to support solar water heating activities, taking into consideration that elimination of electricity subsidization will make such systems more economically feasible. This fund will finance about 25– 30% of investments to improve the economic feasibility of such solutions and will take into consideration the solar system instalment-based funding program added to electricity bills based on the successful experiences of other countries in this regard.

Third- Accreditation certificates for professionals and officers in charge of installing these systems

For system-installation professionals, an accreditation system will be developed to set out minimum requirements of qualifications and skills for engineers, architects, technicians, maintenance professionals, operation teams, and other workers in the field of construction. Two certificates will be offered; the first for technicians and the other for experts. Qualification courses will be organized for experts, such as the design and implementation of energy performance improvement procedures for buildings. As for technicians, there will be focus on practical training with the help of the Ministry of Education through the building EEU, in collaboration with the Supreme Council on Human Resource Development (SCHRD).

C. Long-term procedures

First- Application of funding mechanisms for energy efficient buildings

When the Egyptian market is ready, energy efficient buildings will be supported. Based on EU experience, Zero buildings - a term used to refer to low-energy consumption buildings, can actually exist if economic obstacles are addressed, in terms of capital recovery period, which may require provision of some financial support and incentives to reduce investment costs by combining soft loans at the beginning of the investment, and incentives to use renewable energy sources.

After 2030, standard specifications of Zero buildings will be obligatory for all new buildings in Egypt. Such procedures will encourage similar procedures to use solar heating systems and PV systems to meet 75% of energy needs in new buildings, taking into consideration energy efficiency standards in order that consumption reaches 30 kW/m^2.

7-3-2 Targeted Results

Table 7-9 Targets to be achieved during the strategy term

Short Term Targets	
Application of procedures over new buildings (10% improvement)	340,000 units
Identification of best economic technologies for new buildings	10 technologies
No. of installed solar water heating systems	20,000 systems
No. of installed PV systems	20,000 systems
Medium Term Targets	
No. of initial buildings on which energy efficiency standards are applied	30,000 units
Application of procedures over new buildings (20% improvements)	4,250,000 units
No. of installed solar water heating systems	800,000 systems

Long Term Targets	
Number of Zero buildings	30,000 units
Application of energy efficiency procedures over new buildings (30% improvements)	4,930,000 units

7-4 Energy efficiency procedures for buildings in the plan

First- Activation of energy efficiency codes in buildings

Table 7-10 Activation of energy efficiency codes in buildings

SN	Action Title	Energy efficiency code in buildings
1	Objective	MoU signed between MoERE and the Ministry of Housing to activate energy codes for existing and new buildings, for which a steering committee was formed, chaired by the First Undersecretary for Research and Planning, and to follow up with agencies and representatives of all concerned ministries.
2	Description	Compliance of all types of buildings with the Egyptian energy efficiency code for all types of buildings, upon issuing the necessary decrees that would ensure compliance at the time of issuing building construction and occupation licenses, as set out hereinafter: ▪ The Housing Research Centre will prepare a memo to be presented to head of the steering committee on the requirements needed for making a check list in addition to the required funding. ▪ The Centre will also prepare a list of the required material for buildings to be compliant with energy efficiency codes, to develop a mechanism for making such material available in the Egyptian market. ▪ The Federation of Egyptian Industries will coordinate with the Housing Research Centre to conduct a workshop with the construction department to introduce the energy efficiency codes for buildings and exchange views with the department members on how to implement such codes. ▪ EEHC will provide the committee with data on consumers according to their consumption levels. ▪ The Housing Research Centre will investigate the possibility of developing a tourism investor's guide on the application of energy efficiency codes over tourism projects, in addition to training courses for qualifying the energy manager of the establishment.

SN	Action Title	Energy efficiency code in buildings
3	Implementing Agency	Ministry of Housing –Ministry of Local Development – all governmental agencies responsible for the issuance of licenses.
4	Focal Point	Housing & Building National Research Centre (HBNRC)
5	Stakeholders	The steering committee including representatives of NUCA – MoERE –Urban Coordination Centre – Federation of Egyptian Industries –EEIP… etc. Consulting firms – Contractors – Urban communities.
6	Awareness	• Training course for engineers • Mass media and its awareness role • Teaching faculty of engineering students • Follow up with municipalities and new urban community bodies.
7	Evaluation and Monitoring	Follow up with municipalities and new urban community bodies.
8	Calculation of Savings	Using electronic programs to calculate energy savings which will account for approximately 40% of energy consumption.

Second- Solar Panel Installation in New Cities

Table 7-11 PV Power Plants' Installation in New Cities

SN	Action Title	Installation of Solar Panels in New Cities
1	Objective	Ministerial Decree No. 512 of 2014 on the establishment of CUSCRE at NUCA to develop required plans and strategies to ensure implementation of sustainable urban green standards in new cities, especially with regard to energy use, and the provision of technical and technological support as well as required consultations and studies, whether in existing or future new cities. The Presidential Circular on energy rationalization and the use of new and renewable energy sources.
2	Description	Installation of 14 PV power plants of a total capacity of 920 kW in the cities of New Tiba, 6th of October – Borg El Arab- El Salheya- 15 May- Fayoum- Beni Suef- Sheikh Zayed- New Miniah- New Qena.

SN	Action Title	Installation of Solar Panels in New Cities
3	Implementing Agency	CUSCRE and the Electricity Department affiliated to NUCA.
4	Focal Point	Eng. Gamal Talaat Badawy. Dr. Mohamed Abdellatif Abdelhaleem
5	Stakeholder	Residential Buildings Sector at NUCA and its agencies.
6	Implementation Costs	EGP 12.76 million
7	Total Costs	EGP 12.76 million
8	Source of Financing	Self-funding (NUCA and affiliated bodies)
9	Estimated Saving across Sector	The project started in April 2015 and saved EGP 476,836 to date and is still ongoing.

Third- Grid-Connected Small-Scale PV Power Plants in partnership with the Industry Modernization Centre (IMC)

SN	Action Title	Grid-Connected Small-Scale PV Power Plants
1	Objective	The project strategy builds on the government initiative to develop small-scale renewable energy projects
2	Description	Establishment of 4 MW Distributed PV power plants The project will reduce 66 kT of CO_2 emissions
3	Implementing Agency	National project for small-scale grid-connected PV power stations
4	Focal Points	Dr. Hind Farouh – Project Manager
5	Stakeholders	IMC in collaboration with UNDP
6	Implementation Costs	USD 3.3 million
7	Source of Financing	UNDP

Fourth- Solar Heaters Installation in New Cities

Table 7-12 Solar Heaters Installation in New Cities

SN	Action	Solar Water Heaters Installation in New Cities
1	Objective	Preparation of a draft ministerial decree to gradually deploy the use of solar water heaters in residential and services sectors. A ToR was prepared for procurement of the solar water heaters in collaboration with NREA.
2	Description	- Installation of solar water heaters for 96 housing units (social housing) in New Tiba. - Installation of solar heaters for 200 housing units (social housing) in El Sadat City.
3	Implementing Agency	Sustainable Cities and Renewable Energy Central Unit and the Electricity Department affiliated to NUCA.
4	Focal Point	Eng. Gamal Talaat Badawy. Dr. Mohamed Abdellatif Abdelhaleem
5	Stakeholders	Housing Sector at NUCA and its agencies
6	Total Costs	EGP 1,830,575
7	Source of Financing	NUCA (New Tiba Municipality) in collaboration with Shamsek Ya Misr Initiative of the Energy Rationalization Unit at the Council of Ministers. El Sadat City Municipality (self-funding).
8	Estimated Saving across Sector	Estimations and saving calculation are underway due to the incomplete occupancy of social housing buildings for which solar water heaters have been installed.

Chapter 8- Energy Efficiency Procedures in the Tourism Sector

8-1 Overview

Transforming Egypt's tourism sector into a more sustainable sector requires combining all energy efficiency activities into a single parcel on both supply and demand sides. Dealing with energy efficiency issues in commercial sectors, generally, requires a parcel of measures that support energy efficiency during the phases of hotel construction and operation, as well as during the marketing phase. As this sector provides luxury for consumers, this may result in high energy consumption behaviours.

It should be noted that there are a number of programs already in place to rationalize energy in the tourism sector, such as the following:

- **Green Star Hotel Initiative**: This is a national environment certificate and capacity building program designed for the hotel sector in Egypt. It aims to encourage hotels and resorts to improve performance of the tourism environment and achieve sector sustainability.
- **Memoranda of Understanding in the Green Energy Field** in the tourism sector that provides incentives for disseminating the green energy system.
- **Energy Saving Program in the Tourism Sector** funded by UNEP through MEDREP to help deploy the use of solar heaters and energy efficiency technologies in the Red Sea and South Sinai hotels and resorts.
- **Diesel to Solar Initiative** adopted by the green tourism unit at the Ministry of Tourism, which promotes the development of technical and economic studies to determine the feasibility of solar energy use in Marsa Alam.

8-2 Energy Efficiency in the Tourism Sector according to ISES 2035 on

The following table depicts the required short-term procedures (2015 – 2020) medium-term procedures (2021-2024) and long-term procedures (2025-2035).

It is clear that most of the short-term policies are complementary to current undergoing programs in addition to awareness and capacity building activities as shown in the following table. Medium-term procedures include introduction of energy efficiency technologies and technical reviews in the tourism sector. Where education in the field of tourism in Egypt focuses on three main sections; hotel management, historical and geographical curricula for tour guides, and hospitality studies, such curricula need to be developed to include studying energy management in hotels to allow workers in the hotels sector to develop the energy system in hotels, in addition to introducing more specialized post-graduate studies in the field of energy management and scholarships through GTUHTW, TDA, CTE and EHA. It is suggested that hotels provide scholarships to its staff.

Additionally, it is necessary to tackle one of the key challenges faced by hotels at present, which is the outdatedness of air-conditions and the use of non-energy efficient water heating technologies as 65% of these technologies are over 10 years old. One of the main medium-term goals is to implement a (replacement) program for these technologies through GTUHTW and the provision of required funding for that program.

Long-term procedures include promotion of Egypt as a sustainable tourist destination over several phases until the general outlook of tourism in Egypt is changed on both the tourist level and the investor level. Moreover, it is necessary to launch a number of media campaigns to promote Egypt as a sustainable tourist destination after the publication of Egypt's ISES 2035 and the establishment of the green tourism unit at the Ministry of Tourism. The green star rating program is also considered one of the key reliable programs in the field of energy efficiency. The Ministry of Tourism will begin to oblige hotels to obtain this certificate and link it to the STARS system so that energy efficiency can be incorporated as a commercial system in the marketing of hotels. This will also act as a catalyst for hotels to achieve progress concerning energy efficiency procedures. Further the electricity tariff will be set to include incentives to improve the efficiency of energy use in tourism facilities.

Table 8-1 Energy Efficiency Procedures in the Tourism Sector according to ISES 2035

	Institutional Procedures	**Encourage demand for energy efficiency**	**Disseminate energy efficiency technologies**	**Market mechanisms and pricing**
Short Term	Energy efficiency manager and Register	Awareness and capacity building	Expansion of the green star rating program	Expand existing funding mechanisms
Medium Term	-----	Capacity building on the use of energy information system for energy efficiency teams in hotels	Introduction of energy efficiency technologies and provision of training on their use in tourism institutes	Implementation of the technologies replacement program in the tourism sector
Long Term	-----	Promote Egypt as a sustainable tourist destination	Oblige hotels to earn energy efficiency certificates	Re-pricing of energy in the tourism sector

Based on the above-mentioned procedures, the following deliverables are expected:

Table 8-2 Expected deliverables from the implementation of energy efficiency procedures in the tourism sector

Expected Short Term Results	Forecasts
No. of qualified staff in hotels	2,000
No. of renovated rooms	100,000
Media campaigns and their evaluation	1
Expected Medium-Term Results	
No. of renovated rooms	150,000
No. of rooms in which air conditions have been renovated	50% of total rooms
Expected Long-Term Results	
No. of rooms in which air conditions have been renovated	Remaining rooms

8-3 Energy efficiency procedures in the tourism sector according to NEEAP

8-3-1 Support deployment of solar water heaters in tourism facilities in the Red Sea and South Sinai (EGYSOL)

8-3-1-1 Activities during the previous years:

- Within the framework of the memorandum of understanding signed between NREA, IMELS and UNEP, with the participation of TDA, to promote the use of solar water heaters in the Red Sea and South Sinai hotels.
- The plan's objective is to install of 6,000 m^2 of solar water heaters.
- During the first phase, the specialized work group at TDA's Solar Water Heating and Energy Rationalization Department will conduct a technical study on water solar-heating systems for 30 hotels covering the total area of 3,820 m^2 of solar water heaters.

Table 8-3 Completion of EGYSOL Project

SR	Action Title	Completion of EGYSOL Project
1	Objective	- This project aims at the deployment of solar water heaters in the Red Sea and South Sinai hotels according to the memorandum of understanding signed between NREA, IMELS and UNEP, with the participation of TDA. - The total amount of funding provided by IMELS is USD 500,000 to install 6,000 m^2 of solar water heaters.
2	Description	- Technical evaluation and receipt of solar water heating systems of a total area of 1,180 m^2. - Through this mechanism, financial support of 25% of the total cost of the solar heating system will be provided to each hotel in addition to partial support of maintenance costs for 4 years.
3	Implementing Agency	- NREA
4	Focal Points	- Eng. Raafat Abdel Kader – General Manager of the Thermal Systems and Energy Rationalization Department, NREA. - Eng. Sahar Fouad Yousef – Chief Engineer of the Thermal Systems and Energy Rationalization Department, NREA.
5	Stakeholders	- Hotel facilities in the Red Sea and South Sinai.
6	Implementation Costs	- USD 500,000.
7	Total Costs	- USD 2 million.
8	Source of Financing	- Local funding (hotels) – NREA
9	Financial Incentives	- Support in the amount of 25% of the total cost - Partial contribution to maintenance costs for the first 4 years as set out hereinafter: - USD 4 per m^2 for the first 2 years – then USD 3 per m^2 for the following 2 years.
10	Awareness	- Organize capacity building programs for technical cadres working in the field of solar heating systems on the installation, operation, and maintenance of solar heaters.

SR	Action Title	Completion of EGYSOL Project
11	Evaluation and Monitoring	- Study by NREA and UNEP of the documents sent by the system supplier. - Send a specialized team from NREA after system installation to ensure its conformity with the documents sent, to conduct required inspections to ensure quality operation of the system, and to prepare a report supported by images to be sent to UNEP for consideration and study.
12	Saving Calculation Method (math equations)	- According to the submitted study among the project documents, saving is expected to reach 835 kWh/year for every 1 m^2 of solar water heaters.
13	Expected Saving	- 5,010 GWh

8-3-3 Use of solar water energy and energy rationalization technology in hotel facilities

Table 8-3 Use of solar energy and energy rationalization technology in hotel facilities

SN	Action Title	Use of solar energy and energy rationalization technology in hotels through joint investments between the Ministry of Tourism and hotel owners
1	**Objective**	- To protect the environment by shifting to green tourism in order to reduce greenhouse gases. - To increase hotels competitiveness. - To increase the tourism sector's ability to cope with reduced energy subsidization and to face expected energy prices for the hotels sector in light of current occupancy rates.
2	**Description**	To implement a pilot project in 6 to 10 hotels aiming to set an investment model to motivate hotels to use energy efficiency and solar energy technologies (either for electricity production or for water heating purposes) such as energy efficient lighting (LED).
3	**Implementing Agency**	Green Tourism Unit
4	**Focal Points**	Dr. Elham Fouda, Executive Director of the Green Tourism Unit
5	**Stakeholders**	Egyptian Hotels Association (EHA) NREA EgyptERA

SN	Action Title	Use of solar energy and energy rationalization technology in hotels through joint investments between the Ministry of Tourism and hotel owners
6	**Implementation Costs**	EGP 20 million
7	**Total Costs**	EGP 20 million
8	**Source of Financing**	Tourism Fund
9	**Financial Incentives**	Provision of financial incentives by lending some hotels two thirds of the project cost without interest, while if the hotel's occupancy rate exceeds 60%, the loan will be returned to the fund at the rate of USD 1/ room/day
10	**Awareness**	Several seminars to promote the project
11	**Monitoring and Evaluation**	Technical support proposal by MoERE (EEIP) to assess the projects prior to and after implementation.
12	**Calculations of Savings (math equations)**	Electricity bills issued to grid-connected hotels and electricity produced for self-electricity- generating hotels.

Chapter 9- Energy Efficiency Procedures in the Sector of Industry & SME's

9-1 Introduction

Based on the electricity consumption indicators report on industrial activities in 2014/2015 issued by EgyptERA, the number of subscribers in industrial activities with a contractual capacity of 10 kW and above, reached 87,064 subscribers, accounting for 37.3% of total subscribers in economic activities (any activity except electricity consumption in residential and commercial stores), marking an annual consumption of 438,073 GWh in 2014/2015, representing 61.29% of electricity consumption in economic activities, and accounting for 26.09% of the overall electricity consumption for all purposes in Egypt.

As for small-scale industrial activities with a contractual capacity of less than 10 kW, total consumption during the financial year 2014/2015 reached approximately 7,168 GWh, representing 44% of the total electricity consumption in the industry sector, and representing 11% of the overall electricity consumption in Egypt.

Intensive-energy industries, such as those of iron & steel, cement and aluminium, account for 17.54%, 17.17% and 12.97% respectively of total energy consumption in the industry sector, representing a total of 68.47% of overall energy consumption. This is followed by food industries, spinning & weaving, rubber & plastics and chemical Industries which accounted for 9.29%, 7.1%, 4.13% and 3.74% respectively of overall energy consumption in the industry sector.

The qualitative consumption of some intensive-energy industries is illustrated in the following table from the same source:

Table 9-1 Qualitative consumption of some intensive-energy industries in Egypt in 2014/2015

Industry	Qualitative Energy Consumption Rate	Unit
Aluminium	14,618	kWh/ Ton
Iron and Steel	848	kWh/ Ton
Fertilizers	249	kWh/ Ton
Cement	150	kWh/ Ton
Ceramics	8	kWh/m²

9-2 Improving Energy Efficiency use in the Industry Sector as per ISES 2035

ISES 2035 outlined a parcel of procedures to improve energy efficiency in the Industry sector, as follows:

- Procedures for energy-intensive industrial sectors.
- Cross-cutting energy efficiency procedures across various sectors.
- Maximization of the energy efficiency market in the industrial field.

This is illustrated in the following table:

Table 9-2 Parcel of procedures relating to energy efficiency in the industry sector according to ISES 2035

Sector	Institutional Procedures	Increased demand for energy efficiency	Dissemination of energy efficiency related technologies	Market mechanisms and pricing
Energy-intensive industries sector	- Completion of establishment of sectorial EEUs - Monitoring and evaluation - Completion of the energy efficiency managers and register system	- Assessment of energy efficiency potentials - Energy auditing planning - Awareness campaigns about projects	- Technical support - Identification and adoption of the best available technologies	- Financial mechanisms - Pricing policies
Cross Cutting Programs across sectors	- Completion of establishment of sectorial EEUs - Monitoring and evaluation - Completion of the energy efficiency managers and register system	- Pilot projects - Availability of means to disseminate information - Setting of negotiation models	- Support energy management systems - Technical support - Identification and adoption of the best available technologies	Support system (including FiT for co-generation)
Shift the energy efficiency market to the industry sector	- Institutional development of EEUs - Monitoring and Evaluation	- Develop models for negotiation - Compulsory plan for energy auditing	- Compulsory adoption of the best available technologies	Advanced funding mechanisms

The above procedures were spread over short term procedures (2015-2020), medium term procedures (2021-2024) and long-term procedures (2025-2035) as illustrated in the following table:

Table 9-3 Parcel of policies relating to sectorial programs in the industry sector

	Institutional Procedures	Increased demand for energy efficiency	Disseminate energy efficiency related technologies	Market mechanisms and pricing
Short term	- Finalize the procedures of institutional development, measurement system and monitoring & evaluation	- Assessment of energy efficiency market potentials - Energy auditing planning - Media Campaigns	N/A	- Develop funding mechanisms to provide the necessary funds for energy efficiency improvement applications
Mid-term	N/A	- Continued application of the energy auditing program	- Identify best available technologies	- Implementation of the financial plan - Develop pricing to stimulate energy efficiency improvement procedures
Long term	N/A	- Continued application of the energy auditing program	- Adopt the best available technologies and practices	- Continued application of the funding system

Based on the above procedures, the following outcomes are forecasted:

Table 9-4 Expected outcomes of energy efficiency improvement procedures according to ISES 2035

Expected short term outcomes	No.
Final report on market assessment and energy efficiency improvement potential	1
Number of detailed energy audits for intensive-energy industries	50
Number of pilot projects in intensive-energy industries	30
Investment in pilot projects in intensive-energy industries	30
Develop financial system to support investments in energy efficiency improvement	1
Expected medium term outcomes	
Final report on market assessment and energy potential	1
Identify best available technologies in intensive-energy industries (5 industries)	5
No. of energy management systems implemented in intensive-energy industries	100
Investment to implement the national funding 5-year plan for intensive-energy industries	100
No. of in intensive-energy industries that contribute to implementing the national funding plan	100
Design of pricing system to stimulate energy efficiency improvement procedures	1
Expected long term outcomes	
Repetition of energy audits of intensive-energy industries on short and medium terms	100
Implementation of a number of compulsory procedures	550
Investment to implement best available technologies in industrial operations	2,750

9-3 Proposed energy efficiency procedures in the industrial sector in NEEAP 2017-2020

These procedures can be classified in NEEAP as follows:

9-3-1 Project for use of highly efficient electric motors in the industry

Table 9-5 Project for use of highly efficient electric motors in the industry

SN	Action Title	Project for use of highly efficient electric motors in the industry (program on transfer of high-efficiency advanced technology in the industry)
1	Objective	- Set policies relating to the exportation of highly efficient electric motors, as well as developing standard criteria to manufacture electric motors by increasing the local manufacturing of electric motors components. - Promote local manufacturing of highly efficient electric motors. - Design parcel of procedures to develop use of electric motors (quality standards and specifications)
2	Description	- Prepare and adopt standard specifications for electric motors IE1, IE2, IE3 through EOS. - Audit energy consumption in electric motors by consulting team in collaboration with Lawrence Berkeley Lab through conducting field missions to 100 factories and to identify and apply the following goals: • Set policies for regulations governing electric motors of a capacity of 1-200 kW. • Design technical specifications for electric motors, whether re-rolled or new. • Provide assistance to establish labs for measuring the efficiency of electric motors, in collaboration with EOS, MoERE and ENCPC. • Technical capacity building to implement the project. • Increasing local manufacturing of electric motor components. - Implementation of the project will start in October 2017 and the product is expected to be available in Egypt as of 2019
3	Implementing Agency	ENCPC- Ministry of Industry
4	Focal Point	Dr. Ali Abu Sina- Manager of ENCPC Eng. Mohamed Mahmoud, Manager of Energy Department- ENCPC
5	Stakeholders	Various industrial sectors

SN	Action Title	Project for use of highly efficient electric motors in the industry (program on transfer of high-efficiency advanced technology in the industry)
6	Implementation Costs	Depends on the factory size of SMEs (100 factories)
7	Total Costs	USD 3.2 million
8	Source of Financing	International Finance Corporation (IFC)
9	Financial Incentives	Provide support to improve the efficiency of electric motors through performing electric measurements at factories to identify the efficiency of used electric motors and issue technical recommendations either to change or re-roll motors, and to provide capacity building for laborers engaged in the electric motor industry
10	Awareness	Launch training programs in collaboration with stakeholders (develop specifications of electric motors and plans to increase the local manufacturing of electric motor components)
11	Monitoring and Evaluation	Monitor energy consumption based on electricity bills before and after implementation
12	Calculations of savings	Through field study prepared by the consultant team from Lawrence Berkeley Lab
13	Estimated Savings across Sector	- It is expected that the project will save over 3 TWh for electric motors users in commercial and industrial sectors, as well as USD 560 million and 1,100 MW by 2030. It is expected that savings will increase to 11 TWh translated into USD 2 billion by 2050. - According to the mentioned study, savings were calculated for the period starting 2019 and ending on June 2020 at approximately 270 GWh.

9-3-2 Solar energy applications used for heating processes in industry

Table 9-6: Solar energy applications used for heating processes in industry

SN	Action Title	Solar Energy applications in heating processes in industry
1	Objective	The agreement signed between Ministry of Industry and United Nation Industrial Development Organization (UNIDO) to activate the project on using solar energy for heating purposes in industrial applications aiming to avoid using traditional energy sources in heating applications.
2	Description	- Implement a number of pilot projects to use solar energy in heating processes in the industrial sector by using solar energy for running industrial applications (in food Industries, chemicals, textiles) for 100 establishments, during the 4-year period of the project. - Implementation will take place in 35 industrial facilities during the first year and the rest will be divided over 3 years. - Design innovative financing parcels amounting to USD 2 million with low interest rates to be identified in the study and in a way that realizes economic feasibility. - Technical assistance for the industrial facility will include the following: ▪ Setting a number of standard specifications and the necessary manufacture and installation criteria. ▪ Accreditation of solar heater labs. ▪ Technical capacity building. ▪ Setting an information-exchange mechanism between solar water heaters manufacturers. ▪ Design of the aforementioned financial parcels.
3	Implementing Agency	ENCPC
4	Focal Points	Dr. Ali Abu Sina- Manager of ENCPC Eng. Mohamed Mahmoud, Manager of Energy Department, ENCPC
5	Stakeholders	- Ministry of Industry represented by ENCPC - UNIDO - SME's in the industrial sector (food, chemicals and textiles). - NREA- EOS
6	Implementation costs	Around USD 5.4 million for technical assistance + USD 2 million
7	Overall costs	USD 5.6 million

SN	Action Title	Solar Energy applications in heating processes in industry
8	Source of Financing	UNIDO
9	Financial Incentives	Design innovative financing parcels worth USD 2 million to implement new projects for using solar energy in heating applications
10	Awareness	Capacity building for 200 Egyptian calibers in the field of manufacturing, installation, and maintenance of solar energy technologies.
11	Monitoring and Evaluation	Energy efficiency procedures will be asserted periodically.
12	Calculations of Savings	According to the study conducted for this project, solar water heating will save 5% of overall savings and 10% of electricity.
13	Estimated Savings across Sector	Savings of 4.5 GWh during the period 2017-2020.

9-3-3 Transfer of Environmentally Sound Technologies in Mediterranean Basin Countries (MED-TEST)

Table 9-7: Transfer of Environmentally Sound Technologies in Mediterranean Basin Countries- MED-TEST II

SN	Action Title	MED TEST II
1	Objective	Support Egyptian industries by rationalizing consumption of resources (energy and raw material) through the provision of technical support.
2	Description	Calculate the amount of raw material and energy consumed, based on which experts would develop a database for realizing the optimum use of raw material that would lead to saving raw material and energy used in the manufacturing process.
3	Implementing Agency	ENCPC
4	Focal Point	Dr. Ali Abu Sina, ENCPC Director Eng. Maysara, ENCPC
5	Concerned entities	ENCPC and UNIDO
6	Implementation costs	Depends on the SME factory size (30 factories)

SN	Action Title	MED TEST II
7	Overall costs	USD 440k
8	Source of Financing	SWITCH-MED (UNIDO)
9	Financial Incentives	- Design a parcel of procedures and incentives to encourage the transfer of environmentally sound technologies in selected sectors. - Knowledge transfer and national capacity building concerning mechanisms for the transfer of environmentally sound technologies. - Transfer of environmentally sound technologies and energy rationalization in 30 companies.
10	Awareness	Hold workshops and training courses for participants to support awareness raising on the use of resources (raw material and energy).
11	Monitoring and Evaluation	Through project's national experts and the issuance of technical reports to participating companies
12	Calculation of Savings method	- Due to the different types of industries and project sizes, there is no case study based on which saving calculations can be made to generalize them over other cases. - Determine the value of savings of resources for each production unit and comparing it with international best practices.
13	Estimated Savings across Sector	It is expected that the project will achieve savings of around 20-30% of energy and raw material used.

9-3-4 Pilot project on usage of low carbon technologies in industrial applications

- Activities carried out during phase I:
  - Assessment of the current situation of climate change and carbon emissions resulting from various industrial sectors in Egypt and their impact on various fields, such as industry, agriculture and tourism.
  - Preparation of two reports on the sector of frozen vegetables and fruits and the sector of processed and frozen meats in Egypt, the impact of climate change on all manufacturing stages in these two sectors and how to mitigate such impact.
  - Assessment of the two aforementioned sectors, including identifying different opportunities to apply environmentally sound technologies to mitigate greenhouse emissions.

- Activities carried out during phase II:
    - The technical committee and stakeholders (Chamber of Food Industries (CFI), EEAA, UNIDO, technical section at the Embassy of Japan in Egypt, …etc.) conducted a study and assessment of the outcomes of phase I, prepared for phase II, and set the selection criteria for participating companies in the project.
    - A workshop was conducted with participants from 40 companies in the food industries sector in Egypt, in addition to some stakeholders such as CFI, EEAA, IDA and UNIDO representatives, to present the outcomes of phase I of the project as well as to promote for the activities of phase II and to introduce the conditions for participating in the project to the attending companies.
    - A visit was made to 20 companies from the food industries sector which showed their interest to participate in the project.
    - A preliminary technical evaluation was conducted for the 20 visited companies.
    - 12 companies were selected to participate in the project based on the preliminary technical evaluation as well as the selection criteria set in collaboration with the project's technical committee and UNIDO.
    - A detailed technical evaluation of the selected companies was conducted to assess their environment-related conditions, in terms of energy and water consumption, as well as emissions and pollutant rates, to be compared with environmental limits set out in the Egyptian Environment Law in order to develop the best technical proposals to be applied over the factories and to conduct a technical and economic study of these proposals.

Table 9-8 Use of low carbon technologies in industrial applications- Phase II

SN	Action Title	Use of low carbon technologies in industrial applications- phase II
1	Objective	In light of cooperation between ENCPC and UNIDO, it was agreed to apply the project over the food industries sector, particularly, frozen vegetables & fruits, and frozen meats to achieve the following goals: ▪ Improve environment-related conditions of participating companies in the project. ▪ Provide financial support to implement the propositions for 2 out of 12 factories for which technical support was provided.

SN	Action Title	Use of low carbon technologies in industrial applications- phase II
2	Description	- Procurement of technical equipment of Japanese origin for one or more of the companies for which the proposed environment solutions will be applied. UNIDO will appoint a Japanese technical expert to engage with the technical committee, that will consist of members from ENCPC and the Ministry of Trade and Industry to visit the companies which have undergone comprehensive evaluation in phase II, to perform a detailed technical and financial assessment for the proposed environmental solutions and choose the best solutions with great environmental and financial return, to apply them over one or more companies and to procure the necessary equipment for implementing these propositions, provided that these technological solutions are available for other companies as a model that can be repeated through a contractual model to be approved upon between the Ministry of Trade and Industry and such companies. - Calculate the quantity of carbon emissions resulting from energy consumption in industry based on opportunities of energy rationalization inside the factory.
3	Implementing Agency	ENCPC UNIDO Ministry of Foreign Affairs in Japan
4	Focal Points	Dr. Ali Abu Sina- ENCPC Director Eng. Mohamed Mahmoud, Energy Department Manager- ENCPC
5	Stakeholders	ENCPC- UNIDO
6	Implementation Costs	Depends on the SME factory size (100 factories)
7	Overall Costs	USD 109k
8	Source of Financing	Ministry of Foreign Affairs in Japan
9	Financial Incentives	- Apply climate change adaptation technologies in 30 factories- special audit. - Conduct thorough audit of 12 factories. - Transfer technologies by applying the project over 2 of the participating factories.
10	Awareness	Conduct training workshops for participants to raise awareness on using resources (raw material and energy).

SN	Action Title	Use of low carbon technologies in industrial applications- phase II
11	Monitoring and Evaluation	Through project's national experts and the provision of technical reports to participating companies according to the project plan.
12	Calculations of Savings	Calculate the quantity of carbon emissions and transform it to equivalent quantity of fuel equivalent used as a result of energy consumption rationalization.
13	Estimated Savings across Sector	It is expected that if the project is applicable on the rest of the companies in the targeted sectors, then it will save about 30% of fuel usage and hence, cause low carbon emissions from the aforementioned sectors.

Chapter Ten- Energy Saving in Public Lighting

10-1 Introduction

Several authorities oversee street lighting, such as the Ministry of Transportation's Roads & Bridges Authority, which is concerned with lighting on highways between cities and governorates, while municipalities are in charge of the lighting of internal roads, whereas main roads axes within the cities are directly operated by governorates. On the other hand, the lighting system in new cities and urban communities, constructed by NUCA, are operated by the city authorities affiliated to NUCA. However, there are some exceptions. For instance, street lighting within Alexandria governorate is operated by Alexandria EDC.

This diversity of competent authorities overseeing street lighting, as well as the differences in technical capacities and contracting procedures, have resulted in the non-efficient operation of the lighting network.

10-2 Improving energy efficiency of public lighting pursuant to ISES 2035

Pursuant to ISES 2035, the actions proposed for energy efficiency improvement for public lighting purposes, are divided into short-term actions (2015-2020), medium-term actions (2021-2024), and long-term actions (2025-2035). The table below demonstrates the target procedures over different phases:

Table 10-1: Actions proposed for energy efficiency improvement for public lighting purposes on the short-term, medium-term, and long-term pursuant to ISES 2035.

	Institutional Regulations	Increasing Demand for Energy Efficiency	Spread of Energy Efficiency Technology	Market Mechanism & Pricing
Short Term	Establishment of EEUs in the Ministries of Local Development and Transportation	Capacity building on the level of municipalities	Improvement of quality control over local and imported public lighting components	Execution of existing initiatives
Medium Term	holding tenders through the PPP initiative for improving the energy efficiency of public lighting	Information exchange with governmental officials and decision makers	Installation of smart meters for monitoring and performance evaluation	To secure mechanisms for financing energy efficiency applications
Long Term	N/A	Deploy "Khod Balak" mobile application	Pave way for the use of LED lightbulbs and other advanced technologies	N/A

10-3 Existing Initiatives

A. Replacement of sodium lamps with low pressure sodium lamps (PSLs), the initiative of Improving Energy Efficiency of Lighting and Other Building Appliances "IEELBA" financed by UNDP, and using LED lightbulbs, sensors and advanced technology to control street lighting.
B. The study conducted by the team of consultants TARES over Alexandria, as a case study, recommended the replacement of traditional lightbulbs with LED lightbulbs, using dimming control, digital timers and other modern technologies.
C. Streamlining "Khod Balak" mobile application.

In May 2014, EgyptERA developed the advanced mobile application "Khod Balak," which allows users to report public lights that are turned on during daytime and to specify their locations on google map. It is worth mentioning that during the first two weeks, 173 lighting poles were reported to be operating during daytime. To date, the application attracts thousands of users. It was thus set as a long-term procedure as its use is expected to spread among citizens. Upon using the application and with the spread of smart phones and the availability of data through the application, the necessary measures will be taken to overcome the mis-operation of the public lighting system.

Table 10-2 Expected Results as per ISES 2035

Expected Short Term Results	Number
No. of qualified technicians in 28 governorates	56
No. of replaced lightbulbs used for public lighting and similar purposes in Alexandria.	300,000
Expected Medium Term Results	
Percentage of upgraded public lighting on roads in proportion to total road lighting in Egypt.	25 %
Expected Long Term Results	
Percentage of upgraded public lighting on roads to total road lighting in Egypt.	100%

10-4 Procedures for improving energy efficiency of street lighting pursuant to NEEAP

10-4-1 Improving energy efficiency of public lighting

Within the framework of the contract concluded between the Ministries of Local Development, Finance, MoERE, and the Arab Organization for Industrialization (AOI) to reduce consumption in public lighting (street light poles), through the supply and installation of 2.6 million energy efficient lights and timers, around 2 million lights and 8,000 timers were installed up until June 2018. Coordination took place with the electricity police directorate to develop a comprehensive electricity anti-theft plan.

MoERE contacted the Ministries of Local Development and Transportation for taking the necessary measures for saving energy used for advertisements on main roads, bridges and city roads by replacing existing light systems with LED and reflective lights instead of internal lighting in advertisements boards and tying renewal of licenses to abidance by the foregoing, in addition to encouraging granting new licenses upon using solar energy for street advertisements. Instructions were also given not to connect any electric currents to billboards that do not use energy saving lighting systems.

Table 10-3 Saving energy used in public lighting

	Action Title	Saving energy used in public lighting
1.	Objective	The contract concluded between the Ministries of Local Development, Finance, MoERE, and AOI.
2.	Description	Supply and installation of 2.6 million energy efficient lamps, related accessories and timers for street lighting, where the action includes carrying out the following: ▪ Replacement of the high capacity road lamps (i.e. 400 watt sodium bulbs) or non-energy efficient ones (mercury and incandescent lightbulbs) with energy efficient lightbulbs (high efficiency sodium bulbs of 100, 150 watt or LED lightbulbs) of suitable capacities to achieve the standard levels of lighting for roads based on the road type in accordance with international standards.
3.	Executing Agency	▪ EEHC and affiliated entities. ▪ Local municipalities.
4.	Focal Points	Dr. Salwa Aly Ahmed, General Manager of Energy Efficiency, EEHC.
5.	Stakeholders	▪ Ministry of Finance (financing). ▪ MoERE (technical support). ▪ Ministry of Local Development (execution).
6.	Action Cost	EGP 240 million.
7.	Source of Finance	Ministry of Finance.
8.	Financial Incentives	Reduction of electricity consumption bills for public lighting, which are borne by the Ministry of Finance.
9.	Awareness	Advising local bodies in all Egyptian governorates of procedures to be followed for replacement and renovation of lighting systems, the best design for new roads, and specifications of energy efficient lighting equipment, in addition to holding training courses for employees on energy efficient lighting equipment including installation thereof.

	Action Title	Saving energy used in public lighting
10.	Monitoring & Evaluation	Electricity bills.
11.	Saving Calculation Method	Compare consumption before and after application of the Action.

10-4-2 Program for Road Lighting using PV Modules

On August 2014, a strategy was adopted for using renewable energy in new cities and villages constructed by NUCA. It began to be applied from Borg El-Arab, Alexandria to Aswan. Ten PV power plants were established and were used for lighting road poles within and outside the city.

The first phase of the program included the installation of central PV power plants for roads' lighting (LED lightbulbs and PV cells were used) worth a total cost of EGP 20 million, as set out hereinafter:

- Tiba - Qena Desert Road in New Tiba City.
- Nile Sat Road at 6th October City.
- Installation of 128 kW central PV power plant over a 6.6 Km distance for purposes of lighting Al-Brigat Road in Sadat City.

The second phase of the program will be implemented to include the activities detailed in the table below.

Table 10-4: Road Lighting using PV Modules- Phase II

SN	Action Title	Road Lighting using PV Modules- Phase II
1.	Objective	Ministerial Decree No. 512 of 2014 on establishment of CUSCRE at NUCA, to be responsible for developing plans and strategies required to guarantee meeting sustainable green urban standards in new cities, particularly in aspects relating to energy usages, provision of technical support, and provision of relevant consultations and studies, whether on the level of existing or future new urban cities.
2.	Description	Bidding procedures and deciding on financial and technical offerings are underway for 3 PV power plants with different capacities (70 kW, 160 kW and 130 kW)from which electricity will be provided for roads' lighting purposes.

SN	Action Title	Road Lighting using PV Modules- Phase II
3.	Executing Agency	CUSCRE, and Electricity Department at NUCA.
4.	Focal Points	Representative of NUCA.
5.	Stakeholders	Housing Buildings Sector at NUCA, and municipalities.
6.	Action Cost	Estimate Cost of EGP 50 million.
7.	Source of Finance	Self-finance by NUCA
8.	Financial Incentives	Application of Net Metering scheme
9.	Monitoring & Evaluation	Through electricity consumption as reflected in electricity bills, and periodic reports issued by bodies affiliated to NUCA.
10.	Saving Calculation Method	Electricity consumption bills.

10-4-3 Replacement of streets' lightbulbs overseen by NUCA

EGP 150 million was allocated for the first and second phases of internal and external lighting projects.

Table 10-5 Phase II of the Project for Replacing Regular Lamps with Electricity-Saving Lamps for Lighting Roads overseen by NUCA

SN	Action Title	Phase II of the Project for Replacing Regular Lamps with Electricity-Saving Lamps for Lighting Roads overseen by NUCA
1.	Objective	▪ Ministerial Decree No. 512 of 2014 concerning establishing CUSCRE at NUCA, to be responsible for developing plans and strategies required to guarantee meeting sustainable green urban standards in new cities, particularly in aspects relating to energy usages, provision of technical support, and provision of relevant consultations and studies, whether on the level of the existing or new urban cities. ▪ The Circular issued by the Presidency advocating saving energy and using new and renewable energy.
2.	Description	Replacement of the non-energy efficient lightbulbs with LED ones in NUCA buildings and roads in new cities.

SN	Action Title	Phase II of the Project for Replacing Regular Lamps with Electricity-Saving Lamps for Lighting Roads overseen by NUCA
3.	Executing Agency	CUSCRE, and the Electricity Department at NUCA.
4.	Focal Points	Dr. Hind Farouh, Chief of Central Department of Sustainable Energy Unit.
5.	Stakeholders	Urban Buildings Sector at NUCA, and local municipalities.
6.	Action Cost	EGP 150 million for internal and external lighting projects.
7.	Source of Finance	NUCA and city municipalities within its scope.
8.	Financial Incentives	Application of Net Metering scheme.
9.	Monitoring & Evaluation	Through electricity consumption reflected in electricity bills before and after using of LED lightbulbs.
10.	Saving Calculation Method (Equation)	Comparing consumption before and after execution of the Action.

10-4-4 Improving Energy Efficiency of Street Advertisements and Public Places

Table 10-6: Improving Energy Efficiency of Street Advertisements and Public Places

SN	Action Title	Illuminated Advertisements Inventory
1.	Objective	A permanent ministerial committee was formed to study and make an inventory of all types of advertisements using lights in order to charge them on a fair basis, to identify their source of electricity across all governorates and roads, to calculate consumption costs on basis of the comprehensive cost per kWh according to the cost of unsubsidized liquid fuel (diesel oil) imported for mobile electricity generators and power plants under the urgent plan and the FiT for electricity generated from PV power plants and at real cost (without subsidization), and to compare that with current prices in order to identify the actual subsidization borne by the state for electricity used in illuminated advertisements.

SN	Action Title	Illuminated Advertisements Inventory
2.	Description	▪ To obligate advertising companies, whether at the time of contracting or renewal, to use new and renewable energy, and LED lightbulbs, and to prohibit use of regular fluorescent lightbulbs in advertisements. ▪ To prohibit the use of diesel generators for advertisements, to use electric energy instead at unsubsidized rates, as well as solar energy and to promote this initiative by granting incentives to abiding advertising companies, such as payments over instalments and provision of technical support. ▪ At the time of renewal or licensing of illuminated advertisements in governorates and roads, consultation must take place with electricity companies to verify the actual capacity and energy consumed at unsubsidized rates, to verify calculation methods and to use the most appropriate energy saving methods. ▪ At the time of granting licenses to advertising companies or at the time of renewing licenses before local municipalities (for districts, governorates), the average annual consumption of electricity previously estimated and ratified by the competent electricity company must be included, based on actual unsubsidized costs, to be transferred to the governorate's state budget revenues. ▪ Advertising companies are to be charged according to the highest commercial tariff levels. ▪ To develop a unified code for advertisements that sets out the type, dimensions and capacity, based on a certified technical drawing that would facilitate licensing and accounting processes. ▪ To update and review this study semi-annually.
3.	Executing Agency	Ministry of Local Development- MoERE- Ministry of Transportation – NUCA.
4.	Focal Points	Members of the Permanent Ministerial Committee formed to conduct the study and inventory on illuminated advertisements.
5.	Stakeholders	MoERE- Ministry of Local Development - Ministry of Transportation - NUCA- Ministry of Petroleum - Ministry of Finance.
6.	Action Cost	

SN	Action Title	Illuminated Advertisements Inventory
7.	Financial Incentives	Incentives are granted to abiding advertising companies, such as providing them with technical support and instalment plans.
8.	Awareness	Awareness program for advertisement companies to be carried out by EDCs.
9.	Monitoring & Evaluation	Semi-annual inventory for evaluation purposes.
10.	Saving Calculation Method (Equation)	Current consumption value = amount of consumption kWh x current tariff value P.T. /kWh. Unsubsidized consumption value = amount of consumption kWh x unsubsidized tariff value P.T./ kWh.
11.	Value of Savings	= consumption value (unsubsidized tariff value) - consumption value (current tariff value)

Chapter Eleven- Improving Energy Efficiency in the Educational Field

11-1 Background

According to the data provided by CAPMAS, the number of school students in Egypt reached 19,864,000 students in different grades, as follows:

1. General Education	**Public**	**Private**	**Total**	**No. of Schools**
Primary	9,306,857	948,440	10,255,297	17,847
Preparatory	4,220,821	302,281	4,553,102	11,228
Secondary	1,349,540	185,524	1,535,064	3,114
2. Azhar Education				
Primary	1,028,317		1,028,317	3,536
Preparatory	404,930		404,930	3,304
Secondary	383,003		383,003	2,163
3. Technical Education				
Secondary/Total	1,654,750		1,654,750	1,995
Industrial	809,093			966
Agricultural	667,952			824
Commercial	168,705			205
Total			19,864,463	43,187
Primary				21,383
Preparatory				14,531
Secondary				7,272

The total number of school buildings reached over 40,000 schools, taking into consideration that in many schools, both primary and preparatory classes are located within the same area and sometimes within the same building.

This massive number of students across Egypt is crucial in disseminating the culture of the efficient use of energy, whether on a personal level or on level of their own families and communities.

NEEAP 2017-2020 focuses on secondary school stages; however, other stages will be included in subsequent plans. Emphasis is laid on secondary stages due to the elevated level of awareness of students in this stage and their ability to communicate with both elder and younger people.

The EEU at the Ministry of Education is the focal point within the Ministry to oversee the achievement of the goals of EEIP, to monitor the program's progress and to issue relevant periodic reports.

11-2 EEIP at the Ministry of Education

EEIP of the Ministry of Education is composed of the following four components:

a. To develop and teach curriculum that provides students with the required information on the impact of energy and its rationalization on growth rates, environment protection and creating job opportunities, which would have a direct impact on the level of individuals, the community and the state as a whole. In this respect, international expertise will be used for guidance.

b. To propose school activities where students would be engaged in determination of energy distribution and sources of energy mis-use at the school, making suggestions for saving energy and controlling energy use inside the school for purposes of outcome evaluation and avoidance of bad performance. Competitions/contests are to be held among different classes where the best performing class should be honoured.

c. The School Buildings Authority will develop a guidebook for energy efficiency improvement at schools and school buildings, taking into consideration the requirements of the energy efficiency code for buildings for rehabilitation purposes. It will also implement energy efficient projects in schools based on plans developed by students themselves.

d. Installation of PV power plants, either using for electricity production or solar water heating. Such units will serve as an illustration of the importance of solar energy and dissemination of the concept of using solar energy and renewable energy in general, to save energy and reduce the negative impact on the environment as a result of using electricity produced from traditional sources. Taking into account the fact that secondary schools of all types are around 7,272 schools, including public, Azhar, and technical education, PV power plants with a capacity of 5 kW will be installed on the rooftop of each school, with a total capacity of 36,360 kW during the years of the plan.

FIT contracts will be concluded, which will generate income for schools, which would help them pay for energy efficiency activities.

11-3 Role of the EEU at the Ministry of Education:

The EEU of the Ministry of Education acts as the focal point and liaison among the different stakeholders for achieving the NEEAPs objectives and monitoring the submission of periodic reports.

The unit also bears the responsibility of contacting donors to provide monetary support for the financing and installation of solar panels and solar heaters.

The unit will ensure that the capacity building program includes the proper preparation of teachers to enable them to teach the energy efficiency improvement curriculum and to lead school activities.

Chapter Twelve- Awareness and Consumers Communication Plans

12-1 Energy Rationalization Media Campaign

On 18/05/2016, a contract was concluded between EEHC and DDB Co., an affiliate of Tarek Nour Holding Company, for launching a three-year media campaign to raise awareness among citizens concerning energy rationalization.

Such media campaign consists of four pillars:

- First: television.
- Second: Radio.
- Third: Public Roads & Bridges (outdoors campaign).
- Fourth: Websites (digital campaign).

Further, such media campaign for the first year was divided over 3 main phases:

- First Phase: Ramadan 2016.
- Second Phase: After Ramadan (back to school).
- Third Phase: before summer of 2017.

All these procedures resulted in the reduction of the maximum load in 2016 to 29,400 MW as compared to 29,550 MW in August 2015.

12-1-1 Energy Rationalization Media Campaign- Phase II

Table 12-1 Energy Rationalization Media Campaign- Phase II

SN	Action Title	Energy Rationalization Media Campaign- Phase II
1.	Objective	Presidency's Circular to launch the energy rationalization media campaign.
2.	Description	▪ The media campaign consists of four pillars: ○ First: television. ○ Second: Radio. ○ Third: Public Roads & Bridges (outdoors campaign). ○ Fourth: Websites (digital campaign). ▪ This phase starts from July 2018 and lasts for two years.
3.	Executing Agency	EEHC
4.	Stakeholders	▪ MoERE's EECCD. ▪ EEHC. ▪ The advertising company.
5.	Focal Points	Eng. Ahmed Mohamed Mahina, Under-Secretary for Technical Follow-up.
6.	Action Cost	Around EGP 33 million, excluding taxes
7.	Total Cost	Around EGP 40 million.

SN	Action Title	Energy Rationalization Media Campaign- Phase II
8.	Source of Finance	EEHC
9.	Financial Incentives	Distribution of LED lightbulbs over residential buildings achieving the highest rationalization rates based on contests taking place over the social media.
10.	Monitoring & Evaluation	Through periodic reports released by the advertising company and a final report by the companies conducting campaign assessment, such as IPSOS.

12-2 Awareness about the Electricity Law

Table 12-2 Awareness about the Electricity Law

SN	Action Title	Awareness about the Electricity Law (Article 48 of the Law concerning Large Consumers)
1.	Objective	- Article 48 of the Electricity Law, which obligates subscribers whose contractual capacity exceeds 500 kW to appoint an official to oversee improving energy efficiency and to maintain energy register as set out in Articles 62, 64, 65, 66 and 67 of the Executive Regulation of the Law. - Article 50 of the same Law states that "the body assigned by the Cabinet for improving energy efficiency, in cooperation with stakeholders, shall lay policies…..”
2.	Description	▪ Holding awareness seminars. ▪ Preparation of an energy register guidebook.
3.	Executing Agency	EgyptERA.
4.	Focal Points	Eng. Cherine Abdullah. Dr. Camilia Yusuf.
5.	Stakeholders	▪ Large consumers (6,000 subscribers), ▪ Investors. ▪ EDCs.
6.	Action Cost	▪ Transportation allowance for trainers to move across Egyptian governorates to provide training courses, as well as costs for holding seminars, and preparing & renting halls. Such costs will be borne jointly by EgyptERA, GIZ and EDCs. ▪ Costs for printing the guidebook of around 15 pages, including the proposed register, an example of a factory’s energy register, and an introduction about such register.

SN	Action Title	Awareness about the Electricity Law (Article 48 of the Law concerning Large Consumers)
7.	Source of Finance	▪ EgyptERA, GIZ and EDCs.
8.	Awareness	Factory owners and directors of big organizations will be invited to attend a seminar during which an explanation will be given about: ▪ EgyptERA ▪ Electricity Law (brief overview). ▪ Chapter IV of the law (in detail). ▪ Presentation of the energy register prepared by EgyptERA. ▪ Presentation of the energy management system ISO 50001.
9.	Monitoring & Evaluation	A list will be made of the participants and the extent of their responsiveness. An officer will be appointed by the Cabinet to monitor and follow up with these large consumers and to verify that they have appointed an energy manager and that is carrying out the tasks in the best possible manner.
10.	Energy Saving Calculation Method (Equation)	Not identified, since energy efficiency improvement procedures have not been actually initiated inside institutions. We are currently in the awareness raising phase.

12-3 Raising Awareness on Energy Efficiency

Table 12-3: EDC Plans for Raising Awareness on Energy Efficiency

SN	Action Title	Raising Awareness on Energy Efficiency
1.	Objective	Article 49 of the Electricity Law of 2015 states the following: ▪ The network operator or the entity authorized to distribute electricity, will implement the proposed annual plan developed thereby, as approved by EgyptERA, for implementing projects or programs addressing consumers in the following fields: ○ Management of demand for electric energy. ○ Improving energy use efficiency. ○ Promoting the use of renewable energy. ○ Raising awareness on energy efficiency. At time of distribution license renewal annually, EgyptERA verifies what has been accomplished out of the plan.

SN	Action Title	Raising Awareness on Energy Efficiency
2.	Description	▪ Holding awareness raising seminars (attached scientific paper on the steps taken). ▪ Preparation of the energy register guidebook. ▪ Holding seminars covering the 9 EDC zones, during the first six months of 2017, as follows: ○ North Cairo EDC: around 120 seminars will be held by June 2022. ○ South Cairo EDC: around 40 seminars by June 2022. ○ Alexandria EDC: around 80 seminars by June 2022. ○ North Delta EDC: around 32 seminars by June 2022. ○ South Delta EDC: around 80 seminars by June 2022. ○ Middle Egypt EDC: around 48 seminars by June 2022. ○ Canal EDC: around 32 seminars by June 2022.
3.	Executing Agency	EgyptERA
4.	Focal Points	Eng. Cherine Abdullah. Dr. Camilia Yusuf.
5.	Stakeholders	▪ Large consumers (6,000 subscribers), ▪ Investors. ▪ EDCs.
6.	Action Cost	▪ Transportation allowance for trainers to move across Egyptian governorates to provide training courses, as well as costs for holding seminars, and preparing & renting halls. Such costs will be borne jointly by EgyptERA, GIZ and EDCs. ▪ Costs for printing the guidebook of around 15 pages, including the proposed register, an example of a factory's energy register, and an introduction about the register.
7.	Source of Finance	▪ EgyptERA, GIZ and EDCs.
8.	Awareness	Factory owners and directors of big organizations will be invited to attend a seminar during which an explanation will be given about: ▪ EgyptERA ▪ Electricity Law (brief overview). ▪ Chapter IV of the law (in detail). ▪ Presentation of the energy register prepared by EgyptERA. ▪ Presentation of the energy management system ISO 50001.

SN	Action Title	Raising Awareness on Energy Efficiency
9.	Monitoring & Evaluation	A list will be made of the participants and the extent of their responsiveness. An officer will be appointed by the Cabinet to monitor and follow up with these large consumers and to verify that they have appointed an energy manager and that is carrying out the tasks in the best possible manner.
10.	Saving Calculation Method (Equation)	Not identified, since energy efficiency improvement procedures have not been actually initiated inside institutions. We are currently in the awareness raising phase.

12-4 Promoting the Use of Renewable Energy

Table 12-4 EDC Plans to Install PV Power Plants

SN	Action Title	Installation of Solar Panels
1.	Objective	Article 49 of the Electricity Law of 2015 states the following: ▪ The network operator or the entity authorized to distribute electricity, shall implement the proposed annual plan developed thereby, as approved by EgyptERA, for implementing projects or programs addressing consumers in the following fields: ○ Management of demand for electric energy. ○ Improving energy efficiency. ○ Promoting the use of renewable energy. ○ Raising awareness on energy efficiency. At time of distribution license renewal annually, EgyptERA verifies what has been accomplished out of the plan.

SN	Action Title	Installation of Solar Panels
2.	Description	PV power plants will be installed within the 9 EDC zones, as follows: ○ North Cairo EDC: installation of PV power plants for 120 subscribers by June 2022. ○ South Cairo EDC: installation of PV power plants for 24 subscribers by June 2022. ○ Alexandria EDC: installation of PV power plants for 248 by June 2022. ○ North Delta EDC: installation of PV power plants for 72 subscribers by June 2022. ○ South Delta EDC: installation of PV power plants for 80 subscribers by June 2022. ○ Middle Egypt EDC: installation of PV power plants for 48 subscribers by June 2022. ○ Canal EDC: installation of solar panels for 24 subscribers by June 2022.
3.	Executing Agency	EgyptERA
4.	Focal Points	Eng. Cherine Abdullah. Dr. Camilia Yusuf.
5.	Stakeholders	EDCs.

Chapter Thirteen- Training and Capacity Building

13-1 Objective

Objective of the capacity building program is to raise the level of knowledge and acquire technical and managerial skills that would enable employees engaged in energy efficiency improvement, to manage energy resources and to select the best applications of technical and economic feasibility to improve energy efficiency, evaluate the performance of these applications and determine the energy rationalization achieved, that is besides acquiring skills that would help in studying, managing, and securing funds, as well as contracting and following-up EEIPs.

13-2 Fields of Training and Capacity Building

Fields of training and capacity building, will include the following:

1) Energy efficiency improvement technologies and their operation systems, including systems run by electric motors, such as compressed air systems, pumping fluids, air and cooling fans, high efficiency motors and speed changers, in addition to improving energy efficiency of electrical systems, including decreasing losses of electricity distribution networks, conducting electricity measurements, improving power factors, reducing harmonics, using energy efficient electric transformers, and energy efficient lighting and their control system, controlling industrial systems and operations, boiler and furnace combustion systems, as well as air conditioning and heating systems.

2) Management of EEIPs and identifying objectives and monitoring & evaluation mechanisms.

3) Energy auditing, whether rough or detailed.

4) Estimating costs of applications and projects, conducting technical and financial feasibility studies, energy efficiency implementation contracts, methods of financing EEIPs, project management, establishing energy databases, calculating performance indicators and measuring energy efficiency.

5) To adopt optimum methods of operation for equipment, appliances and devices, energy recovery systems (Pinch Analysis), methods of production planning and maintenance works, reduction of energy losses and controlling operations to achieve the least possible energy consumption and raise performance efficiency.

6) Distributed Electricity generation, such as renewable energy systems, co-generation units or electricity production units using recovered energy.

7) Solar heating in services or industrial applications.

8) Energy measurement, calibration and testing of devices, appliances and equipment.

9) Using energy efficiency software and applications.

10) Installation of energy efficiency improvement codes for buildings and facilities.

11) Energy efficiency specifications for devices, appliances and equipment and energy management (ISO 50001).

12) Management of the demand for energy as well as means and programs for reducing and shofting loads.

13) Calculation of cost of service and electricity tariffs.

14) Awareness raising & communication, as well as designing communication programs and plans to disseminate energy efficiency improvement messages.

Capacity building programs will be executed through the following mechanism:

1) Cooperating with universities to develop diplomas and masters' degrees in the field of improving energy efficiency.

2) Cooperation with training centres, specialized centres, university research centres, institutes and specialized institutes to develop and implement courses for improving energy efficiency.

3) Establishing databases of these centres and their programs, to render them accessible through the website of MoERE's EEECCD, to set up a communication network with all parties targeted by EEIPs, to contact them regarding the programs, to update them, and to evaluate the scientific and technical content of the courses and the relevant centres.

4) Energy efficiency units will collect from relevant sectors, training and capacity building requirements, and will send them to MoERE's EECCD every six months for developing the required training program.

5) All entities addressed by the Electricity Law with a contractual capacity of 500 kW and higher, are required to develop a training program for their employees at the beginning of fiscal year according to the entity's needs in a manner that would ensure training on energy efficiency of 20% of the employees working in the fields of energy uses, by selecting the appropriate courses announced to the training centres or proposing topics to the competent bodies for developing new courses.

6) EECCD will contract with a consultant during the first years of the plan to develop an integrated vision for the training system, capacity building and minimum requirements to be met by training centres, their evaluation and classification methods, as well as incentives that can be granted to trainees, their entities or the training centres.

Chapter Fourteen- Cooperation with the Civil Society

14- 1 Background

Civil society organizations represent the organized part of society which consists of NGOs established by individuals and groups which aim to achieve common objectives or defend the interests of their founders and members. Civil society organizations include syndicates of all types, including labor, professional, scientific, cooperative associations, commercial, industrial, agricultural, exportation and investment-related organizations. Civil society organizations also include associations and institutions which provide services for development of the society, such as education, health, religious affairs, sports, population, child protection and women rights, as well as charity to help the needy and vulnerable. Civil society organizations also serve the community and defend their interests through the protection of consumers, environment, freedoms and human rights. Civil society organizations may also include associations that advocate animal rights. Associations may gather to form general or private federations, such as industrial federations, federation of chambers of commerce and unions for consumer protection. Civil society organizations may also include foreign or international associations operating in Egypt, or associations of regional character. Civil society organizations may have political objectives, such as political parties. However, Law No. 70 of 2017 for regulating associations and other foundations working in the civil arena drew a line between activities of political parties and those of civil society organizations, where the former activities are regulated by another law.

In view of the dynamic and ability of civil society organizations to communicate with citizens, in addition to their credibility, cooperation with civil society organizations is regarded as one of the crucial means of supporting public policies, especially when such policies represent prevailing agreeable values among the society. The policy of improving energy efficiency, energy rationalization, proper use of resources and avoidance of wasting resources, is deemed to be as one of the agreed upon values among society members. However, despite the clarity and legitimacy of this policy, society's daily practices may infringe this policy, either due to insufficient awareness levels or lack of technical and administrative efficiency. Other times, these policies are not among the first priorities for citizens, when compared with other pressing challenges.

EgyptERA has cooperated with civil society organizations to activate their engagement, as an authentic party, in proposing, monitoring and enforcing rules regulating the electricity industry, as well as to conduct dialogue among consumers themselves to reach an agreement among them in case there is conflict of interest between the different consumer segments. This is in addition to the membership of representatives of civil society organizations in the board of directors of EgyptERA pursuant to the Electricity Law, such as FEI and the Federation of Chambers of Commerce, which are represented by their presidents. However, EgyptERA's goal is to expand such engagement in a manner that would assure higher levels of credibility, transparency and the smooth implementation of decisions. It is noted that there are no civil society organizations concerned with energy causes in spite of the high importance of these causes. This may be attributed to the fact that energy is regarded as a public service provided by the state to its citizens without seeing the link between such service and the importance of preserving natural resources, increasing competitiveness and environment protection.

This initiative led to the establishment of the Egyptian Organization for Consumers and Energy (EOCE), representing over 25 NGOs, including a wide range of associations concerned with the environment, consumer protection, and cultural and awareness activities. Some of these associations operate their activities within a particular city or governorate, while other associations operate their activities across all of Egypt. EOCE participated in the design and implementation of the energy rationalization media campaign and various promotional materials, including visual and printed advertisements, as well as seminars. However, recently, EOCE's activities suffered a drawback as a result of its weak administrative structures and lack of sufficient support for its activities.

Furthermore, the activities of the national project of energy efficiency and reduction of greenhouse gases, implemented through EEHC in coordination with the UNDP and GEF, include providing aid to NGOs to carry out energy efficiency awareness activities and pilot projects. This includes holding seminars and implementing pilot projects for energy efficient lighting and promoting awareness concerning energy efficient appliances.

14-2 Fields of Cooperation with the Civil Society

Cooperation with civil society organizations is one of the most effective means of boosting energy efficiency activities. EECCD, cooperated through announcements or direct contact with associations, in cooperation with the Ministry of Social Solidarity, and the Foreign NGOs Regulatory Authority, to set up a database of associations concerned with energy, environment, consumer protection, education, culture, and professional and industrial synergies, investments, and community services, in order to introduce EECCD's plans for cooperation with civil society organizations to promote energy efficiency activities, identify areas of cooperation and discuss cooperation potentials and requirements. Cooperation with civil society organizations includes the following:

(1) Develop a mobile application and set a hotline for reporting the mis-use of energy, such as leaving public lights on during daytime, theft of electricity, or use of non-energy efficient lighting. Civil society associations are to follow up such reporting, raise awareness in this regard and follow-up with the competent authorities. The mis-use of energy, especially that used for public services, affects the whole society and sends out negative messages about energy efficiency performance, in a manner that renders any of the state's messages weak and void of credibility.

(2) Raise awareness through seminars and direct communication with community members, to develop and produce simple awareness raising material that can be easily understood by different classes of society.

(3) Participate in the implementation of energy efficiency improvement initiatives, such as launch campaigns for the distribution of energy efficient lightbulbs, to provide technical support to consumers to realize optimum benefit, as well as to launch initiatives for disposal of non-energy efficient lightbulbs.

Regarding the first point, EgyptERA had already developed the mobile application "*Khod Balak.*" This application uses a GPS mechanism that determines the location at the time of reporting energy mis-use and identifies the identity of the reporting individual through his/her phone No. registered on the application (upon activation). However, this application suffers lack of proper promotion, prompt follow-up of reports and response to reporters concerning the action taken. The purpose of cooperation with civil society organizations is to raise awareness about the application and the means of using it, to follow up the received reports, to verify their credibility, to take precautionary measures to prevent reoccurrence, which may reach taking legal action, and to respond to the reporting. The associations are selected on basis of competitive bidding where offers are submitted for activating the system for MoERE's EECCD, while the latter will provide financial support to the association(s) having appropriate expertise and offer competitive conditions and costs.

The mechanism will be implemented and the association(s) will be selected during the first year of the plan. The association will commence its work during the subsequent two years of the plan and will publish monthly, quarterly and annual reports on EECCD's website.

As for the second point concerning awareness-raising, the association(s) will be selected according to target plans by setting priorities based on geographical areas. This will be carried out through a consultant to be hired by EECCD to prepare a communication strategy with the civil society, the message required to be delivered, and to set the ToRs for issuing a RFP for associations to submit their offers for implementing this plan. This procedure will be completed within the first year of the plan, provided that the association(s) will initiate their work at the beginning of the second year at the latest.

As for the third point relating to engagement in energy efficiency pilot projects, this will be implemented through CRGM for at least two projects, as follows:

(a) Energy efficient lightbulb distribution project: The association will receive credit for the value of 5,000 LED lightbulbs, guaranteed by the CRCG, to be provided to the companies supplying the lightbulbs. The energy efficient lightbulbs will be distributed over volunteers (50 lightbulbs at the most will be given to each volunteer) to distribute them over their district residents in coordination with the competent EDC. The volunteer will obtain from the beneficiary a low efficient lightbulb with the capacity of at least five times the capacity of the new lightbulb. The value of the lightbulb will be charged to the electricity bill where the consumer will sign a declaration that failure to pay the lightbulb's value will be deemed as non-payment of the entire bill.

    The volunteer will deliver the non-energy efficient lightbulbs along with the aforementioned consumer's declaration to the association, which will, in turn, deliver same to the EDC to charge the lightbulb value to the consumer's bills. The EDC, in the course of disposal of the old lightbulbs, will receive payment for the collection of the non-energy efficient bulbs from EEF. The association will distribute the value of the non-energy efficient lightbulbs over the volunteers and will replace the distributed lightbulbs with the

new ones within the limits of the credit granted. Associations that appoint unemployed fresh graduates will have priority to receive credit.

(b) Energy efficient appliances distribution project: This project is executed in cooperation with vocational or labour syndicates or federations, in order to encourage the members of these associations to replace their non-energy efficient appliances with energy efficient ones. The energy efficient appliances will be sold in consideration of durable appliances with a life cycle exceeding 20 years. The consumer will be offered a discount for the value of the new appliances according to a price table specifying the value of the old one and will be exempted from interest on instalments. Consumers will also be entitled to an additional instalment period of two years at the most in case of not handing over an old appliance. EECCD will coordinate with the concerned parties, either directly or through a specialized committee, and EEF will bear costs for replacement of the old appliances.

EECCD will finalize laying the executive framework for the pilot projects mentioned in points (a) and (b), and will carry out financial settlement procedures and budget arrangements during the first year of NEEAP 2017-2020 at the most.

Chapter Fifteen- Annual Report and Conference on Energy Efficiency in Egypt

15-1 Annual Report on Energy Efficiency in Egypt

MoERE's EECCD will prepare the annual report on energy efficiency in Egypt, to include the following:

1. Budget of energy consumption in Egypt and the percentage of electric energy.
2. Electricity production and consumption indicators.
3. Energy efficiency KPIs based on the data available from the energy register.
4. Work results of EEUs in different sectors and energy efficiency measures, as well as the activities of specialized committees, including EESLC and EECACB.
5. Training and capacity building programs, impact assessment of these programs and development plans.
6. Funding through various funding mechanisms for energy efficiency activities and programs and the economic evaluation of these funds.
7. Awareness raising programs and assessment of their impact.
8. Cooperation programs implemented with civil society associations.
9. The broader impact of energy efficiency programs and projects, such as environmental and social impact, including job creation and its cost.

The report will be issued in the name of SEESC upon approving same. Printed copies of the report will be sent to all stakeholders, ministries and various state institutions. An electronic copy of the report will be available on the websites of EECCD, GoE portal, and the website of the relevant entities.

15-2 Annual Conference on Energy Efficiency in Egypt

A one-day annual conference on improving energy efficiency will be held for stakeholders, including ministries, authorities, EEHC, electricity companies, whether private or public companies, funding institutions, accreditation and training centres, and institutions and companies addressed by the Electricity Law, whose contractual capacities reach or exceed 500 kW, and representatives of civil society associations. The conference objectives are as follows:

1. To present the results of the energy efficiency annual report.
2. To present success stories of EEIPs and applications.
3. To hold open discussions among officials and beneficiaries concerning energy efficiency improvement opportunities and challenges.
4. To serve as a platform for holding meetings among beneficiaries or those who seek to benefit from energy efficiency improvement services and representatives of the relevant entities, thereby grant access to the greatest amount of information for obtaining energy efficiency improvement services.

MoERE's EECCD will be responsible for arranging for the conference while the conference invitations will be extended by the Minister of Electricity and Head of SEESC.

Recommendations of the Sustainable Energy Plan

Solar Energy Sector Improvement Plan- NEEAP

Recommendations of the Sustainable Energy Plan (Solar Energy Sector Improvement Plan- NEEAP)

To further build on the achievements in this field and to realize Sustainable Energy Plan's two-dimension sustainability goals (the Solar Energy Sector Improvement Plan- Electric Energy Efficiency Plan), the following recommendations have been issued:

- To form a SEESC headed by the First Under-Secretary at MoERE overseeing renewable energy and energy efficiency activities at MoERE, and including first undersecretaries of ministries engaged in the execution of the plan, including those of Petroleum & Mineral Wealth, Investment & International Cooperation, Finance, Planning, Follow up & Administrative Reform, Industry & Trade, Public Business Sector, Housing & Utilities, Tourism, Local Development, Education, Transportation, Youth & Sports, in addition to the CEO's of EgyptERA, EEAA, EEHC, and a group of professional experts. Moreover, SEESC's mandates will include the following:
  - SEESC will be formed pursuant to a decree issued by the Prime Minister.
  - SEESC will coordinate and monitor the implementation of plans and programs pertaining to sustainable electric energy systems (Solar Energy Sector Development Plan and NEEAP) on the national level.
  - SEESC will prepare a quarterly report on its activities to be presented to the Minister of Electricity and Renewable Energy.
  - The Minister of Electricity and Renewable Energy will present a semi-annual report on SEESC's works to SEC.
- To ratify the proposed pillars and action plans for the sustainable energy plan in line with the goals of ISES 2035.
- To call on ministries and competent bodies to intensify efforts to develop and present NEEAP programs and the necessary measures for their while taking into consideration institutional and human wealth capacity building in all value chain fields related to the activities of each pillar.
- To request that each body responsible for implementation of the pillars' activities to rapidly form competent workgroups, to immediately begin to identify the detailed procedures for the activity elements, and to follow up implementation in collaboration with the executing agencies of such activities.
- To ratify initiatives on the solar energy distributed systems proposed within the plan, while the Minister of Electricity and Renewable Energy is to present the necessary implementation measures to SEC for ratification.
- To complete the institutional structure of the energy efficiency improvement industry by completing, activating and empowering energy efficiency units in the different economic sectors.

- To provide the necessary funds for the electric energy efficiency industry through several tools, such as the establishment of EEF as per NEEAP as well as CRGM for energy efficiency projects, in addition to a mechanism for coordination of energy efficiency activities among the stakeholders and financing programs.
- Sustainability of awareness programs on solar energy activities and energy efficiency, and developing educational programs and school activities that raise awareness of students on the importance of solar energy and energy efficiency.