

**THE EGYPTIAN NATIONAL ENERGY EFFICIENCY STRATEGY :
A SUSTAINABLE PATH FOR ECONOMIC DEVELOPMENT
AND MITIGATING THE THREAT OF CLIMATE CHANGE**

By

Dr. Ibrahim Abdel-Gelil

Executive Chairman
Egyptian Environmental Affairs Agency (EEAA),
Ministry of State for Environmental Affairs

Eng. Maher Aziz Bedrous

General Director of Environmental Studies
Egyptian Electricity Holding Company (EEHC),
Ministry of Electricity and Energy Egypt

1. INTRODUCTION

1.1 Background

Egypt's economic development outlook for the period 2000 to 2017 calls for an average annual growth of gross domestic product (GDP) of 7.6%.¹ Energy efficiency offers Egypt a sustainable path to meet these aggressive growth targets in an economically and environmentally sound manner. Market studies estimate that Egypt can generate considerable economic and environmental benefits from energy efficiency investments, including: monetary savings equivalent to approximately 1% of the country's GDP and a 10% drop in annual carbon dioxide emission by 2016-17.²

As in many developing countries, barriers to the wide spread use of energy efficiency applications exist in Egypt in different domains (institutional, financial, technical, and market). In the past few years, however, several market and economic-based factors have led to the business community's recognition of the need for energy efficiency.

To capture the significant benefits associated with energy efficiency, an integrated and sustainable national strategy that engages both public and private sector stakeholders is required. A national strategy should also satisfy both short and long-term objectives. While short-term issues should focus on removing barriers that inhibit the development of the energy efficiency field, long-term aspects should focus on ensuring the sustainability of energy-efficient practices in various sectors of the economy. The national strategy should also take into account the local business culture and should allow for a high degree of flexibility that can help accommodate the changing needs of Egypt's emerging economy.

The Energy Efficiency Council (EEC), a consortium of interested public and private organizations, has taken responsibility for coordinating inputs to a sustainable national strategy, which is described below.

1. National Strategy for Economic and Social Growth in Egypt, 1996/97 to 2016/17. Ministry of Planning, March 1997.
2. ECEP Replication Study, March 1998.

1.2 The Need for A National Strategy

Past government and donor-funded energy efficiency activities in Egypt contributed significantly to raising awareness of the associated economic and environmental benefits.

They helped bring attention to existing barriers and drivers with direct influence on the energy efficiency market. However, despite 15 years of various activities and donor-funded interventions, the market has reached only a limited amount of its identified potential.

Market studies quantified the size of the energy efficiency market in Egypt to range between US \$1-2 billion in products and services. As energy resources are central to Egypt's aggressive economic development agenda, the need for an integrated energy efficiency strategy has become obligatory.

Developing a national strategy to support the country's political and economic agenda should however, take into consideration the following objectives:

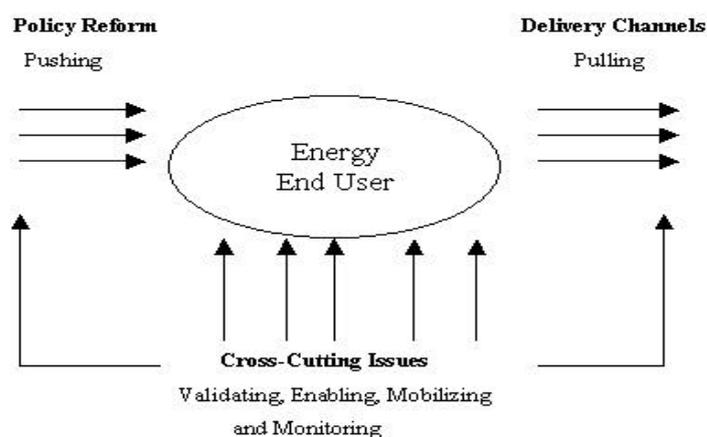
- Achieving national energy security and sustainability of energy supply.
- Increasing demand on efficient use of energy resources.
- Building capacity into local market forces.
- Sustaining energy efficiency practices.
- Contributing to environmental improvement and global climate change efforts.

To meet these objectives, a strategy with short and long-term tactics should be formulated as part of the national economic development plans. While the short-term component of the strategy will focus on immediate barriers inhibiting the growth of the efficiency market, the long-term vision should focus on sustaining efficient practices in Egypt. Increasing demand on energy efficiency applications and building the needed capacity within existing or anticipated market forces should be the immediate focus. Sustaining the adoption of efficiency practices, balancing energy resource dependence, expanding the use of renewable energy alternatives, and improving environmental conditions should be the focus of long-term strategic planning.

Typically, the reformulation of existing policies and regulations is used to "push" the market towards certain objectives, but should not be relied on as the sole force. Market delivery channels, either in the private sector or in the form of public/private partnerships should be considered the primary movers and the engines that "pull" this market and help its growth and expansion (Figure 1). Other market initiatives offered by donors, or any other assistance, should be provided to enable the market to develop and expand; and therefore, they should be guided to compliment the strategy to optimize effectiveness.

Both the short and long-term aspects of the strategy, incorporate a philosophy of shifting the role of implementation and leading market initiatives to the private sector with its investment capacity. Economic and policy related incentives should be evaluated to encourage local and foreign investments in energy efficiency. It is critical however, to design a smooth transition to allow time for building capacity to meet market expectations. Transferring responsibility without having a capacity base may yield a negative outcome.

Figure 1: Pushing-Pulling Energy End-User Forces



2. ENERGY PROFILE OF EGYPT

2.1 Energy Production

Egypt relies mainly on crude oil and natural gas for its primary energy production with an insignificant amount of hydropower and coal. In 1998-99, the country's energy production reached 59 Million Tones Oil Equivalent (MTOE) (Table 1), of which half or 29.5 MTOE have been consumed for the end use industrial, commercial, residential, agricultural, transportation, and other government and utilities needs. The balance is used for export partners' share of crude oil, electricity and petroleum sectors consumption, and system losses. Although the production of primary energy resources has remained almost at its 1997-98 level, final or end use energy consumption has grown by 4.57 percent in 1998-99.

Table 1: Primary Energy Sources for 1998-99

1998-99 Primary Energy Sources	MTOE	Ratio of Total
Crude oil	39.318	66.7%
Natural Gas	13.190	22.4%
Condensate & LPG	2.974	5%
Hydropower	3.365	5.7%
Coal	0.067	1%
TOTAL	58.914	100%

2.2 Energy Consumption

Table 2 provides a breakdown of final energy end-use consumption by sector for the period 1994-99 with growth rate ratio indicated for each year. Units are measured in MTOE. The industrial sector is the primary consumer of end-use energy with a 47 percent share of the total use, followed by the transportation sector with 31 percent, while both the residential and commercial sectors combined using 19 percent. The remaining 3.5 percent are used for agricultural and government use.

Table 2: End-Use Consumption by Sector for the Period 1994-99

Year	Industry	Transport	Res/Com'l	Agr/Gov	Total MTOE	Growth
1998-99	13.74	9.11	5.65	1.03	29.54	4.57%
1997-98	13.78	8.24	5.20	1.03	28.25	8.19%
1996-97	12.77	7.58	4.84	0.93	26.11	1.73%
1995-96	12.83	7.35	4.57	0.89	25.63	8.52%
1994-95	11.73	6.75	4.32	0.83	23.62	

Of the total end use consumption in Egypt, 66 percent is met by petroleum products, 14 percent is covered by natural gas, with electricity providing 16.5 percent and coal slightly exceeding 3 percent. With a population over 64 millions, per capita energy use translates to 656 kg of oil equivalent, and 1,057 kWh per year.

As shown in Table 2, end-use energy consumption has been steadily increasing in Egypt since 1994, and with the government plans for maintaining economic growth at aggressive rates, there is no immediate prediction of a reversal of this trend.

2.3 Natural Gas

Natural gas consumption has been steadily increasing since 1994 with a notable increase in 1998-99 due to expanded electricity generation, residential use, and reduction in use of other fuels such as solar (oil no.2) and mazout (oil no. 6) in industrial applications. Electricity generation comprises approximately 60 percent of the total consumption, followed by industries which exceed 30 percent, while the remaining 10 percent is used by the petroleum, residential and commercial sectors. Table 3 lists consumption by sector from 1994-95 through 1998-99 in MTOE.

Table 3: National Gas Consumption by Sector for the Period 1994-99

Year	Industry	Petroleum	Electricity	Residential	Total MTOE	Growth
1998-99	3.92	0.88	7.68	0.32	12.80	9.53%
1997-98	4.42	0.79	7.23	0.25	11.69	1.87%
1996-97	3.27	0.79	7.31	0.19	11.47	2.41%
1995-96	3.15	0.86	7.02	0.16	11.20	4.34%
1994-95	3.05	0.66	6.90	0.13	10.73	

2.4 Electricity

Electricity needs are also rising in Egypt to meet expansion and development plans. In 1998-99, total electricity consumption reached 56.6 billion kWh, marking a 31 percent increase over the 1994-95 consumption levels. The total installed capacity is approximately 13,300 megawatts (MW), of which only 11,000 megawatts can be relied on due to fluctuation in hydropower and aging of some thermal generation units. Almost 80 percent of the total installed capacity is natural gas powered, while the rest is split between hydropower and oil-fired units. The Ministry of Electricity and Energy plans to increase capacity to meet future demands with a target of 20,000 MW by 2010. Electricity demand is currently above 10,000MW, and is expected to reach 17,000 MW by 2007. Table 4 below lists electric energy consumption by market sector from 1994-95 through 1998-99 in million kWh.

Table 4: Electric Energy Consumption by Market Sector for the Period 1994-99

Year	Industry	Agricult.	Res/Com	Gov. & pub. Utilities	Total Million kWh	Growth
1998-99	22.900	2.200	23.200	8.300	56.600	6.48%
1997-98	22.079	2.131	20.471	8.296	52.977	7.38%
1996-97	21.150	1.940	18.962	7.285	49.336	6.47%
1995-96	20.087	1.904	17.525	6.822	46.338	7.15%
1994-95	19.046	1.940	16.241	6.019	43.246	

3. THE ENERGY EFFICIENCY COUNCIL

3.1 The Main Vision

The Energy Efficiency Council (EEC) is a voluntary consortium of public and private sector organizations associated with the generation, distribution, and use of energy resources in Egypt. It was formed to foster inter-agency cooperation for promoting and guiding energy efficient practices in Egypt. The Council currently includes 12 organizations representing seven Ministries: Electricity and Energy, Petroleum, Environment, Industry, Transportation, Water Resources, and Planning and two organizations representing the views and interests of the private sector. These two organizations are the Federation of Egyptian industries: a forum representing most Egyptian industries, and the Egyptian Energy Service Business Association: a non-governmental organization representing providers of energy efficiency products and services.

The main vision of the Council is to create an enabling framework that allows a wide adoption of energy efficiency in Egypt. Its aim is to oversee the development of a national energy efficiency strategy that will be used as a roadmap to increase Egypt's efficient use of its natural resources. The strategy, which has been already designed and formulated by the member organizations with support from other interested parties and international donors, includes short-term and long-range initiatives targeting policy reform and market initiatives to increase efficiency and reduce greenhouse gas emissions.

3.2 The Cooperation Protocol

To coordinate their efforts towards the development of a national strategy for energy efficiency, the leaders of participating agencies volunteered to sign a protocol of cooperation to exchange information and coordinate inter-agency efforts. In October 1998, they signed the said protocol, and agreed to hold the first quarterly meeting in February 1999.

The Protocol clarifies the intention of the signing agencies to cooperate by coordinating their efforts and sharing their resources and expertise to increase the adoption of energy efficiency practices through the following activities:

1. Cooperation in information exchange and data linkage to ensure transparency.
2. Identification of available expertise and resources to achieve integration and form specialized working groups.
3. Coordination of energy planning and environmental protection activities.

4. Cooperation in outreach and awareness building initiatives on energy efficiency, renewable energy, demand-side management, and global warming through awareness campaigns, workshops, and capacity building seminars.
5. Demonstration and promotion of energy-efficient, renewable, and environmentally friendly technologies for future replication in various sectors.
6. Coordination of other relevant areas and activities deemed necessary by the member agencies to increase their scope of cooperation.
7. Encouraging the private sector including Energy Service Companies (ESCOs) to increase energy efficiency.
8. Establishment of working links with official energy stakeholders such as the National Committee of the World Energy Council, the Industry & Environment Committee of the Peoples' Assembly and the Shoura Council, and the Electricity and Petroleum Committee at the Specialized National Councils.

The Protocol also encourages cooperation in additional areas that the members may find necessary, as well as the addition of other agencies or relevant stakeholders to expand the scope of cooperation and expedite the achievement of the above objectives. In this context, the Protocol will rely on the creation of planning and cooperation mechanisms such as committees and working groups to facilitate decision making and periodical evaluation of efforts. The Organization for Energy Planning will act as a coordinator between participating agencies.

3.3 The Energy Efficiency Council's Plan

To aid in the development and implementation of a National Energy Efficiency Strategy, the Energy Efficiency Council (EEC) will form strategic alliances (Figure 2) with the media, investors' associations, non-governmental organizations, policy makers, financial institutions, international organizations, educational institutions and research organizations. These alliances, and their input to the EEC, are critical in broadening the consensus for a national strategy and defining its tactics.

Figure 2: Strategic Alliances



Short Term Planning

The Energy Efficiency Council plans to draft the initial National Energy Efficiency Strategy by tapping its alliances and member resources to carry out several types of activities in the near term. These activities include:

- Assessing resources available among the associations and organizations that participate in the EEC.
- Strengthening methods of cooperation and integration among EEC member organizations.
- Assessing topics that directly affect the strategy for energy efficiency.

Intermediate Planning

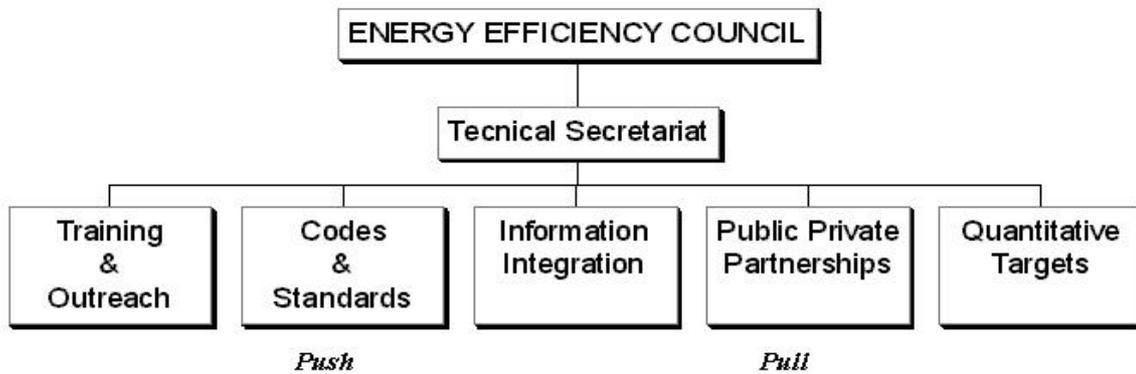
The results of the EEC's short-term activities will establish the basis for the EEC's efforts to enact the National Energy Efficiency Strategy. More specifically, the long-term plan calls for the following:

1. Organizing public awareness campaigns on the economic and environmental benefits of energy efficiency.
2. Examining appropriate policy and market mechanisms to enhance demand for energy efficiency by considering, for example, options such as:
 - Energy pricing
 - Customs
 - Tax incentives
 - Substitution of natural gas for liquid fuels
 - Equipment labeling
 - Certification of service providers
3. Formulating the National Energy Efficiency Strategy.
4. Organizing appropriate training and public awareness programs to implement the strategy.
5. Establishing mechanisms to monitor and, as necessary, update the National Energy Efficiency Strategy.

3.4 Working Group Activities

The EEC's Technical Secretariat created five working groups to examine various aspects of the strategy approach (Figure 3). Integration of the groups' findings will form the backbone of the national strategy. The working groups are examining and developing recommendations in:

Figure 3: Working Groups of the Energy Efficiency Council



Public-Private Partnerships: Evaluating possible partnerships between the public and private sectors to expand the practice of energy efficiency. These partnerships will create effective market forces that are central to the "market pull" approach. The group's findings will include identification of an enabling framework of policies, protocols, evaluation tools, and techniques to foster and promote effective partnerships.

Codes & Standards: Assessing potential regulatory initiatives and policy instruments that comprise the "market push" approach. Efficiency codes, equipment standards and labels will be utilized as pushing tactics. As pilot initiatives to develop standards for selected appliances are underway, the group's efforts will concentrate on developing a comprehensive approach to applying codes and standards to ensure effectiveness.

Information Integration: Examining options to ensure the availability of reliable data in support of the EEC's overall guidance and monitoring role. Additionally, the use of integrated databases will enable end-users and energy efficiency service providers to make sound business decisions related to energy investments. The working group is identifying appropriate systems and processes to meet the information requirements of the EEC.

Training and Outreach: Extensive training and capacity building is required among both public and private sector entities to enable successful formulation and implementation of the National Energy Efficiency Strategy. Significant outreach is also required to raise the levels of awareness and understanding of energy efficiency issues. The working group is developing an agenda for institutional development, capacity building, and public outreach.

Quantitative Targets: Setting meaningful goals for the energy efficiency strategy is a challenge that requires adequate planning and design to insure coordination with the overall political and economic agenda for Egypt. This group is examining relevant issues and developing recommendations for setting, and monitoring progress towards, quantifiable energy efficiency goals and indicators.

4. FORMULATING A NATIONAL ENERGY EFFICIENCY STRATEGY

To formulate the national strategy, the EEC will consider and integrate findings and recommendations of the working groups, and in doing so will incorporate the inputs of

national experts from both public and private sectors. The working groups have accepted the task of carefully examining key issues, so the selection of initiatives and planning activities will fully consider technical, market, social, and institutional issues that ultimately influence the success of the strategy.

By examining the working groups' findings in detail and then working to integrate their recommendations, the EEC is developing a comprehensive plan for a broad range of energy efficiency initiatives. The methods used to examine and integrate issues ensure that the emerging National Energy Efficiency Strategy is consistent with the EEC's two-pronged approach of pulling the energy efficiency market through market oriented initiatives and pushing the market with regulatory initiatives.

In addition to action plans for market-oriented and regulatory initiatives, the strategy will include detailed descriptions of requirements and activities planned for increasing awareness of energy efficiency, strengthening organizational and private sector capacity to serve markets, and developing information systems capable of facilitating efficient communications among the key market players. The expected outcome of the Council's activities is a robust strategy for stimulating and sustaining the market for energy efficiency services and achieving the economic, environmental, and social benefits that increased energy efficiency can bring to the country.

4.1 Objectives

A primary theme in the development of a National Energy Efficiency Strategy (NEES) for Egypt is the identification of approaches that facilitate sustainable economic development and mitigate the threat of climate change. Increased efficiency in the utilization of energy resources is needed to ensure the reliability of domestic energy supply, enhance the competitiveness of Egyptian industries, and to reduce greenhouse gas emissions. Given the strong link between energy, economic growth, and the environment, the development and implementation of a NEES will aim to achieve several national objectives that can be classified in three main areas:

I - Economic Development

Objective 1. Support and augment national economic growth plans.

Objective 2. Enhance the competitiveness of Egyptian industries.

Efficient use of end-use energy, especially in energy-intensive sectors, is critical to support economic growth. This will result in the freeing-up of resources that can be reinvested in both local infrastructure and human capital (thereby increasing productivity).

II - Sustainability of National Energy Supply

Objective 1. Strategically shift reliance on energy consumption towards natural gas.

Objective 2. Increase deployment of energy efficiency and renewable energy applications.

Efficient production, distribution, and use of domestic energy resources will contribute to the country's energy security by increasing the sustainability of domestic energy supplies.

III- Environmental Protection

Objective 1. Reduce emissions of atmospheric pollutants (nitrogen oxides, particulates, and sulfur oxides).

Objective 2. Reduce emissions of greenhouse gases, mainly carbon dioxide(CO₂).

Expanding the use of cleaner energy systems and technologies will reduce the threat of adverse environmental and health-related impacts.

Table 5: Relationship of NEES Objectives to National Priorities

Objectives	Economic Development	Sustainability of Energy Supply	Environmental Protection
Support economic growth	•	*	*
Industrial competitiveness	•	*	*
Shift to natural gas	•	•	•
Clean technology deployment	•	•	•
Reduce atmospheric pollutants	*	*	•
Reduce greenhouse gas emissions	*	*	•

• = Primary effects

* = Secondary effects

4.2 Goals

Achieving the objectives of the NEES is expected to result in significant and quantifiable economic and environmental benefits. To support strategy planning and implementation, it will be necessary to establish a set of meaningful and quantifiable goals/targets that can be used by implementing institutions in order to effectively monitor and evaluate the impact of NEES initiatives at both macro and micro levels. The proposed targets should be expressed as indicators reflecting an increase in efficiency in each sector as follows:¹

- **Macro Level:** Reduce national energy consumption per unit of economic output by a designated percentage in the year 2016/17, compared to a designated base year (for example 1996-97).² Associated reductions of air pollutant and greenhouse gas emissions will reduce (PM₁₀, NO_x, SO_x, CO₂) by x, y, z, etc. in the year 2016/17 compared to the UNTCCC base year of 1990.

1. Where indicated, the targets, indicators, base years, and target years are all preliminary estimates based on analyses conducted by the EEC's Quantitative Targets Working Group.

2. This target results from analysis of energy and economic forecasts, including structural changes in economic output, and consideration of numerous studies on the market potential for energy efficiency.

· **Sectoral Level**

Secondary Energy Production

- **Oil Sector:** Increase local consumption of natural gas by ----- tcf by 2005.
- **Electric Power Sector:** Increase on-site generation applications by 1,000 MW by 2010.
- **New & Renewable Resources:** Increase share of renewable electricity generation to 3% of national total by 2010. Increase nameplate capacity of wind generation to 1800MW and solar generation to 1050MW.

Final Energy Consumption Sectors

- **Industrial:** Reduce energy use per unit of output by 10% to 15% by 2016-17 compared to BAU forecast for the same year.
- **Government & Public Utilities:** Reduce energy consumption per square meter in government facilities by 5% in 2006 and by 20% in 2016/17 compared to 1998/99.
- **Residential & Commercial:** Reduce energy use by ---% by 2016-17, compared to 199?¹
- **Transportation:** Increase average fuel efficiency of new automotive vehicles by ---% in 2016-17 compared to 199?
- **Petroleum Sector:** Reduce energy consumed per ton oil equivalent (TOE) of output by ---% by 2016/ 17 compared to 1998/99 levels.
- **Agricultural:** Reduce consumption related to irrigation by --% in 2016-17 compared to 199?

Table 6: NEES Goals & Expectations (Preliminary Estimates)

Target Sector	Target Improvement	Target Year*	Baseline*
Macro Economic Level	20% to 30% decrease in energy intensity	2016/17	--
Petroleum Sector	6% reduction in energy inputs per TOE output	2016/17	--
Petroleum Sector	??% Increase in domestic natural gas use (cm)	2005/06	--
Electric Power Sector	1,000 MW of increased cogeneration application	2005/06	NA
New & Renewable	3% Share of renewable energy in electricity generation	2009/10	NA
Industrial Sector	10% - 15% Decrease in energy use to economic output	2016/17	--
Government	5% Decrease in energy use per square meter 20% Decrease in energy use per square meter	2006/17 2016/17	-- --
Res'l & Comm'l	??% Decrease in energy use	2016/17	--
Transportation	??% Increase in fuel efficiency per distance traveled	2016/17	--
Agricultural	??% Increase in irrigation (kWh/yr per feddan)	2016/17	--
GHGs & Air Pollutants	??% Reduction in PM ₁₀ CO ₂ , NO _x , and SO _x	2016/17	--

* Actual Base and Target Years will be determined by sector

1. All question marks are used to illustrate that specific target years need to be defined.

4.3 Strategy Roadmap

4.3.1 STRATEGY CONCEPT

The National Energy Efficiency Strategy (NEES) will focus on developing an enabling framework for energy efficiency practices to expand by removing existing barriers that inhibit market growth. This framework will rely on a combination of regulatory and policy reforms as well as market transformation initiatives to increase demand on efficiency and build capacity to meet market demand. Reforming relevant policies will create demand, and building the necessary capacity in the delivery channels will strengthen market development. Regulations and successful policy reforms can be utilized to "push" the energy consumers towards energy efficiency practices. Policy reform and regulations can also be used with other market-based initiatives to "pull" the market and condition its growth towards efficiency.

As illustrated in Figure 4, the "push and pull" strategy elements and initiatives will rely on a range of cross cutting activities such as capacity building, awareness and promotion, and information integration. Since flexibility is an essential element in the design of any strategy, maintaining the right balance between policy reforms and market transformation initiatives will require an implementation approach that allows for greater flexibility and customization.

Figure 4: NEES Conceptual Diagram



4.3.2 STRATEGY APPROACH

To achieve the desired objectives of the strategy, an enabling environment for the expansion of the energy efficiency practice needs to exist. Creating such an environment will require concurrent activities in several key areas. However, and prior to discussing these areas, it is essential to identify a point of responsibility for overseeing the development, coordination, and implementation aspects of the NEES in general. The most suitable body to take that function is the Energy Efficiency Council (EEC).

For the purpose of discussing key areas and approaches to achieve the goals and objectives of the strategy, two main areas are defined. 1) Areas relying on policy and market initiatives to condition the market by stimulating demand for and increasing the supply of energy-efficiency goods and services. 2) Cross cutting activities that function as a general foundation for the energy efficiency field to grow and develop. Each of these areas includes a group of proposed initiatives or tactics for which further detailed planning and careful evaluation are

required for market implementation. Approaches or key areas focusing on removing existing barriers, and provide market conditioning are:

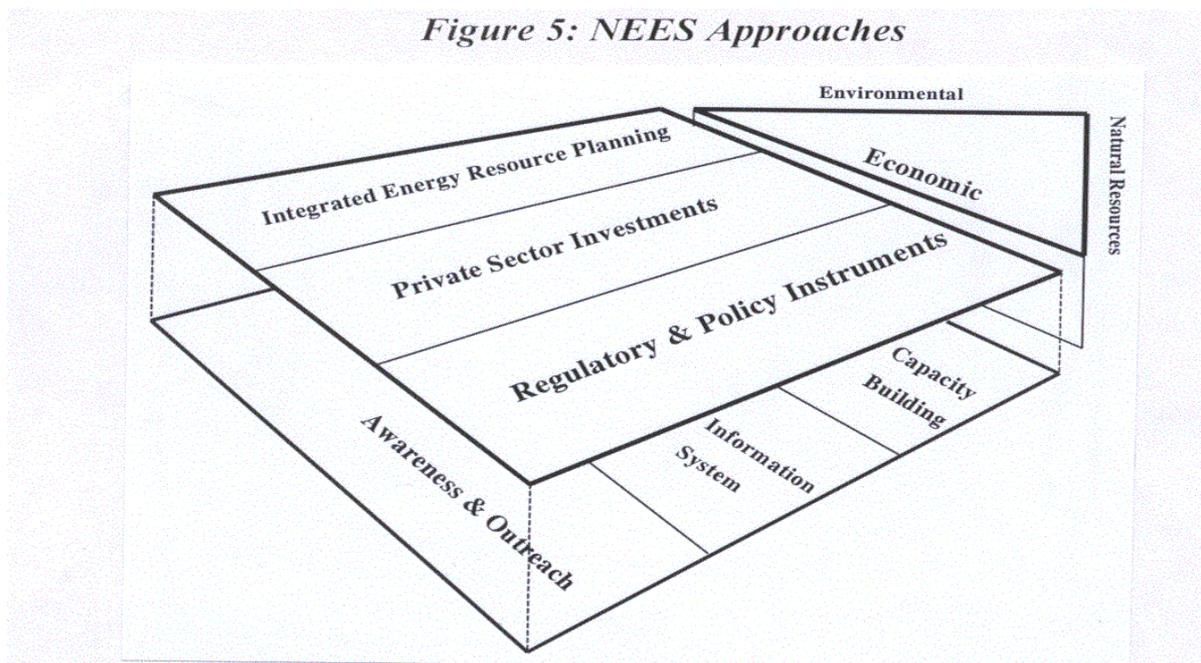
1. Utilizing regulatory and policy instruments to move towards EE.
2. Attracting private sector investments and resources in EE.
3. Integrating energy efficiency into energy, economic, and environmental planning.

The current climate and economic conditions is suitable for only some of these initiatives, allowing for easier market acceptance. The remaining initiatives, however, will require more fundamental changes in policies and regulations before their adoption is possible. Therefore, proposed initiatives are classified as either long-term or short-term based on their relevance to the national priorities, prevailing policy, and institutional conditions.

Key areas that are considered as a necessary foundation for the energy efficiency field to grow and develop are:

4. Increasing awareness of energy efficiency benefits.
5. Building capacity in key stakeholder organizations.
6. Developing an integrated energy efficiency information system.

Each key area in both groups comprises of various tools, approaches, and means to achieve its objectives. Figure 5 provides a conceptual illustration of how the strategy approaches lead toward strategy objectives, followed by a brief explanation of the overall theme and focus of each key approaches.



1. Utilizing Regulatory and Policy Instruments

A range of policy instruments will be used to send economic and regulatory signals to key energy efficiency stakeholders. A primary objective of the regulatory and policy initiatives is to expand the applications of energy efficiency practices by encouraging cost-effective delivery of efficient products and related services. In the short- to medium-term, targeted

policy interventions will be used to stimulate the supply of and demand for energy efficiency technologies and services. Full-scale adoption and commercialization of many energy efficiency technologies may be achieved in the longer run.

Key to the success of the Strategy however, is ensuring that proposed regulatory and policy reforms are offered in an integrated fashion, thus avoiding conflicting signals, and leveraging potential synergies. Examples of these instruments include:

- Pricing signals that encourage optimal use of available resources for both fuels and electricity while taking into consideration socioeconomic objectives.
- Investment incentives and tax credits that stimulate the development of energy efficiency projects and increase the local manufacture of efficient technologies.
- Codes and standards that detail minimum acceptable energy efficiency and performance for energy-intensive end-uses through mandatory and voluntary guidelines.
- Favorable import duties for designated energy-efficient equipment with penalties imposed on imported in-efficient and environmentally unfriendly products.

2. Attracting Private Sector Investments and Resources

A key component of the NEES is encouraging private sector involvement in the delivery of energy efficiency goods and services. Developing a market-driven environment that mobilizes technical and financial resources of the private sector will expedite implementation of the Strategy recommendations. Creative delivery mechanisms, competition, and other means to increase market awareness will expand the energy efficiency practice. This can be engineered through proper policy and regulatory signals.

Using private resources can also be accomplished through public-private partnerships (PPPs). The formation of PPPs will leverage private sector expertise in financing and developing energy efficiency initiatives. PPPs will help create commercially viable methods of providing infrastructure and services to key areas of the economy, including the energy, industrial, transportation, and commercial sectors. To stimulate the use of such arrangements, the government will enhance its procurement guidelines, as well as other institutional practices, to create a healthy environment for PPPs.

The strategy approach will also stimulate participation of local and international financial institutions in the development of the energy efficiency market. The creation of investment vehicles will be evaluated as means to fund energy efficiency projects.

3. Integrating Energy Efficiency into National Energy Planning

One of the key approaches to increasing efficiency of the economy is integrating energy efficiency considerations into national economic, energy, and environmental planning. This includes the application of least-cost planning techniques such as integrated energy resource planning, which relies on the use of supply- and demand-side measures to meet Egypt's growing energy needs. In addition to traditional planning aspects, it will include considerations for end-use efficiency programs (or demand-side management programs), industrial competitiveness and international trade, deployment of distributed generation resources, development of domestic renewable energy resources, alternative fuels, and advanced "clean" technology R&D, among others. Integrated planning will thus ensure that domestic energy resources are utilized in a manner that promotes sustainable economic development and environmental protection.

4. Increasing Awareness of Energy Efficiency Benefits

Energy efficiency awareness and promotional campaigns will be undertaken in parallel with other strategy initiatives in order to stimulate local demand for energy efficient goods and services. Awareness campaigns and outreach activities will be designed to support the core policy and market initiatives in the NEES by accomplishing the following:

- Enhancing the awareness of target players of the economic benefits of energy efficiency, as a foundation for increasing the **supply** of energy efficiency services.
- Increasing public awareness of the environmental, health-related and economic benefits of energy efficiency, thus increasing **demand** for energy efficiency services.

Target players to which energy efficiency awareness and outreach activities will be directed include investors, energy service providers and equipment manufacturers. This will ensure their buy-in and help increase the supply of energy efficient goods and services.

On a parallel track, energy efficiency awareness and outreach activities will target service recipients including end-users and the general public. This will enhance their support of energy efficient practices and values due to economic, health-related and environmental gains. This will lead to increased demand for energy efficient goods and services.

Increasing awareness of energy efficiency should be viewed as an ongoing task to be accomplished through effective channels such as media campaigns, educational programs, advertising and informational seminars. The media, as well as educational institutions, will have a key role to play in this respect. Awareness campaigns will also be directed at and channeled through private business associations and non-governmental organizations, given the opportunities for leveraging their existing information exchange mechanisms.

5. Building Capacity in Key Stakeholder Organizations

Capacity building initiatives will be designed to support the core policy and market initiatives and recommendations in the NEES by building the required capacity for targeted players to supply the policy inputs and energy efficiency services needed.

Capacity building initiatives will help increase the supply of energy efficiency services by providing energy managers and service providers with the skills and expertise required for implementing projects nationwide. Capacity building activities will also fill gaps in the local manpower profile through a variety of training courses, certification programs, institutional development activities, technology transfer, and the formation of centers for energy efficiency technology development. Energy efficiency stakeholder organizations will be strengthened through capacity building activities that are specifically tailored to the needs of their personnel. In addition, capacity building initiatives will equip policy makers and reformers with the requisite expertise to develop effective policy frameworks that are designed to facilitate the implementation of market initiatives and related NEES activities.

6. Developing an Integrated Energy Efficiency Information System

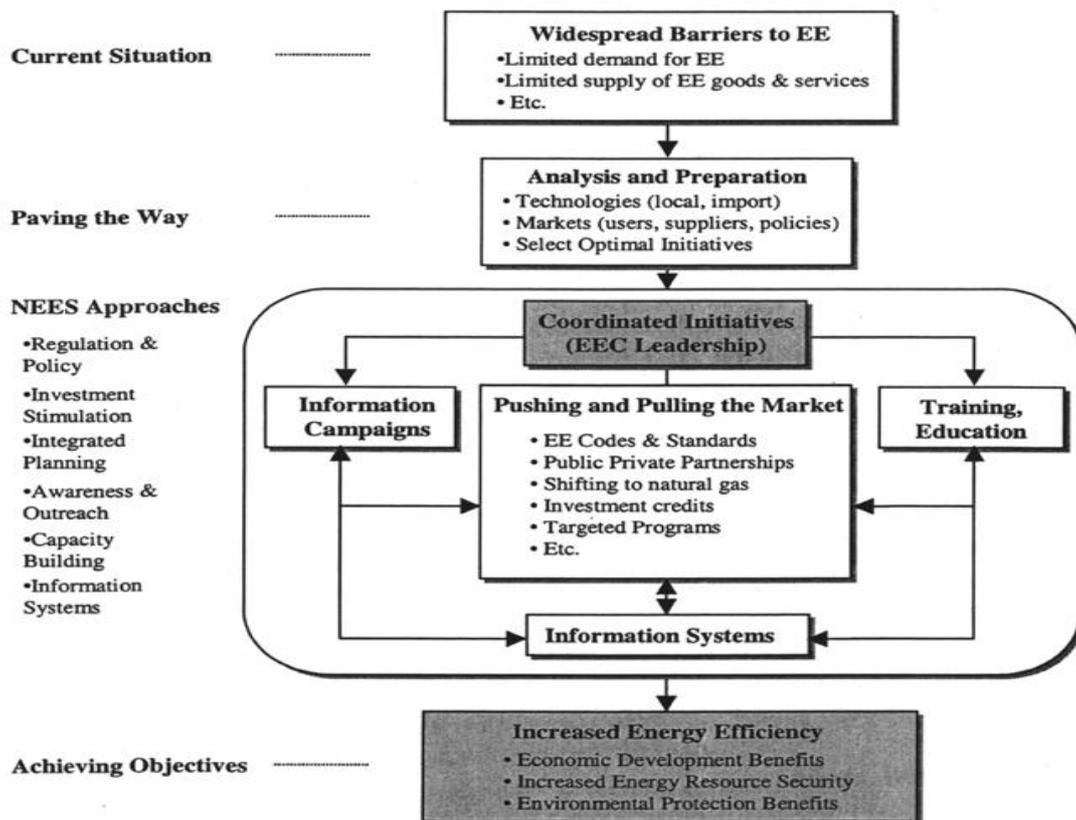
Accurate quantitative and qualitative information is required to enable informed decision-making in developing and implementing the NEES. Furthermore, it is required in the market place to enable energy users and service providers to make sound business decisions

regarding energy use and investments. Therefore, the role of information systems in supplying reliable data to stakeholders is paramount to realizing the Strategy goals and objectives. A coordinated information integration approach will identify appropriate systems, processes, and linkages to meet the information requirements of EEC decision-makers, organizations, and interested parties in government, industry, commerce, and society in general.

4.3.3 REALIZATION OF STRATEGY OBJECTIVES

As outlined before, the successful realization of the national strategy is expected to bring substantial benefits to the national economy, security of energy resources, and the environment. The NEES accelerates the achievement of these benefits occurs through more widespread and rapid adoption of energy-efficiency (see Figure 6).

Figure 6: Realizing NEES Objectives through Strategy Approaches



From the current situation, which is characterized by numerous barriers to energy efficiency, the EEC is paving the way towards a comprehensive strategy. The EEC's preparatory work is building upon previous and existing activities by analyzing remaining market, institutional, and technology barriers. The outcome will be a comprehensive set of initiatives (each of which comprises action plans that coordinate the activities or multiple stakeholders), consistent with the strategy concept and approaches described above.

Through the EEC's leadership, initiatives will be implemented in a comprehensive and coordinated manner, ensuring that market barriers to energy efficiency are appropriately prioritized and addressed systematically. Market stakeholders, through their active participation, will provide invaluable guidance to the EEC's strategy approaches and play critical roles in implementing NEES activities. The outcome of their combined efforts will be the more rapid realization of increased energy efficiency and its benefits to the country.

4.4 Strategy Recommendations

To define a clear path of the NEES implementation, a framework of time-bound recommendations that integrates policy and market-based initiatives with local regulations and national priorities will ultimately be needed. Well-defined stakeholder roles and responsibilities will enable effective coordination and implementation of a wide range of strategy initiatives. Brief discussions of an implementation timeline and of stakeholder roles follow in below sections.

4.4.1 IMMEDIATE STEPS

During the initial phase of the strategy, the EEC and its member organizations will need to take some immediate steps to position the NEES for implementation. During the first year after approving the strategy, the following front-end activities are critical in order to lay the foundation for the successful implementation of the NEES.

· Formalize Functions of the EEC

To ensure successful and timely implementation of the NEES, it is essential that the main functions of the EEC be formally recognized, thereby given it the necessary momentum to play a leadership role in guiding and monitoring the development of an enabling environment for energy efficiency. Key functions for the EEC should include:

- Identifying and advocating necessary energy efficiency policy and regulatory reforms.
- Ensuring comprehensive energy efficiency programming and planning.
- Mobilizing and securing resources (including coordination of donor funding activities) for implementation of NEES initiatives.
- Setting implementation targets and quantifiable goals.
- Monitoring the ongoing implementation of the NEES.

· Prioritize Strategy Recommendations and Initiatives

An essential front-end activity for the EEC and its member organizations will be to prioritize policy reforms and strategy recommendations. This identification and analysis of policy recommendation will involve the following activities:

- Initiating detailed policy and economic analysis that will provide the basis for formulating a policy reform agenda.
- Identifying linkage of strategy initiatives to national economic, environmental, and social priorities.

· *Develop Coordinated Stakeholder Action Plans*

EEC member organizations will develop individual action plans in support of implementing the NEES. Action plans will be time-bound and will address the following elements:

- Actions that a given organization will take to help implement the NEES within its domain (technical analysis, policy development, and outreach & promotion activities).
- Resource and capacity building requirements.
- Organizational responsibilities (assigning responsibility within the organization to carry out strategy-related activities).

The EEC will take a coordinating role by ensuring that the action plans of individual organizations are consistent with the national economic and environmental objectives.

4.4.2 KEY POLICY & MARKET TACTICS

As mentioned above, key policy and market tactics utilize three broad approaches for stimulating energy efficiency in various sectors of the economy. These approaches use a variety of tactics and tools to remove targeted market barriers or seize specific market opportunities. The approaches include:

- Utilizing regulatory and policy instruments to move towards efficiency.
- Attracting private sector investments and resources in energy efficiency markets.
- Integrating energy efficiency into energy resource planning.

The following policy and market recommendations comprise core strategy elements, comprising integral parts of the three strategy approaches.

RECOMMENDATIONS

1. Developing a National Plan for Energy Efficiency Standards

The development of a national plan for EE codes and standards (NPEECS) is needed to help accelerate the deployment of high efficiency technologies as well as to encourage the construction of energy-efficient buildings. The establishment of codes and standards will ensure that design specifications for new equipment and buildings meet or exceed high efficiency standards while preventing Egypt's existing stock of equipment and buildings from slipping below such standards. It is important that the development of a national plan be based on a systematic approach that fosters the increased participation and inter-agency cooperation of key stakeholders. The development of a national plan will be jointly led by the Egyptian Organization for Standardization (EOS), the Organization for Energy Planning (OEP) and the Housing and Building Research Center (HRBC). However, the establishment of a national plan will also involve a myriad of concerned entities, including but not limited to local equipment manufacturers and suppliers and their respective trade and business associations, as well as other stakeholders in the equipment/technology deployment "supply chain." The national plan will not only ensure that suitable standards are codified but will incorporate proper provisions for monitoring and enforcement.

The proposed approach to developing EE codes and standards will be implemented in four main stages. The initial stage of the NPEECS will focus on the inclusion of EE codes and standards as a key item in the National Energy Efficiency Strategy. The second stage will

involve three key elements: First, an institutional capacity assessment will be carried out in order to determine the manpower and infrastructure needs that are required to support a comprehensive NPEECS. Second, relevant studies and analysis will be conducted in order to prioritize the equipment/technologies for which the technical committee should establish EECS. Third, a technical committee for EECS will be established to develop a standardized approach to developing the EECS (this will be carried out in parallel to the second element). The third stage will focus on the development of EE codes and standards. Other activities will include developing test procedures, evaluating labeling and enforcement/compliance-related issues, and awareness & promotion programs. The fourth stage will include the development of supporting laws and regulations as well as introducing monitoring programs. Follow-up and continual improvement systems will also be developed.

2. Identifying and Promoting Strategic Public/Private Partnerships

The formation of public-private partnerships (PPPs) can be used to improve the delivery of existing public services and/or to create new services that utilize the financial and technical resources of the private sector.¹ Successful PPPs draw on the expertise and existing assets of the public sector by forming complementary partnerships with the private sector. PPPs offer Egypt an efficient method of providing energy services that support the implementation of numerous NEES initiatives, including:

- Development of new financing vehicles.
- Promoting local manufacture of energy-efficient equipment.
- Encouraging the cost-effective procure procurement of energy efficiency resources.
- Accelerating the shift from liquid fuel oil to natural gas.

The use of PPPs would represent a change in the way many Egyptian government and public sector organizations have typically financed and delivered energy services. To create an enabling environment for PPPs, a series of targeted policy analysis, capacity building, awareness and promotion, and policy development programs should be implemented as part of a preparatory and implementation phase of the NEES.

A prerequisite to the widespread use of PPP is to carry out a series of front-end preparatory activities that are conducted in parallel over the short-term period, including:

- Forming a PPP Steering Committee.
- Identifying Target Areas for PPP Development.
- Building Capacity.
- Increasing PPP Awareness.

During the implementation phase, momentum gained from activities carried out in the preparatory phase will help create the enabling environment and technical expertise that is necessary to develop a variety of PPPs. Long-term strategy actions will therefore focus on testing PPP options and the codification of PPP guidelines as part of an implementation phase, including activities such as the following:

- Developing Pilot Projects.
- Enacting a PPP Policy.

1. PPPs can be created through a variety of partnership arrangements, including concessions, joint-ventures, and outsourcing.

3. Integrating Energy Efficiency into Environmental Policy

When the Government of Egypt placed improving environmental quality on its priority list, as evident by instituting Law 4 of 1994, the market responded accordingly. The Government priority was mirrored in the business community, and the financial industry paid attention to these emerging needs. Energy efficiency will take the same level of attention if it is promoted as means to economic and environmental solutions. Additionally, the link between energy efficiency and mitigation of adverse climate change lends a strong justification to include energy efficiency as means to comply with the requirements of Law 4.

4. Developing Balanced Custom Tariffs for Imported Energy-Consuming Equipment

Imposing duty taxes on imported goods is used to protect local products from foreign competition. However, most technically proven equipment are manufactured outside of Egypt and therefore, duties present an economic barrier for wide spread implementation. A detailed listing of energy efficiency measures should be compiled with projections of their market penetration for the near future. An analysis should be performed to determine the optimum custom duties rate structure that increases the economic feasibility of projects while maintaining revenue neutrality to the Country's treasury.

5. Facilitating On-site Energy Production

Egypt can capture significant economic and environmental benefits from the increased development of projects that involve the efficient on-site generation of electricity and heat at industrial and commercial facilities. To facilitate the development of cogeneration projects, a comprehensive policy is needed that addresses the following elements:

- On-site generation tariff structure (that includes sell-back provisions and equitable charges for back-up power).
- Technical requirements (grid code) for operating on-site generation units in parallel to the national electric grid.
- Proving transparent guidelines for siting and licensing requirements.

The development of a policy for on-site generation will leverage the work of the Ministry of Electricity and Energy, which is evaluating a range of cogeneration policy options.

6. Developing New Financing Vehicles for Energy Efficiency

The creation of new financing vehicles will help project developers and end-users overcome a significant barrier to energy efficiency investments: a lack of long-term financing options that meet the needs of performance based contracts. Financial institutions are becoming increasingly aware of the economic and environmental benefits from investments in energy efficiency. However, local financial institutions are still in an evaluation mode in which they are assessing the viability of energy efficiency as a business option. To fully engage the financial sector, the following steps should be taken to mitigate perceived lending risks and create a market environment that is more conducive to creating new financing vehicles:

- Enacting legal and regulatory reforms that strengthen the ability of local stakeholders to enforce contracts.

- Deepening local capital markets in order to provide increased access to capital.
- Providing government guarantees on selected energy efficiency projects.
- Increasing the awareness among local financial community regarding energy efficiency project development methods.
- Prioritizing policy and market reforms that help create a pipeline of bankable projects (e.g. development of PPPs, efficient energy pricing, etc.).

7. Promoting Local Manufacturing of Energy-Efficient Equipment

The creation of a sustainable market for energy efficiency in Egypt will require the development of a strong base for local manufacturing of related equipment and other products. Establishing a local manufacture of clean and efficient technologies will help lower up-front investment costs, improve project economics, facilitate maintenance and after-sale support, and create high-skilled new jobs. To encourage local and foreign companies to establish manufacturing operations in Egypt however, an enabling business environment must exist. This will require:

- Economic incentives.
- Industry incubators.
- Licensing and co-manufacturing.
- Protection against foreign products.
- Technology commercialization strategies.

8. Encouraging the Procurement of Cost-effective Energy Efficiency Resources

As mentioned earlier, integrated energy planning relies on the use of either least-cost supply- or demand-side resources. Procuring cost-effective energy efficiency resources will require coordination to ensure competitiveness and verification that such resources can be relied on as part of the overall energy resource map. An implementing agency is needed to play such a coordinating role. The most likely model to implement this initiative is a demand-side management program under the guidance of a power utility or a local distribution company.

The cost of procuring these resources can be arranged in the form of a "customer charge" or a pure government subsidy to help establishing the concept. In the short term, a public oversight agency (designated regulatory agency) might best oversee the implementation of such an initiative, with possible future administration transferring to the private sector.

Egypt has become an attractive market for international independent power producers (IPPs) to compete for contracts to build generation resources. This presents Egypt with an opportunity to procure energy efficiency resources in conjunction with power generation.

9. Accelerating the Shift from Liquid Fuel to Natural Gas

Egypt's abundant reserves of natural gas is estimated at approximately 43 trillion cubic feet, which provides the country with a unique opportunity to utilize its energy resources in a manner that promotes sustainable economic development.¹ Current Egyptian energy policy calls for the shifting of energy demand away from fuel oil and towards natural gas. However,

1. OEP, November 2001 (Arabic Version). The identified seismic 3D potential gas reserves are 120 trillion cubic feet.

in order to stimulate domestic markets for natural gas, innovative business approaches and policy reforms that overcome existing barriers are required, including:

- Expanding the BOOT contracts with natural gas Local Distribution Companies (LDCs) to include incentives for providing turn-key natural gas-based energy services.
- Removing subsidies on local fuel oil.
- Offering incentives for end-users to convert oil-consuming equipment to natural gas.
- Providing training required to install, operate, and maintain natural gas-fired equipment.
- Developing policies that promote on-site generation of power using natural gas.

10. Increasing EE in the Transportation Sector

Transportation accounts for approximately 31% of Egypt's total final energy consumption. The transportation sector is a major consumer of oil products - accounting for over 40% of Egypt's total annual oil consumption.¹ Given the major impact that transport activities have on local economic, environmental, and social issues, front-end activities of the NEES will include the development of an action plan that will help optimize energy use in the transportation sector. The action plan will include an analysis of a wide range of efficiency options for freight and passenger transportation, including:

- Switching to alternative fuels that help reduce emissions and improve fuel economy (including the conversion of vehicles to compressed natural gas systems).²
- Shifting to less energy-intensive modes of transportation by encouraging the increased use of mass transit systems (via policy directives and pricing signals).
- Improving transportation infrastructure and planning by enacting policies that reduce the demand by transport vehicles and improve traffic flow within existing systems.
- Increasing the use of efficient transportation technologies by developing incentives that help promote the use of vehicles with high fuel economics.

11. Expanding the Use of Renewable Energy Technologies

Renewable energy technologies offer Egypt clean sources of energy that have a significantly lower environmental impact than conventional energy technologies.³ Therefore, the NEES will include a series of targeted programs that foster the deployment and use of new and renewable energy technologies in key areas of the economy, including electric power generation and transportation.⁴ Renewable energy programs will be conducted in coordination with a variety of NEES initiatives and will include the following elements:

- Establishing investment incentives and tax credits that stimulate local utilization and manufacture of new and renewable energy technologies.
- Incorporating renewable energy into supply-side energy planning (e.g. evaluating the use of renewable systems to meet distributed power generation needs).

1. Organization for Energy Planning, 1999.

2. The accelerated conversion of cars and buses to natural gas will leverage the success of ongoing GOE and international donor-funded transportation sector initiatives.

3. The GOE has set a target of having 3% of Egypt's electricity production being generated by new and renewable energy by the year 2010. (NREA, January 2001)

4. NREA (New and Renewable Energy Authority) is leading several initiatives that focus on the analysis of wind, solar, and biomass energy systems.

- Increasing research and development efforts that aim to accelerate the commercialization of renewable energy systems (where possible, leveraging partnerships with the private sector and international donor community).

12. Preparing Competitiveness Road Maps for Energy-Intensive Industries

To compete successfully in markets that are increasingly competitive and globally open, the Egyptian industrial sectors must implement strategic reforms and invest wisely in technologies that will achieve competitive advantages in the future. The process of industry road mapping serves national interests by examining market and technology trends to identify strategies aimed at maintaining those competitive advantages. The initial focus will be on energy-intensive industries, where management and technological improvements serve to reduce energy use and boost profits: efficiency gains will not only benefit domestic industries, but also benefit the national economy and environment.

4.4.3 CROSS CUTTING ACTIVITIES

Throughout all phases of the NEES, there will be a series of cross cutting activities that are required to facilitate the successful completion of most if not all strategy initiatives. Specifically, continuous support will be needed in awareness & outreach, capacity building, and information integration domains.

1. Increasing Awareness of Energy Efficiency Benefits

In order for energy efficiency awareness and outreach activities to be effective and to contribute to the achievement of NEES objectives and targets, they need to be based on careful analysis and planning. They also require carefully coordinated implementation, and ongoing evaluation of effectiveness and degree of target achievement. Careful planning and coordination will counter current fragmented efforts in raising energy awareness, with their contingent duplication of efforts wastage of resources and limited achievement of results.

In the interest of careful planning, effective coordination and evaluation, the EEC will take a lead role in directing energy efficiency awareness and outreach activities. This is in keeping with objective #4 in the EEC Protocol, stated as follows: "Cooperation in outreach and awareness building initiatives on energy efficiency, renewable energy, demand-side management, and global warming through awareness campaigns, workshops, and capacity building seminars"¹.

The EEC will have oversight in determining awareness needs, prioritization of activities that address awareness needs, and coordinating awareness/outreach plans belonging to different organizations. It will monitor and evaluate programs, maintain cross-organizational data on awareness needs, programs, participants, and results. In executing this coordination function, the EEC will need to delegate to one of its members organizations the responsibility of conducting needs assessments and market research, aligning organizational outreach plans, monitoring program implementation, and maintaining awareness data.

The results of awareness needs assessments will drive the development of annual awareness and outreach plans at the organizational level, with stakeholder organizations planning to

1. EEC Protocol, October 1998.

implement targeted awareness programs that meet specific objectives and address specific audiences. In addition organizational plans will be coordinated to inform long-term national awareness and outreach plans. This will maximize the effective utilization of resources for implementing awareness programs, and enhance the collective achievement of desired results to support NEES objectives.

Awareness and outreach plans will then form the basis for designing and implementing specific campaigns and programs. The plans will clearly provide the objectives, desired results and resource framework within which awareness programs can be implemented. Program design and campaign organization may be outsourced to specialized campaign organizers and service providers, and monitored by the outsourcing organizations, until such a time when a core of awareness specialists is formed to undertake design and implementation activities.

Awareness and outreach activities will also be evaluated by the implementing organizations to measure the degree to which they have achieved organizational targets. In addition, national-level evaluations of awareness activities will be conducted in order to assess the degree of achievement of national awareness targets, to evaluate contribution to NEES objectives, and to further assess energy efficiency awareness needs.

The above awareness planning and implementation mechanism will be supported by a national awareness and outreach database that maintains needs-related, planning, implementation, programmatic, participant-related and evaluation data. All member organizations will be required to provide systematic data to update the database. The database will be accessed by all organizations as well as by the EEC as a key source of information for awareness needs assessment, planning, implementation, and evaluation purposes.

2. Building Capacity in Key Stakeholder Organizations

As is the case with awareness and outreach, capacity building planning and implementation need to be based on careful analysis, effective coordination, ongoing monitoring and evaluation, and cross-organizational information sharing, if they are to contribute to the achievement of NEES objectives and targets. Currently, several capacity building efforts are undertaken with no overall strategy to guide them, and with little or no cross-organizational coordination, a fact which again leads to duplication of efforts and resource wastage. In addition, current capacity building efforts cannot serve to fill gaps in the energy efficiency manpower profile unless these gaps are assessed and efforts to fill them are carefully planned and coordinated. This is why it will be necessary for the EEC to either plan and coordinate capacity building activities in the field of energy efficiency or to delegate the executive responsibility for such coordination to one of its member organizations.

To this end, the capacity building planning and implementation mechanism again starts with assessing manpower needs in the area of energy efficiency. Needs assessments of current and target energy efficiency skills and expertise have to directly derive from core NEES policy and market initiatives in order to indicate the skilled manpower that will implement these core initiatives. As such, careful analyses and prioritization procedures, a key EEC function, should direct the nature and timing of capacity building activities in order to ensure their contribution to the implementation of core NEES policy and market initiatives.

The above needs assessment and prioritization activities will yield long-term national capacity building plans to fill determined gaps in the energy efficiency manpower profile. These long-term national plans will state the preliminary objectives of capacity building activities to be undertaken and relate those to NEES objectives and targets. Plans will also specify the target audiences for capacity building activities, and determine the overall resource framework required for implementing capacity building activities. Such long-term plans will facilitate the targeted funding of energy efficiency capacity building activities through donor agencies as well as national resources.

The above national-level needs assessment and planning activities will inform and be informed by organizational-level needs assessments and annual capacity building plans. These organizational plans will again be coordinated to ensure effective resource utilization and eliminate duplication of efforts.

Capacity building plans will form the basis for designing and implementing programs. Design and implementation may again be outsourced to specialized training providers until such a time when a core of energy efficiency training specialists is formulated. Program implementation will be systematically monitored by the outsourcing organizations to ensure quality and target achievement. In addition, there will be a need for developing and implementing national-level energy efficiency certification programs.

Capacity building initiatives will be evaluated on an ongoing basis by the implementing organizations. In addition, national level evaluations of capacity building results will be undertaken in order to inform further capacity building planning activities and initiatives.

Capacity building data will again be maintained in a national database, to be updated and accessed by all stakeholder organizations. Again, such data will inform further needs assessments, planning, implementation and evaluation activities.

3. Developing an Energy Efficiency Integrated Information System

Although a significant amount of data on local energy use has been compiled by various organizations, comprehensive energy information is not always readily available to support decision-makers and end-users in the public and private sectors. An integrated information system will support planning and implementation of the NEES by ensuring availability of comprehensive information and by facilitating information exchanges among EEC organizations and stakeholders.

The integrated information system would take the form of distributed information resources (e.g., electronic data, information processing tools, reference materials and reports, etc.), in which core functions, access, and security are clearly established in a series of bilateral and multilateral protocols. The "system" would therefore incorporate both sophisticated information technologies (IT) and more conventional information formats. The protocol agreements would provide for core information system functions including, but would not be limited to, activities such as: data collection and compilation, analysis and validation, updates, dissemination and reporting, etc. Protocols would therefore be both IT-based and process-based.

Steps to develop and organize an integrated national energy information system would focus on the following elements:

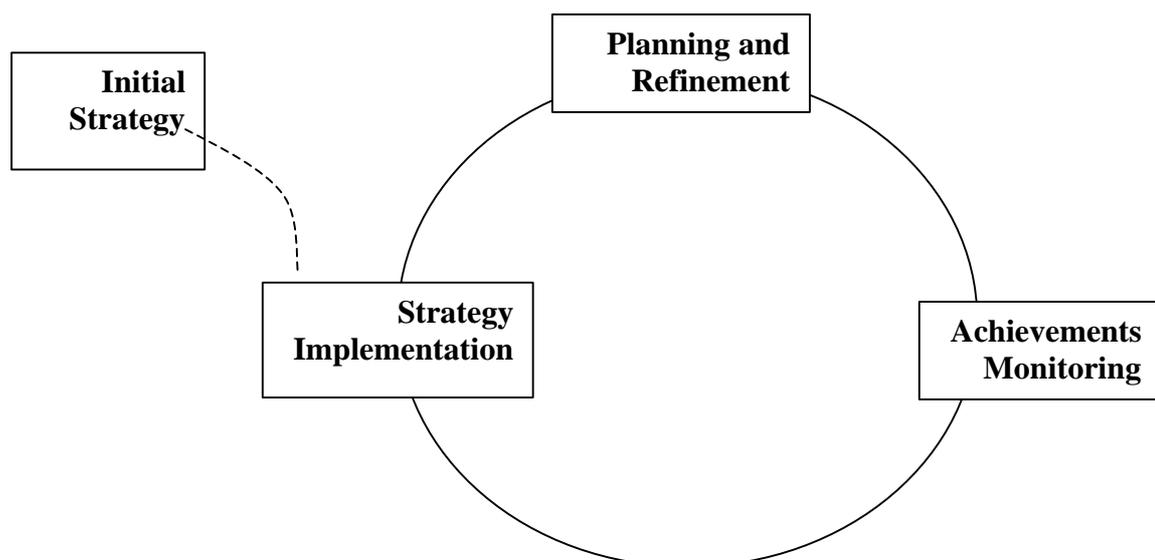
- Identifying information needs to supporting planning and implementation of a broad range of proposed and potential NEES initiatives. This would require identifying needs, processes, and responsibilities to increase the accuracy of information (e.g. reconciling data discrepancies, improving forecasting techniques, etc).
- Developing information sharing protocols among strategy stakeholders to ensure timely data exchange and security. Initial protocols would be based upon existing resources and would be modified as IT-based and other resources develop.
- In parallel with development of information exchange protocols, coordinating stakeholder IT development plans with the appropriate organizational roles and responsibilities.
- Establishing a networked National Energy Information Center within an EEC member organization to support strategy implementation and development. The Center will serve as a repository for electronic and physical information resources, as well as a clearinghouse to direct stakeholders to energy information.

4.5 Implementation Timeline

4.5.1 NEES IMPLEMENTATION CYCLE

The National Energy Efficiency Strategy, comprising multiple initiatives to meet its objectives and involving the efforts of numerous stakeholders, will necessarily require sustained activities over several years. As with any other public or private sector activities, implementation of strategy initiatives will be managed through a continuous cycle of planning, implementation, and monitoring. The evaluation of monitored achievements then feeds back into planning, where activities are revised and refined (see Figure 7).

Figure 7 : NEES Implementation Cycle



The implementation cycle begins, of course, with an initial strategy that is itself the product of intensive analysis and preparation. In the text below, Section 4.5.2 describes the stages of initial National Energy Efficiency Strategy development and finalization and Section 4.5.3 describes stages of the NEES implementation cycle.

4.5.2 STRATEGY FINALIZATION

Development and finalization of the initial NEES is characterized by two distinct phases: preparation, in which stakeholders develop the initial strategy framework, and adoption, in which the initial strategy becomes embodied in coordinated stakeholder action plans.

- NEES Preparation Phase: Stakeholders develop strategy framework for achieving stated national objectives, conducts appropriate preliminary analyses, develops strategy concepts, and identify key priorities (e.g., target market sectors and end-use technologies). The EEC is presently nearing the end of the NEES framework development.
- Strategy Adoption: Beginning with approval of a well-stated strategy framework, the EEC works to formalize its planning and coordination functions. In parallel, the EEC and its members will be developing and coordinating action plans consistent with the NEES framework, establishing measurable expectations, and mobilizing necessary resources. This step - development and coordination of action plans - will require considerable analyses, discussion, and negotiation among all stakeholders and can be expected to require a further 9-12 months.

As the NEES is finalized, as a whole or in stages as coordinated action plans are finalized and adopted, stakeholders will be launching or (continuing) some of the identified high priority initiatives, which will lead the NEES into the implementation cycle.

4.5.3 IMPLEMENTATION TIMELINE

As characterized above, NEES activities will be conducted in a cyclical loop of planning, implementation, monitoring, and back to planning/revising. With each iteration of the implementation cycle, NEES activities will change and improve in response to changing market conditions. The implementation timeline can be characterized in several phases:

- Near term (first 1-2 years): NEES activities will concentrate on initiating (or continuing) high priority, long lead-time activities. The development of such as codes and standards, for example, would be a high priority even though impacts would not be expected for several more years. Other high priorities would include:
 - Beginning capacity building and outreach activities.
 - Initiating a dialog between public and private sectors to develop strategic partnerships.
 - Completing analyses needed to support priority policy/regulatory changes.
 - Launching systems for information exchange and monitoring.
 - Continuing longer-term development and research activities (e.g., industry road mapping, financing vehicles, etc.).
- Medium term (years 2-5): During this period, the market would be characterized by increased awareness (consumer demand for EE goods and services) and increased capacity in delivery channels, operating in an environment where initial policy changes would be beginning to take effect. The NEES would encompass:
 - Broad implementation of fully developed initiatives.
 - Continued development and expansion of cross-cutting initiatives (awareness, capacity building, info systems),
 - Realization of benefits from activities with short lead times. Procurement of EE resources, selected PPPs, fuel-switching to gas, and other initiatives, for example, could

- be achieving significant impacts.
 - Rollout of longer lead-time activities and initiatives.
 - analysis of monitoring results being incorporated into ongoing planning activities.
- Long term (years 5+): A broad spectrum of NEES activities would be in full-scale implementation and initiatives should be functioning smoothly. The ongoing cycle of planning, implementation, monitoring, and refinement would be well established. Market maturity would be considerably increased, and the NEES effects on accelerated EE technology deployment would be achieving significant benefits for the country.

4.6 Stakeholder Roles and Responsibilities

The successful implementation of the NEES and its various recommendations and initiatives requires a clear definition of the roles and responsibilities of all stakeholders including the government, public sector, private sector, non-governmental organizations, and the EEC.

This may pose a challenge given the numerous stakeholders involved or influenced by the energy efficiency practice. Therefore, and to insure accountability to reaching the goals, and to minimize role ambiguity during the implementation period, each of the key stakeholders should assume either a primary or a supporting role in each of the 6 main implementation approaches described earlier.

Table 7 illustrates the proposed roles and responsibilities of all energy efficiency stakeholder groups. For each of the six strategy approaches, stakeholder groups' roles are classified as either a lead role or a support role. Clarity in role definition allows for a smooth communication and coordination between groups and focuses the accountability for results.

Table 6: Stakeholder Roles and Responsibilities

	Applying Regulation and Policy	Mobilizing Private Sector Resources	Integrating EE into Energy Planning	Increasing EE Awareness	Building Capacity	Integrating Information Systems
Government	•	•	*	•	•	*
Public Sector		*		*	*	*
Private Sector		•		*	*	*
NGOs		*		*	*	*
EEC	*	*	•	•	•	•

- = Leading Role
- * = Supporting Role

4.6.1 GOVERNMENT

Includes Government agencies and Ministries related to energy production, economic development, and environmental protection and energy planning.

Roles and Responsibilities: Because of their legislative and policy implementation role, government stakeholders are suited to carry the responsibility of creating an enabling

environment for energy efficiency practices. They should provide overall guidance to the energy efficiency field to ensure its growth and development in support of national priorities. More importantly is the role of monitoring achievement and evaluation of market development in a fashion that protects public interest while benefiting from the free and competitive market concept. In summary, Government stakeholders are expected to:

- Enact regulatory reforms and facilitate initiatives that create a competitive marketplace.
- Continue ongoing energy tariff reforms.
- Establish policies to encourage cost-effective on-site energy production.
- Develop economic incentives to accelerate deployment of clean energy technologies.
- Incorporate supply- and demand-side resources into energy planning activities.
- Set minimum efficiency standards to govern equipment use and new construction.
- Incorporate procurement policies for energy efficient and clean technologies in public buildings.
- Expand outreach and energy efficiency awareness activities.
- Build institutional capacity for energy efficiency practices.
- Facilitate information exchange protocols among strategy stakeholders.

4.6.2 PUBLIC SECTOR

Includes public entities that consume substantial amounts of energy, such as publicly owned industrial or commercial enterprises, hospitals, schools, and other public institutions.

Roles and Responsibilities: Public sector stakeholders can positively influence the demand on energy efficiency field through the following activities:

- Develop energy (or cost) saving targets for public sector facilities.
- Adopt procurement practices that favor energy-efficient equipment.
- Contract out services to the private sector through competitive bidding process.
- Increase employee awareness regarding the benefits of energy efficiency.
- Establish partnerships with the private sector.

4.6.3 PRIVATE SECTOR

Private sector stakeholders include local industrial and commercial end-users, private energy distribution companies, energy products and service providers, and financial institutions.

Role and Responsibilities: the private sector can help stimulate the local market for energy services through a range of supply- and demand-side efforts, including:

- Supply energy efficiency services using innovative business approaches.
- Provide a range of financing options for energy service projects.
- Adopt voluntary guidelines that encourage the use of energy efficient equipment.
- Participate in trade associations that advocate energy efficiency business interests.
- Establish partnerships with the public sector.

4.6.4 NON-GOVERNMENTAL ORGANIZATIONS (NGOs)

Includes NGOs that are non-profit organizations advocating sustainable energy use and helping to create a dialogue between local stakeholders and policy-makers.

Roles and Responsibilities: NGOs can help promote sustainable energy and social development through a range of non-profit programs, including:

- Demonstrate innovative models for sustainable energy use through cooperative programs with energy end-users.
- Organize advocacy programs that provide policy-makers with information on key energy efficiency issues.
- Facilitate energy efficiency education and awareness programs and act as a liaison between government and private entities.
- Enhance the capacity of local organizations through mutual exchanges of energy efficiency information and expertise.
- Participate in policy development.

4.6.5 THE ENERGY EFFICIENCY COUNCIL (EEC)

The EEC is a consortium of public and private sector organizations that are associated with the generation, distribution, and use of energy committed to guide the energy efficiency practice in Egypt. The EEC was formed based on a "Cooperation Protocol" signed in 1999.

Roles and Responsibilities: Representing most stakeholders from both the public and the private sector, the EEC is uniquely positioned to guide the adoption and implementation of the NEES by facilitating its initiatives and providing directions to local stakeholders. The EEC's role should be to:

- Oversee the direction and implementation of the NEES.
- Monitor the results of strategy initiatives and refining future recommendations and expectations.
- Coordinate all local energy efficiency-related programs (including donor activities).
- Manage the development of an integrated energy information system that builds upon the current IT systems used within EEC member organizations.

4.7 Achievements Monitoring Plan

A primary objective in the development of a monitoring plan will be to provide performance-based information to NEES decision-makers and stakeholders in a manner that will enhance ongoing strategy implementation. The achievements monitoring plan will consist of the following three elements:

- Indicators and targets.
- Monitoring system.
- Evaluation and feedback loop.

4.7.1 PERFORMANCE INDICATORS AND TARGETS

Performance indicators will be used to measure progress towards achieving the objectives of the national strategy (i.e., indicators will be directly linked to NEES objectives). A series of indicators will be developed that measure (and to the extent possible quantify) the impact of energy use on economic development, environmental protection, and the utilization of natural resources. After a baseline analysis of current conditions is conducted, short- and long-term targets will be established for each indicator. Performance targets will be set at a challenging, but achievable levels.

4.7.2 MONITORING SYSTEM

A monitoring system will be established to collect information, analyze data, and disseminate results to NEES decision-makers and stakeholders. The NEES monitoring system will address the following items:

- Data sources and collection plan (compilation of performance indicators and targets).
- Frequency and schedule of data collection.
- Identification of entities that will be responsible for carrying out monitoring activities.

4.7.3 EVALUATION AND FEEDBACK CHANNELS

A central component of the monitoring system will be the creation of feedback channels that assist decision-makers in their evaluation of the success of different strategy elements. Feedback channels will provide a forum for testing different hypotheses and making any necessary adjustments to the strategy as it is being implemented.

REFERENCES

1. The Organization for Energy Planning (OEP): “*Energy in Egypt-1999/2000*”.
2. The Organization for Energy Planning (OEP): “*The Energy Efficiency Council*”, Egypt 2000.
3. Egyptian Electricity Holding Company (EEHC): “*Annual Report – 1999/2000*”.
4. SRC International; ICEMEC and Organization for Energy Planning for the Royal Danish Ministry of Foreign Affairs; DANIDA: “*Baseline Survey of the Energy Sector, Arab Republic of Egypt*”, August 1999.
5. NEXANT Inc. Under Contract to the USAID: “*A Framework for the Egyptian National Energy Efficiency Strategy*”, Preliminary Report to the Energy Efficiency Council (EEC), March 11, 2001.
6. Ibrahim Abdel-Gelil; Maher Aziz Bedrous and others: “*Egypt-Successful Practices in Policies and Measures for Combating GHG Emissions*”; Accepted Paper to the 18th Congress of the World Energy Council (WEC), Buenos Aires-Argentina, 21-25 October, 2001.
7. Eng. Maher Aziz Bedrous; Dr. Ibrahim Abdel-Gelil: “*CO₂ Reduction Linked to Increased Energy Efficiency in the Egyptian Power Sector*”; Workshop on Best Practices in Policies and Measures, UNFCCC, Copenhagen, 11-13 April 2000.