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Egyptian Environmental Policy Program
and the
National Energy Efficiency Strategy Development

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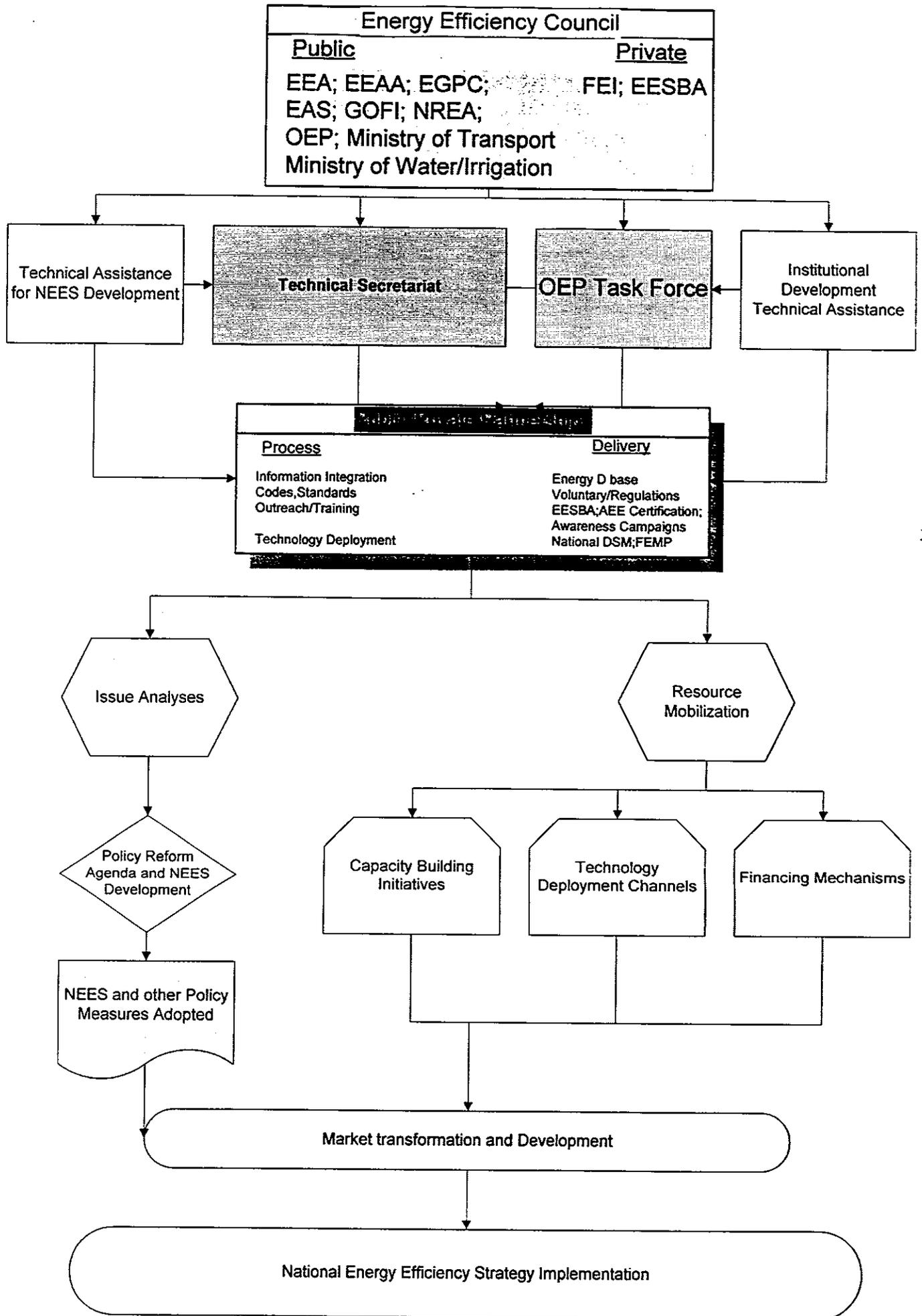
EGYPTIAN ENVIRONMENTAL POLICY PROGRAM (EPPP) AND THE NATIONAL ENERGY EFFICIENCY STRATEGY (NEES)

The *Ministry of Petroleum and Natural Resources, MOP*, is one of three Ministries collaborating on the *Egyptian Environmental Policy Program, EPPP*. The other Ministries are Tourism and Environment. Within the EPPP, the MOP activities are being carried by the *Organization for Energy Planning, OEP*, as part of its role of coordinating the development of the *National Energy Efficiency Strategy, NEES*.

The OEP has helped establish the *Energy Efficiency Council, EEC*, an eleven-member *public/private partnership* that is collaborating on the development of the National Energy Efficiency Strategy. Members of the EEC include representatives of the Ministries of Petroleum, Electricity and Energy, Industry and Technological Development, Environmental Affairs, Transport, Communications and Civil Aviation, and Public Works and Water Resources as well as the Federation of Egyptian Industries and the Egyptian Energy Services Business Association.

The EEC oversees and directs a technical secretariat. The Chairman of OEP heads the secretariat. The secretariat is carrying out *issue analyses* in four key areas as part of the NEES development: *Codes and Standards, Public-Private Partnerships, Information Integration and Training and Outreach*. The issue analyzes will include a thorough review of existing policies as they relate to energy efficiency. The intent is to identify existing and potential barriers to energy efficiency implementation and factor them into the NEES. An *associated policy reform agenda and plans for implementation of energy efficiency throughout key sectors of the economy* are being prepared. The NEES development is estimated to take one year. Technical assistance is being provided to the EEC members as they develop associated work-plans as well as to the private sector and financial community to help mobilize resources for implementation of the strategy.

The NEES is expected to stimulate a *market for energy efficiency goods and services of some \$1 billion plus*. *Widespread implementation of energy efficiency* in the country can lead to *annual energy savings equivalent to 15% of annual oil exports* and help create employment. This is *equivalent to around 1% of gross domestic product, GDP*. In addition, it will reduce *greenhouse gas emissions* to help the country meet its international Climate Change Convention commitments.



Egyptian Environmental Policy Program
and the
National Energy Efficiency Strategy Development
Energy Efficiency Council Members

**Energy Efficiency Council
(EEC)**

- 1) Organization For Energy Planning (OEP)
- 2) Egyptian Environmental Affairs Agency (EEAA)
- 3) Egyptian General Petroleum Corporation (EGPC)
- 4) New And Renewable Energy Authority (NREA)
- 5) Egyptian Electricity Authority (EEA)
- 6) Federation of Egyptian Industries (FEI)
- 7) Egyptian Energy Services Business Association
- 8) Ministry of Public Works And Water Resources
- 9) General Organization For Industrialization (GOFI)
- 10) Egyptian General Organization For
Standardization & Quality Control (EOS)
- 11) Ministry of Transportation

مجلس كفاءة الطاقة

- ١) جهاز تخطيط الطاقة
- ٢) جهاز شئون البيئة
- ٣) الهيئة المصرية العامة للبترول
- ٤) هيئة الطاقة الجديدة والمتجددة
- ٥) هيئة كهرباء مصر
- ٦) اتحاد الصناعات المصرية
- ٧) الجمعية المصرية لأعمال خدمات الطاقة
- ٨) وزارة الأشغال العامة والموارد المائية
- ٩) الهيئة العامة للتصنيع
- ١٠) الهيئة المصرية العامة للتوحيد
القياسى وجودة الانتاج
- ١١) وزارة النقل

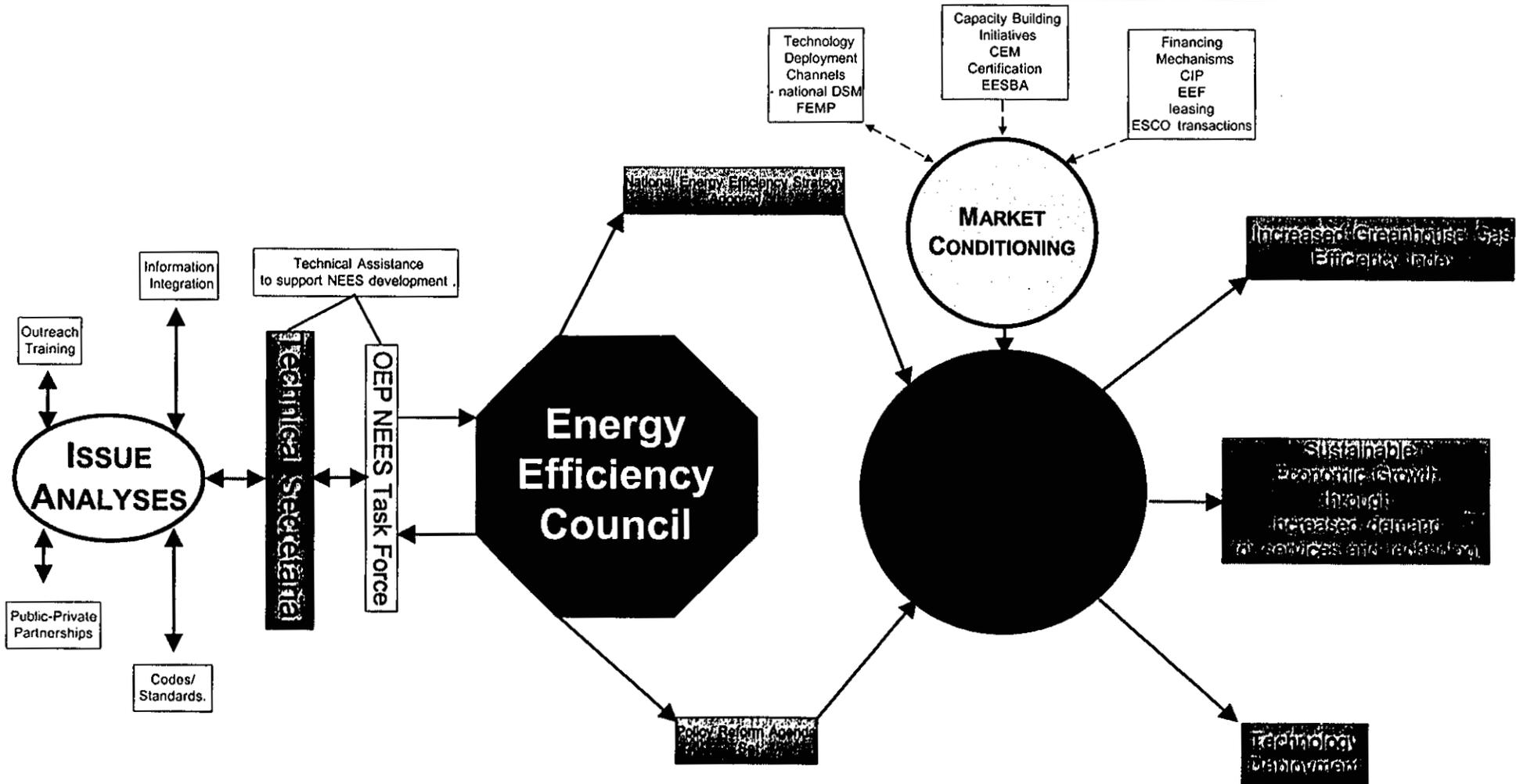
Energy Efficiency Council (EEC)

Goals

- 1- Cooperation in the field of energy information and data exchange .
 - 2- Investigate individual capabilities to plan for integrated scheme for further joint energy projects and studies .
 - 3- Achieve coordinated and cooperated efforts in energy planning and environment protection .
 - 4- Cooperation in the field of public awareness through media, seminars, training programs on energy conservation, renewable energies, energy demand management and greenhouse gas emissions .
 - 5- Conducting joint demonstration projects of energy efficiency utilizing environment friendly energy-saving technologies and renewable energies .
 - 6- Enhance the role of private sector, including the Energy Services Companies, in energy efficiency improvement and energy saving .
- * Organization for Energy Planning (OEP) is the coordinating body of the Energy Efficiency Council .

Egyptian Environmental Policy Program
and the
National Energy Efficiency Strategy Development
Road Map

IMPROVED MANAGEMENT OF THE ENVIRONMENT AND NATURAL RESOURCES THROUGH ENERGY EFFICIENCY



Year 1—Policy Preparation and Presentation Policy Adoption Years 2 - 5 Policy Implementation Years 6 - 10

8.

Egyptian Environmental Policy Program
and the
National Energy Efficiency Strategy Development
Technical Assistance

**SUPPORT TO THE DEVELOPMENT OF
A NATIONAL ENERGY EFFICIENCY STRATEGY IN EGYPT**

“ENERGY EFFICIENCY”

1. SUMMARY

Central to USAID/Egypt’s development strategy is the U.S.-Egyptian Partnership for Economic Growth and Development, also known as the Gore-Mubarak Partnership. A high priority on the joint agenda of the Partnership’s Subcommittee III, Sustainable Development and the Environment is combating Global Climate Change. The National Energy Efficiency Strategy will be a critical element in Egypt’s overall global climate change strategy.

The planned USAID-supported activities will be guided by the objectives contained in the following: the USAID/Egypt Environmental and Natural Resources Strategic Framework; the agenda of the Gore-Mubarak Partnership (primarily Subcommittee III); and the EEPP policy matrix. In addition, to the extent possible, the technical assistance will seek to leverage complementary activities, including the GreenCOM public awareness component of the EEPP, the U.S. EPA energy efficiency work, and the USAID DTII activities as well as the UNDP/GEF project.

2. BACKGROUND

The USAID Mission to Egypt has maintained an on-going relationship with the energy sector in Egypt since the early 1980s. The support has been well-rounded and includes the development of infrastructure as well as helping establish new organizations, notably for energy planning and the use of new and renewable technologies. Initially, the support focused on supply-side infrastructure investments. Since the late 1980s, the USAID has placed increasing emphasis on policy reform initiatives of the electrical sector (independent private power, privatization of electrical distribution companies and the creation of a regulatory body (through the Ministry of Electricity and Energy) and support on the demand-side (the ECEP).

From 1989 to 1998, the USAID/Egypt supported a program to accelerate use of energy efficiency technologies and practices within the industrial and commercial sectors through its Energy Conservation and Environment Project (ECEP). In 1997, the Egyptian Environmental Affairs Agency (EEAA) made energy efficiency a cornerstone of its National Action Plan for Greenhouse Gas Emission reduction in anticipation of meeting its obligations under the UNFCCC by tapping the gains available from widespread replication of practices and technologies introduced through the ECEP. Additionally, the competitiveness of local businesses can be enhanced. This in turn permits wasted resources to be put to more economically productive uses.

The latter stages of the ECEP highlighted the need for an appropriate institutional framework and the development of local private companies to provide services and goods in the market place. Other ECEP work focused on promoting dialogue between private sector businesses and policy makers. Two key activities included support in formation of the Egyptian Energy Services Business Association (EESBA), and helping

the Ministry of Petroleum's Organization for Energy Planning, (OEP), outline an action plan for developing a National Energy Efficiency Strategy, (NEES).

The action plan was based on a strong partnership between the public and private sectors and was designed to provide the private sector with a strong voice in public decision-making, in turn stimulating the private sector to play a leading role in implementing energy efficiency projects and within a few months, some eleven organizations had agreed to become members of the Energy Efficiency Council and had formally signed a protocol for cooperation. They represent the leading players within the areas of energy and environment and collectively have the potential to shape an effective NEES.

The EEPP energy efficiency activity aims at maintaining the impetus toward the development of a policy reform agenda to promote widespread use of energy efficiency. The cornerstone will be the emergence of a NEES built around a meaningful public-private sector partnership dialogue targeted at private sector investment. To insure that this dialogue evolves in a meaningful manner, both sectors need to be armed with information and data that supports the decision-making process and therefore, the contractor will provide support in three broad areas i) institutional development; ii) capacity building; and iii) promotion and outreach.

Both institutional development and capacity building are necessary to ensure the sustainability of this dialogue result of this task order. Promotion and outreach activities will be as important to expand the participation of other interested private sector parties while increasing market awareness on the impact of policy reform. Increasing the awareness of and drawing the participation of financial institutions into this dialogue will be necessary to attract private investments.

Specific support will include helping the OEP set up a task force to administer, monitor, and evaluate success with respect to the goals and objectives set for NEES development. Support will also include providing assistance to those entities with leading implementation roles. Such assistance will include assisting in developing the work plans of the various individual implementation entities as well as helping to create sufficient resources and capacity.

The technical assistance will also support the OEP task force and others in formulating policy reform initiatives. Assistance will also be given to stimulate private sector involvement in shaping the policy reform agenda. Targeted promotional/outreach activities coordinated and implemented with GreenCOM, will be undertaken to ensure a strong private sector voice in all policy development.

In addition, the contractor will support the Energy Efficiency Council in interfacing and coordinating with other USAID-supported initiatives, including the EEPP Program Support Unit, the GreenCOM project, the DTII training program, and the EPA, to best leverage all potential resources for the implementation of the NEES.

3. STATEMENT OF OBJECTIVES

The USAID/Egypt objectives in providing support are as follows:

- to assist the Energy Efficiency Council in formulating a National Energy Efficiency Strategy (NEES) that creates a sustainable energy efficiency market through strategic partnerships between the public and private sectors.
- to support creation of a task force within the Organization of Energy Planning (OEP), to monitor, evaluate, coordinate and direct the development and implementation of a NEES targeting Global Climate Change through mitigation of GHG emissions
- to support Energy Efficiency Council members and other key player working groups to further specific EEPP-related energy policy initiatives.
- to engage the public and private sectors in meaningful dialogue to formulate a policy reform agenda that rationalizes energy use, particularly fossil fuels, based on optimum environmental and economic considerations, and encourages a leading role for the private sector.
- to assist a transformation from a public sector-led market to a sustaining, robust and competitive market for energy efficient goods and services dominated by private sector investments and businesses.
- to stimulate trade and sustainable technology transfer to promote sustainable economic growth, enhance Egypt's competitiveness and ability to enter the global market.

4. TECHNICAL ASSISTANCE

Technical assistance under this task order will be directed at:

- assisting the GOE formulate a National Energy Efficiency Strategy and policy reform agenda, through meaningful dialogue between the public/private sectors, to rationalize energy use based on optimum environmental and economic considerations
- creating a sustainable energy efficiency market by transforming the energy efficiency business sector through strategic public and private sector partnership initiatives.

FINANCING ENERGY EFFICIENCY PROJECTS

*Market Overview and Discussion Topics
Cairo, Egypt
October/November 1999*

Presented by: Robert Hinkle, Bechtel Consulting



Meeting Agenda

This presentation was prepared to facilitate a discussion and review of the following energy efficiency investment issues:

- Market potential (investment opportunity) for energy efficiency in Egypt
- Energy savings potential in key Egyptian industrial sectors
- Market and institutional barriers to energy efficiency investments
- Financing vehicles for energy efficiency projects
- Energy service company (ESCO) project structures
- Energy efficiency project cash flow analysis
- Project risks



Potential Market for Energy Efficiency Investments

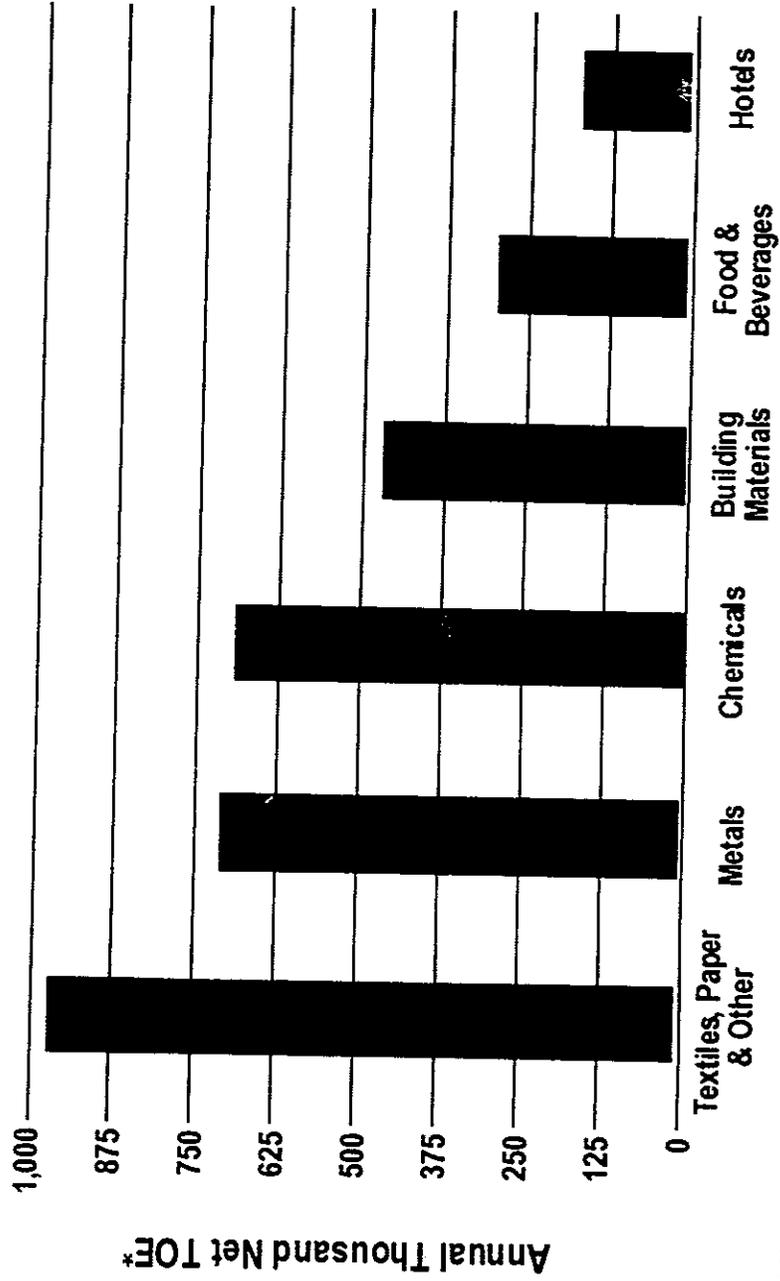
- Estimated market potential in Egypt for selected energy efficiency applications exceeds U.S. \$2.3 billion (includes equipment and services)
- Energy efficiency demonstration projects have generated payback periods that are acceptable to investors (approximately 3 years)

Energy Efficiency Market in Egypt (U.S. Dollars in Millions)

Energy Efficiency Application	Equipment	Services	Total
Cogeneration	\$1,216.9	\$521.5	\$1,738.5
Energy Management Systems	\$254.5	\$137.1	\$391.6
Waste Heat Recovery	\$59.9	\$25.5	\$85.1
Automated Combustion Control	\$58.2	\$10.2	\$68.4
Fuel Switching	\$29.5	\$5.2	\$34.7
Power Factor Improvement	\$18.2	\$3.2	\$21.4
TOTAL MARKET	\$1,637.2	\$702.7	\$2,339.9



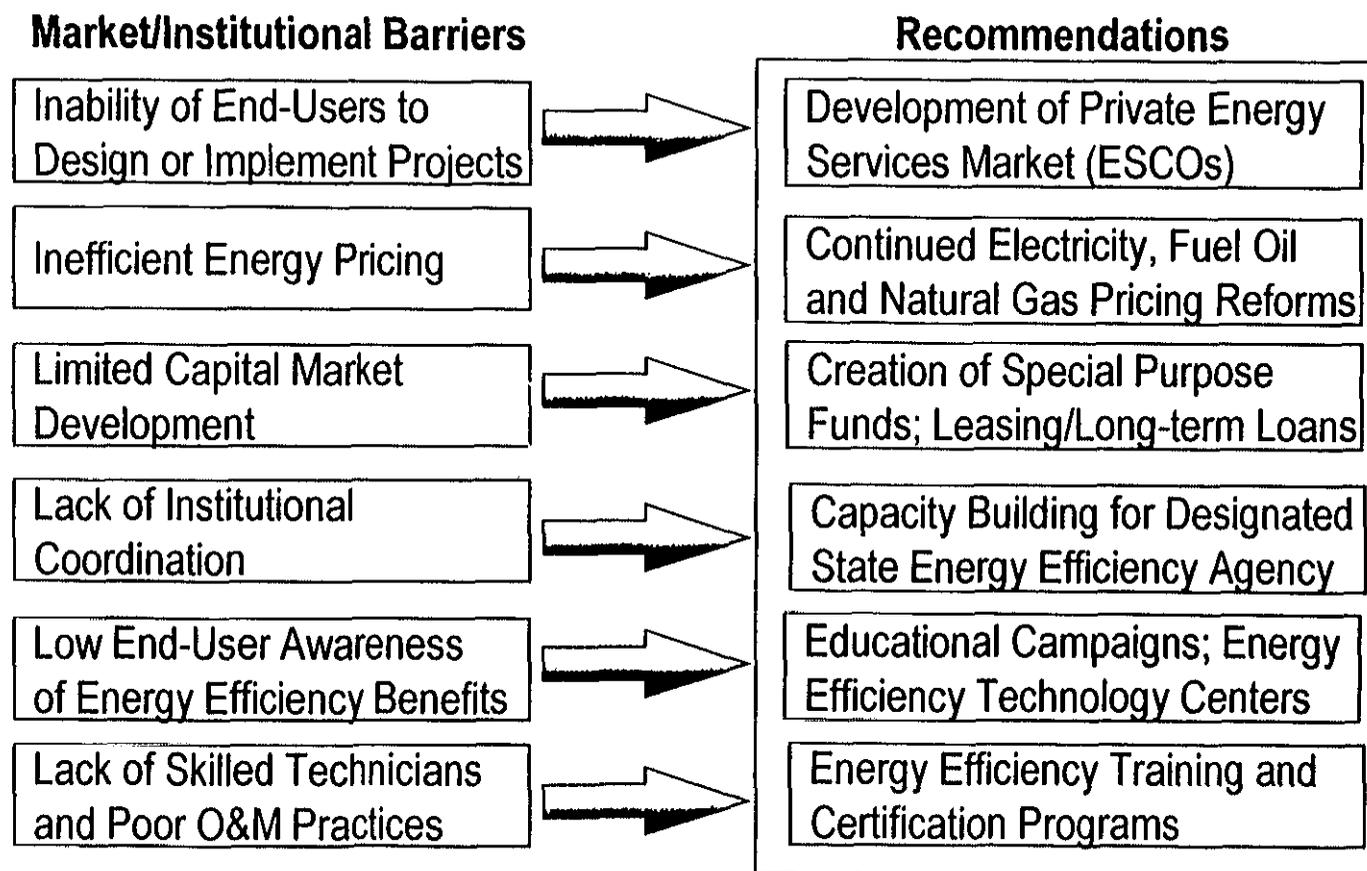
Annual Net Energy Savings From Achieving National Energy Efficiency Potential in Egypt



* Net TOE = fuel oil and electricity savings - increased natural gas consumption



Recommendations to Help Overcome Barriers to Energy Efficiency Investments



Energy Efficiency Financing Instruments

- Commercial bank loans can be effectively used to finance energy efficiency projects (particularly if loans terms have repayment periods > 5 years).
- Leasing structures offer tax benefits and can be tailored to meet the needs of different energy efficiency projects (this includes equipment vendor programs).
 - Operating leases can provide for financing and maintenance services. Payments are structured so that operating leases are not fully amortized.
 - Capital leases do not include maintenance services, but payments do cover the full cost of the equipment (full amortization).
- Special purpose funds (SPFs) are financial instruments that focus on the development of specific types of projects (equipment, region, industry sector).
 - Bond
 - Equity



Energy Service Company (ESCO) Project Structures

- Performance contracting methods (guaranteed and shared savings) can transfer key project risks from the customer to the ESCO.
- Under Guaranteed Savings, an ESCO guarantees that the savings from a project will, at a minimum, equal the payments a customer makes to amortize the cost of a project. If actual savings fall short of the guaranteed level, the ESCO must compensate the customer for the shortfall.
- In a Shared Savings arrangement, the ESCO finances the project (typically borrowing from a third-party) and assumes all performance and credit risks. The customer, however, agrees to share a pre-determined percentage of the actual project savings with the ESCO.
- In practice, the guaranteed savings structure has been used more widely since it is similar to traditional financing schemes.



ESCO Performance Contracting Project Cash Flow Analysis Example

Project Description: Installation of an energy management system (EMS) at a pharmaceutical company. The EMS will save energy by optimizing the use of heating, ventilation, and air conditioning systems at the pharmaceutical plant.

- Total Cost: U.S. \$925,493
- Key Parties: Customer (pharmaceutical company), ESCO, and Commercial bank
- Project Type: Guaranteed savings structure
- Capital Structure: 75% debt; 25% equity
- Loan Terms: 7 years, 10% interest rate
- Savings Structure: The ESCO receives 85% of actual project savings over the the first 7 years of operation (equivalent to the length of the loan term)



Summary of Project Cash Flow Customer's (Pharmaceutical Company) Perspective

- Annual savings result from reduced consumption of electricity and fuel oil
- Annual savings pay off Debt, Ongoing costs, and the ESCO's savings share
- Net Savings = Annual Savings - Debt - Ongoing Costs - ESCO's Savings Share

Customer's Cash Flow for the EMS Project (in U.S. dollars)

Year	Annual Savings	Annual Debt	Ongoing Costs	ESCO's Savings Share	Customer Net Savings
0					0
1	214,565	142,576	22,392	42,157	7,440
2	225,293	142,576	23,064	50,706	8,948
3	236,558	142,576	23,756	59,692	10,534
4	248,386	142,576	24,468	69,140	12,201
5	260,805	142,576	25,202	79,073	13,954
6	273,845	142,576	25,958	89,514	15,797
7	287,538	142,576	26,737	100,491	17,734
8	301,915	0	0	0	301,915
9	317,010	0	0	0	317,010
10	332,861	0	0	0	332,861

NPV = \$460,709



Summary of Project Cash Flow ESCO's Perspective

- The ESCO makes an equity investment that equals 25% of the total project cost.
- The ESCO receives an 85% share of the savings over a 7 year period.
- The internal rate of return (IRR) on the ESCO's investment is 20%.

ESCO's Cash Flow (in U.S. dollars)

Year	ESCO's Share of Savings	Equity Cost
0		(231,373)
1	42,157	0
2	50,706	0
3	59,692	0
4	69,140	0
5	79,073	0
6	89,514	0
7	100,491	0
8	0	0
9	0	0
10	0	0

NPV = \$92,123



Summary of Energy Efficiency Project Risks

- Completion risk entails the risk that a project might not be properly designed, constructed on time, or within budget.
- Technology risk can occur when the equipment or technology used in a project does not perform according to specifications or becomes prematurely obsolete.
- Finance risk can exist if a significant portion of debt financing for an energy efficiency project consists of floating-rate debt.
- Operating risk includes ongoing equipment performance issues as well as end-user compliance with agreed-upon facility operation/load levels.
- Measurement and verification risk can be mitigated by establishing clear guidelines for determining the actual energy and monetary savings generated by a project.



FINANCING ENERGY EFFICIENCY & ENVIRONMENTAL MANAGEMENT PROJECTS

*Inter-Banking Forum
Cairo, Egypt
November 2, 1999*

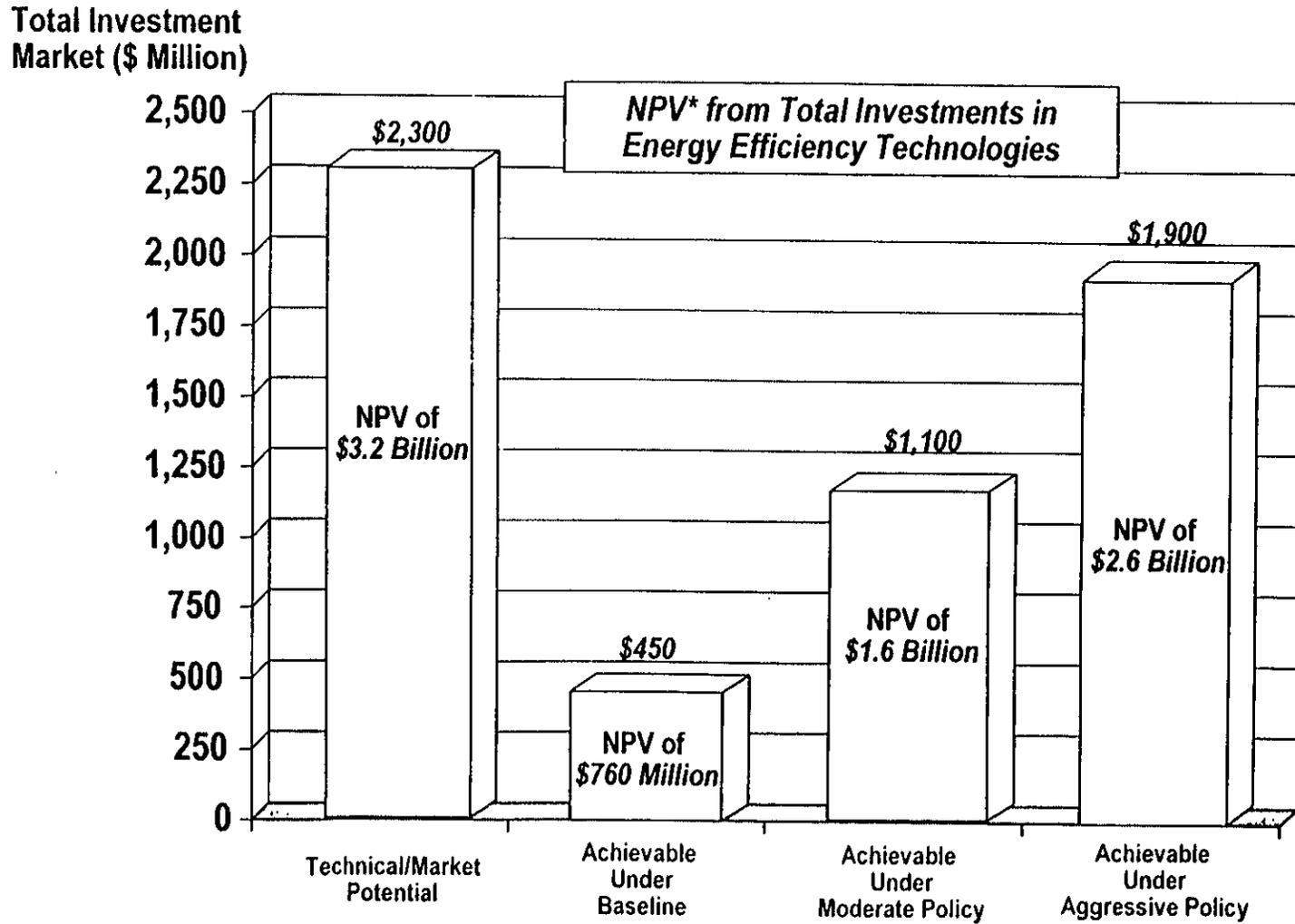
Bechtel Consulting

USAID Technical Assistance on Developing a National Energy Efficiency Strategy

Objectives of the Inter-Banking Forum

- Provide an overview of the market for energy efficiency and environmental management projects in Egypt
- Illustrate the need for enhanced energy efficiency financing vehicles
- Discuss the role played by energy service companies (ESCOs) in energy efficiency project development
- Review energy efficiency case study (example project)
- Summarize key issues identified during inter-banking forum preparation meetings

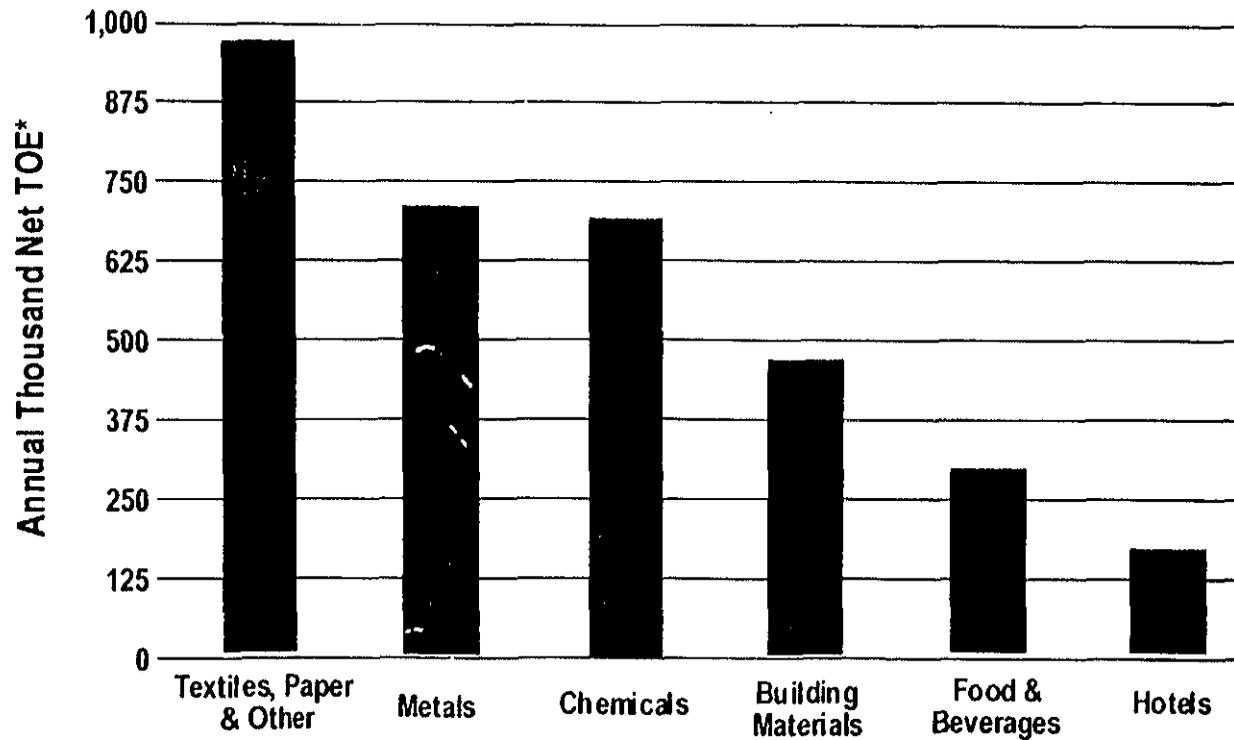
Achievable Energy Efficiency Investment Market in Egypt



* NPV is over 10 year period at discount rate of 12%

Investments in Energy Efficiency Will Improve the Profitability of the Industrial and Commercial Sector

National Energy Savings Potential



* Net TOE = fuel oil and electricity savings - increased natural gas consumption

Source: Bechtel Consulting, 1998

Market Potential for Proven Energy Efficiency Technologies

- Technical market potential for proven technologies is > U.S. \$2 billion
- Energy efficiency demonstration projects have payback periods < 3 years

Energy Efficiency Market in Egypt (U.S. Dollars in Millions)

Energy Efficiency Application	Equipment	Services	Total
Cogeneration	\$1,216.9	\$521.5	\$1,738.5
Energy Management Systems	\$254.5	\$137.1	\$391.6
Waste Heat Recovery	\$59.9	\$25.5	\$85.1
Automated Combustion Control	\$58.2	\$10.2	\$68.4
Fuel Switching	\$29.5	\$5.2	\$34.7
Power Factor Improvement	\$18.2	\$3.2	\$21.4
TOTAL MARKET	\$1,637.2	\$702.7	\$2,339.9

Source: Bechtel Consulting, 1998

Energy Efficiency Financing Instruments

- Commercial bank loans can be effectively used to finance energy efficiency projects (particularly if loans terms have repayment periods > 5 years)
- Leasing structures offer tax benefits and can be tailored to meet the needs of different energy efficiency projects (this includes equipment vendor programs)
 - Operating leases can provide for financing and maintenance services. Payments are structured so that operating leases are not fully amortized
 - Capital leases do not include maintenance services, but payments do cover the full cost of the equipment (full amortization)
- Special purpose funds (SPFs) are financial instruments that focus on the development of specific types of projects (equipment, region, industry sector)
 - Bond
 - Equity

The Energy Service Company (ESCO) Concept

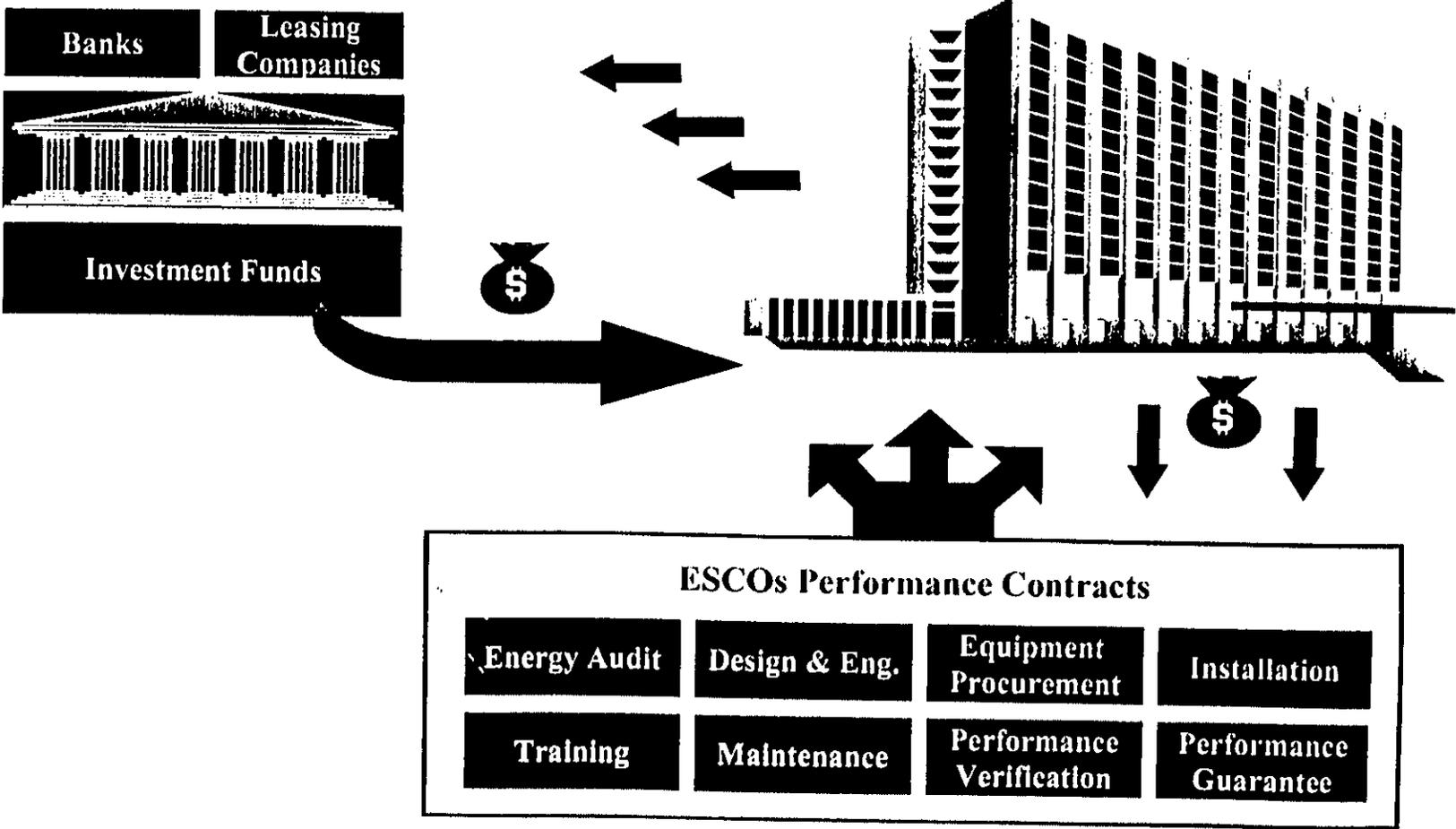
■ ESCO Services

- Turnkey energy management services
- Implementation, maintenance, and financing
- Risk mitigation (performance guarantee to customer)
- ESCO compensation is linked to performance (percentage of energy savings)

■ Delivery Method

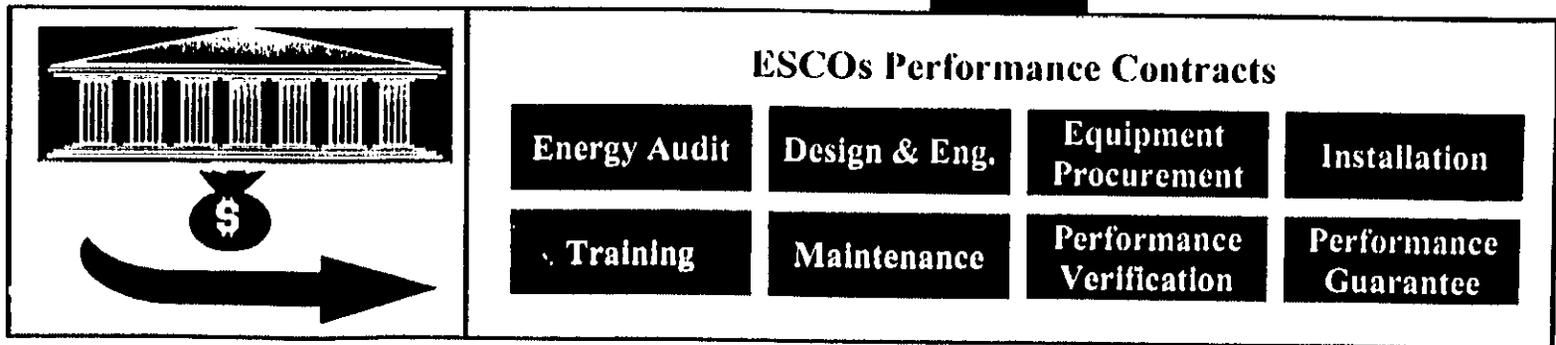
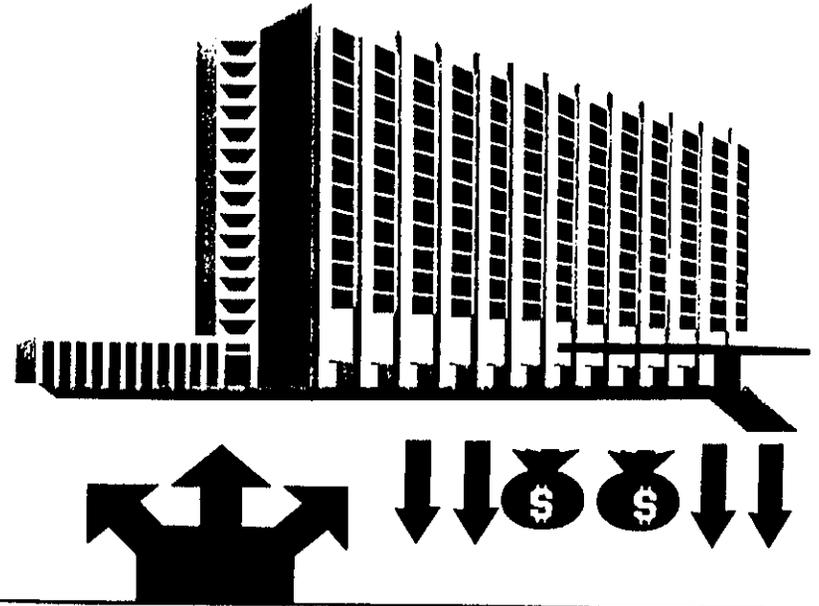
- Integrated services (similar to build, operate, transfer structures)
- Medium to long-term finance
- Customized payment plans

ESCO Integrated Delivery: Customer Financing

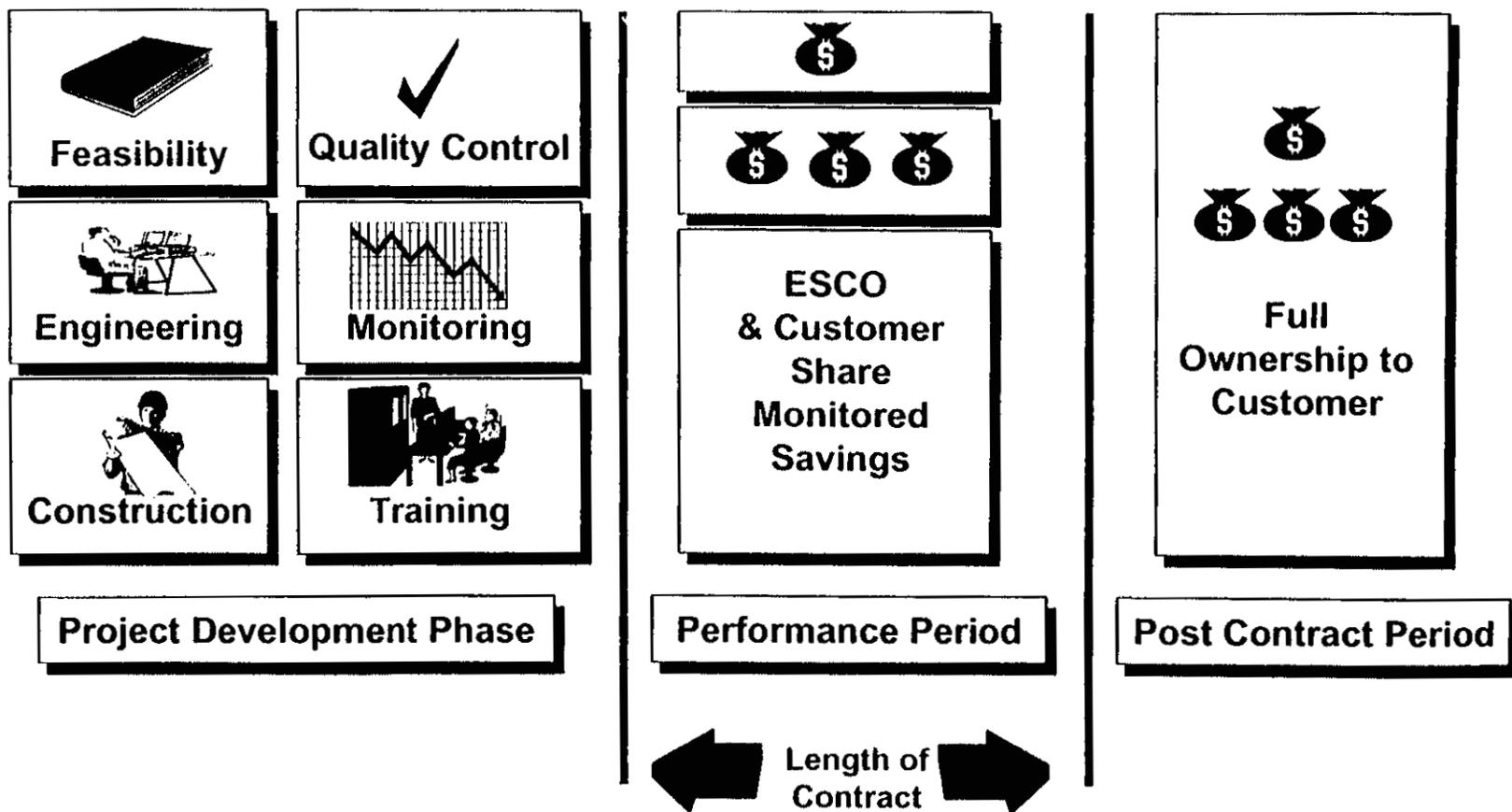


31.

ESCO Integrated Delivery: ESCO Financing



ESCO Project Phases: Build, Operate, and Transfer



ESCOs Provide Performance-Based Services to Customers

- Turnkey Services: Feasibility studies, audits, construction, financing, and monitoring
- Savings Guarantee: An ESCO guarantees the energy savings on a project through a performance guarantee/contract with the customer
- Measured and verified savings: ESCOs install monitoring and verification (M&V) systems to measure the actual energy savings realized in a project
- Third-party investment: ESCOs help arrange and provide financing for customers

ESCO Performance Contracting Case Study

Project Description

Installation of an energy management system (EMS) at a pharmaceutical company. The EMS is designed to optimize the use of heating, ventilation, and air conditioning systems.

- Total Cost: U.S. \$434,980 (includes equipment, installation, and development costs)
- Key Parties: Customer (pharmaceutical company), ESCO, and Bank
- Capital Structure: 75% Debt, 25% Equity
 - Loan of \$326,235 to the customer from the bank over a 7 year term with a 10% interest rate
 - Equity investment of \$108,745 is made by the ESCO
- Savings Structure: The ESCO receives 85% of actual project savings over the the first 7 years of operation (equivalent to the length of the loan term)

ESCO Performance Contracting Case Study **Customer's (Pharmaceutical Company) Cash Flow**

- Savings of \$107,283 in Year 1 from reduced electricity and fuel oil consumption
- Savings are used to pay off Annual Debt (\$67,010), Monitoring and Verification costs (\$11,196 in Year 1) and the ESCO's savings share (\$24,715 in Year 1)

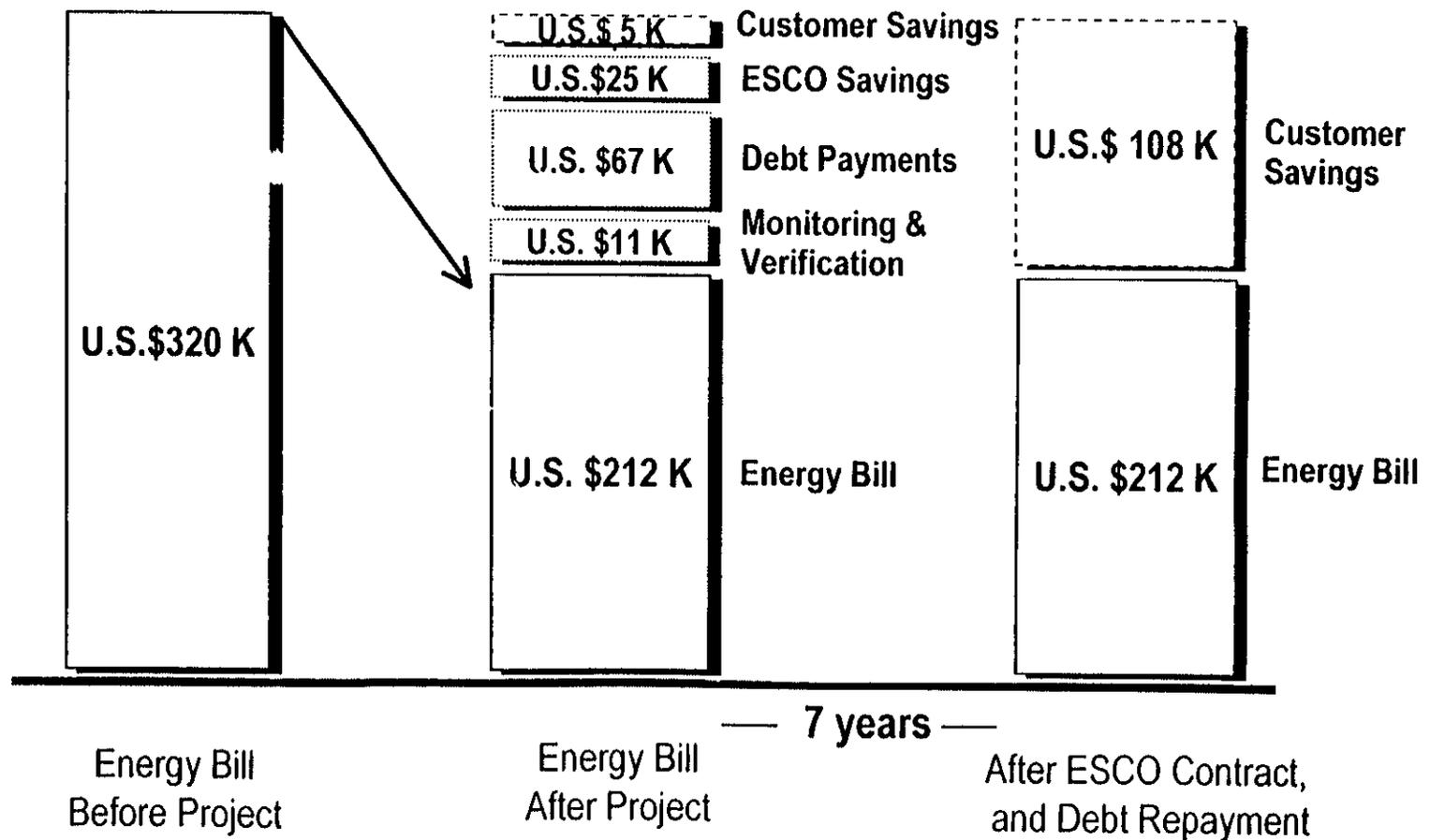
Customer's Cash Flow for the EMS Project (in U.S. dollars)

Year	Annual Savings	Annual Debt	Monitoring & Verification	ESCO's Savings Share	Customer Net Savings
0					0
1	107,283	67,010	11,196	24,715	4,361
2	112,647	67,010	11,532	28,989	5,116
3	118,279	67,010	11,878	33,482	5,909
4	124,193	67,010	12,234	38,206	6,742
5	130,403	67,010	12,601	43,172	7,619
6	136,923	67,010	12,979	48,393	8,540
7	143,769	67,010	13,369	53,881	9,508
8	150,957	0	0	0	150,957
9	158,505	0	0	0	158,505
10	166,430	0	0	0	166,430

NPV = \$233,478
@10% discount rate

ESCO Performance Contracting Case Study

Project Economics: Breakout of Customer Savings



Note: Not adjusted for inflation or change in energy prices

ESCO Performance Contracting Case Study

ESCO's Cash Flow

- The ESCO makes an equity investment of \$108,745 (25% of the total project cost)
- The ESCO receives an 85% share of the savings over a 7 year period
- The internal rate of return (IRR) on the ESCO's investment is 25%

ESCO's Cash Flow (in U.S. dollars)

Year	ESCO's Share of Savings	Equity Cost
0		(108,745)
1	24,715	0
2	28,989	0
3	33,482	0
4	38,206	0
5	43,172	0
6	48,393	0
7	53,881	0
8	0	0
9	0	0
10	0	0

NPV = \$70,705
@ 10% discount rate

Key Energy Efficiency Investment Issues **(Identified During Inter-Banking Forum Preparation Meetings)**

- Monitoring and Verification: Clear guidelines must be established to determine (quantify) the actual energy savings on a project
- Technology Performance: Up-front equipment performance guarantees are needed
- Investment Incentives: Tax and/or investment incentives are needed to stimulate the development of energy efficiency projects (similar to new industrial city incentives)
- Equity Investments: Joint equity participation by banks and ESCOs can be used to develop projects
- Credit Risks: Strong contracts must be in place between the ESCO and customer
- Facility Operating Conditions: Agreements on baseline energy consumption levels at a company (facility) must be made prior to the start-up of a project

MEMO

To: Richard Smith
From: Bob Hinkle
Subject: Coverage of ECEP-demonstrated Technologies in the PRCIP Equipment List
Date: November 14, 1999

One of the main barriers to replicating the energy efficiency technologies demonstrated under USAID's Energy Conservation and Environment Project (ECEP) is a lack of financing for private sector industrial and commercial companies. The U.S. Government's Private Sector Commodity Import Program (PRCIP) helps remove this barrier by providing financing to local companies through U.S. dollar-based loans at fixed exchange rates and by offering short- to medium-term credit with interest free grace periods. However, the recent granting of preferred terms for environmental equipment does not include key components of ECEP-demonstrated technologies.¹ Specifically, the current PRCIP list does not include equipment needed to fully develop the following energy efficiency measures:

- Cogeneration
- Energy management systems (EMS)
- Automated combustion controls
- Waste heat recovery
- Power factor improvement
- Fuel switching

A detailed list of the equipment required to install these selected energy efficiency applications is attached at the end of this memo. The omission of ECEP technologies from PRCIP eligible equipment hinders private sector development of energy efficiency projects that could result in widespread national energy savings and the capture of significant economic and environmental benefits. Based on the findings of a Bechtel Consulting market study, 26% of industrial energy consumption can be saved annually by the replication of the energy efficiency applications listed above.² By achieving this technical/market replication potential, Egypt can attain the following benefits inherent in the use of ECEP applications:

- Net present value (NPV) of approximately \$3.2 billion to end-users
- 16% annual reduction in national CO₂ emissions
- \$2.3 billion market for energy efficiency equipment and services
- Net annual energy savings of 3.3 million tons of oil equivalent (MTOE)
 - ◊ 2.2 MTOE of fuel oil savings (equivalent to 9% of current oil exports)
 - ◊ (3.5) MTOE of increased natural gas consumption (cogen and fuel switching)
 - ◊ 4.6 MTOE of electricity savings.

¹ See PRCIP equipment list in Attachment No. VII of the June 15, 1999 General Circular No. 1.
² *The Replication Potential of ECEP Applications: An Assessment of National Energy, Economic, and Environmental Benefits*. Prepared by Bechtel Consulting under contract to USAID, 1998.

The remainder of this memo summarizes the estimated national energy savings results for each ECEP application. An assessment of the investment in equipment necessary to implement all replication projects is also summarized. Environmental benefits are then derived from the estimated energy savings associated with the replication of ECEP applications.

Annual Energy Savings

Figure 1 illustrates the annual energy savings from each of the ECEP applications evaluated in the replication study. The significant level of energy savings is consistent with the results of ECEP energy audits and public and private sector demonstration projects.

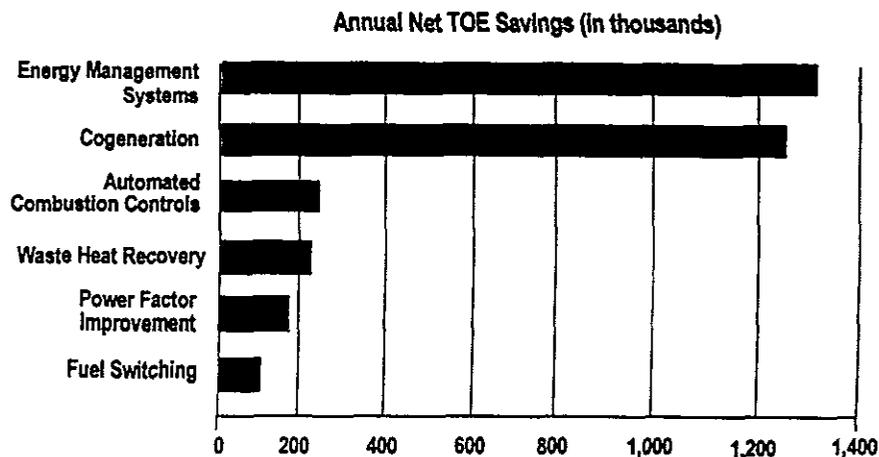


Figure 1 Replication Potential of ECEP Applications

Market For Equipment And Services

In order to achieve the potential energy savings from replication, a significant investment in energy equipment and services is required. This market (for energy efficient equipment and services) exceeds \$2.3 billion and is based on meeting the estimated annual energy savings of 3.3 MTOE from replicating ECEP applications. The market size for each ECEP application is based on the identified energy savings from the technical/market replication potential and the associated cost of equipment and services, as depicted below in Table 1.

**Table 1
Market for Equipment and Services From the Replication
of ECEP Applications (U.S. Dollars in Millions)**

ECEP Application	Equipment	Services	Total
Cogeneration	\$1,216.9	\$521.5	\$1,738.5
Energy Management Systems	\$254.5	\$137.1	\$391.6
Waste Heat Recovery	\$59.9	\$25.5	\$85.1
Automated Combustion Control	\$58.2	\$10.2	\$68.4
Fuel Switching	\$29.5	\$5.2	\$34.7
Power Factor Improvement	\$18.2	\$3.2	\$21.4
TOTAL ECEP MARKET	\$1,637.2	\$702.7	\$2,339.9

Environmental Benefits

By maximizing the potential of ECEP demonstrated technologies, Egypt would significantly reduce its emissions of greenhouse gases (CO₂) and atmospheric pollutants (NO_x and SO₂). Potential annual CO₂ emissions reductions from ECEP applications equal 12.4 million tons which represents 16% of national emissions. In addition, SO₂ emissions would be reduced by approximately 426,000 tons and NO_x emissions by 34,300 tons. Figure 2 displays the annual CO₂ reduction from each ECEP application.

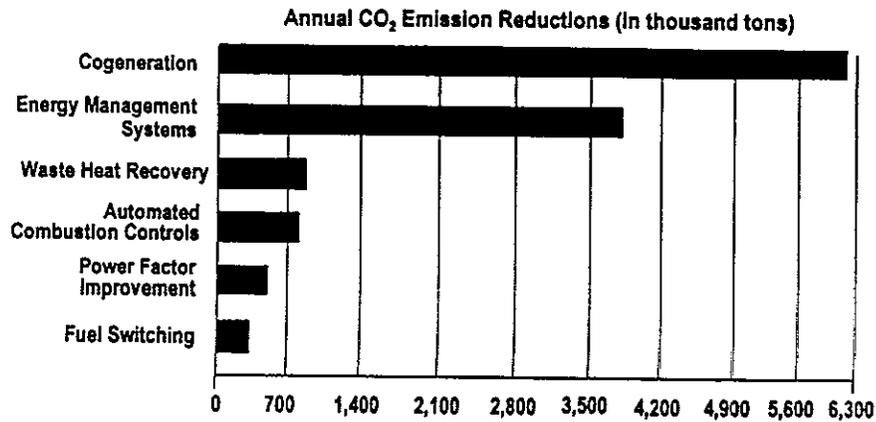


Figure 2 Potential Greenhouse Gases (CO₂) Reductions

For the same reasons that the implementation of ECEP applications would achieve CO₂ reductions, Table 2 illustrates the significant potential to reduce NO_x and SO₂ emissions.

**Table 2
Potential SO₂ and NO_x Annual Emission Reductions**

ECEP Application	Tons SO ₂	Tons NO _x
Cogeneration	309,936	26,371
Energy management systems	67,155	4,456
Waste heat recovery	17,420	960
Automated combustion control	14,299	957
Power factor improvement	12,350	1,029
Fuel Switching	4,847	485

EQUIPMENT LIST FOR SELECTED ECEP APPLICATIONS

TECHNOLOGY	EQUIPMENT
Energy Management Systems	Computers and EMS Software Sensors (temperature, light, occupancy, exhaust gas, etc...) Transmitters Actuators Fans and Motors Valves
Cogeneration	Steam Turbines Gas Turbines Diesel Engines Generators Heat Recuperators Boilers Heat Exchangers Fans and Motors Valves and Piping Thermal Insulation Material Instrumentation
Automated Combustion Control	Burners Gas Analyzers Fans and Motors Valves Instrumentation, Transmitters, Actuators Computers and Software
Waste Heat Recovery System	Heat Recuperators Instrumentation Heat Exchangers Fans and Motors Thermal Insulation Material Valves
Power Factor Improvement	Capacitors Electrical Cabinets High Voltage Fuses Instrumentation
Fuel Switching	Burners Fans and Motors Gas Tanks Gas Analyzers Transmitters and Actuators Valves

4

**INTER-BANKING WORKING GROUP:
ENERGY EFFICIENCY & ENVIRONMENTAL
MANAGEMENT FINANCING**

*Working Group Discussion Slides
November 17, 1999*

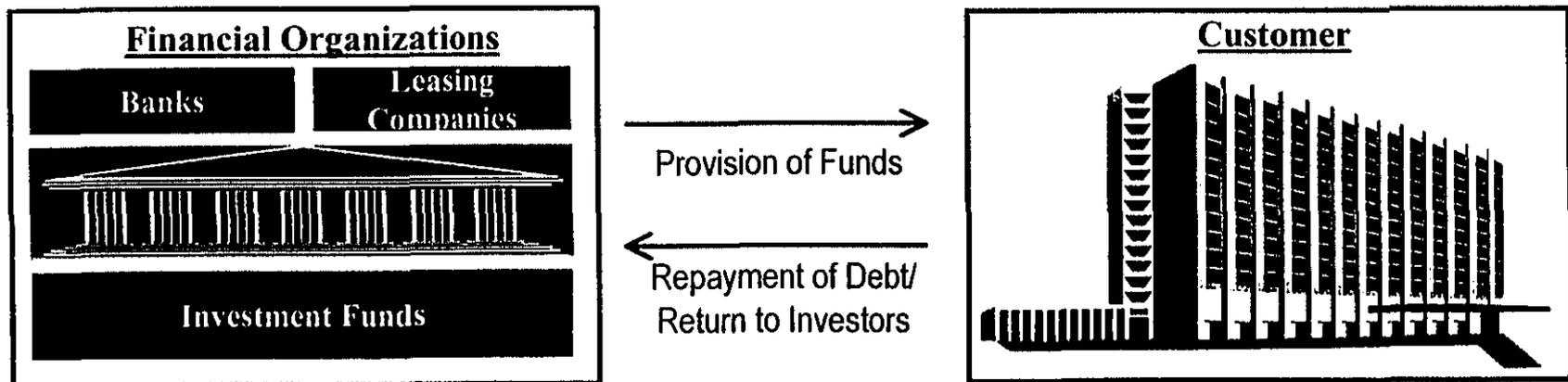
44

Energy Efficiency and Environmental Management Financing Models and Instruments

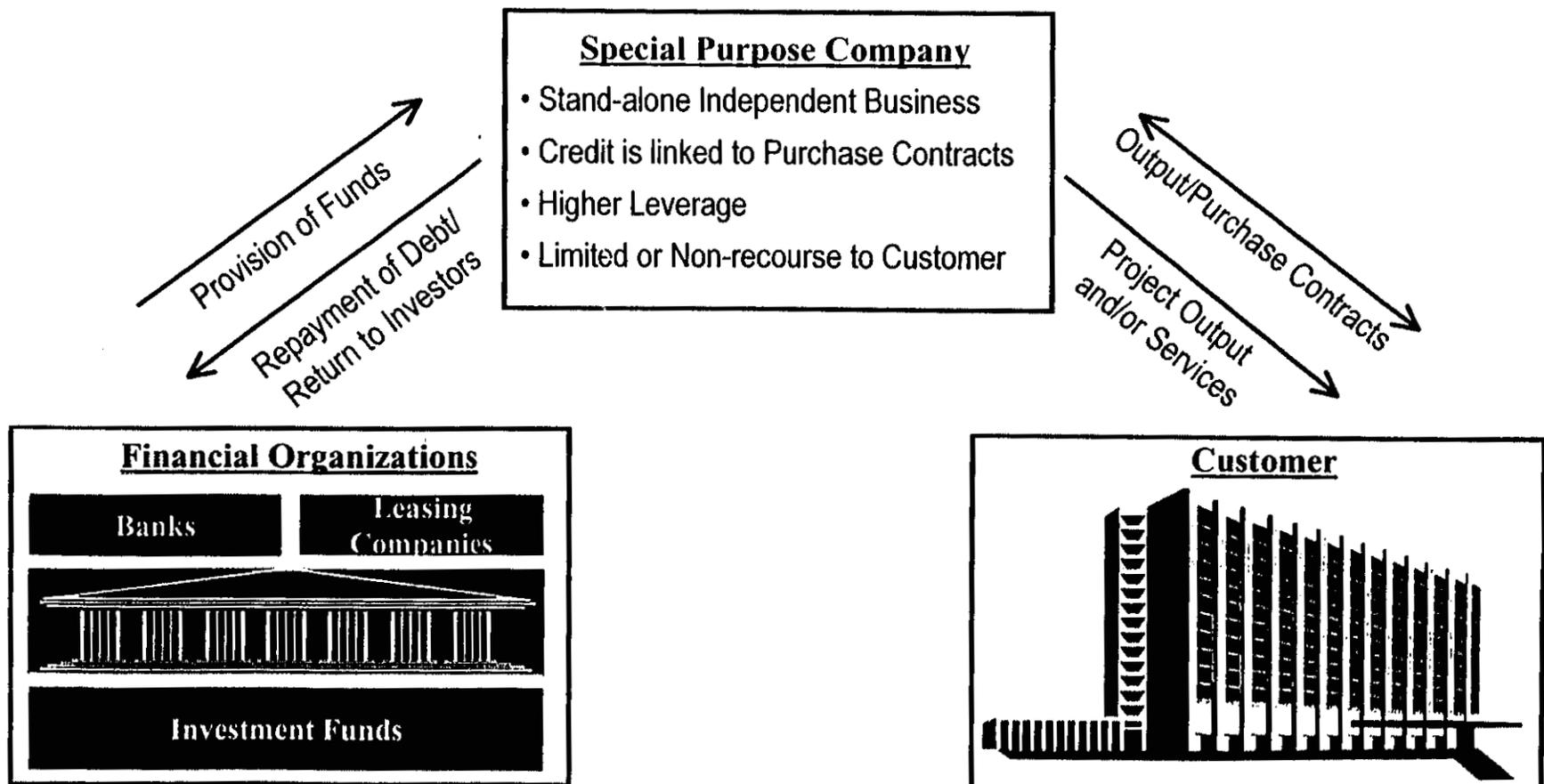
- Corporate financing relies on traditional commercial lending practices that provide creditors with full-recourse to a sponsor's asset portfolio
- Project financing involves the creation of an economically independent entity that is responsible for operating and managing a project (limited or non-recourse)
- Both models use a wide range of financing instruments, including: bank loans, leasing, and special purpose funds
- Energy service companies (ESCOs) can play multiple roles under each project development model

Energy Efficiency and Environmental Management Corporate Finance Model

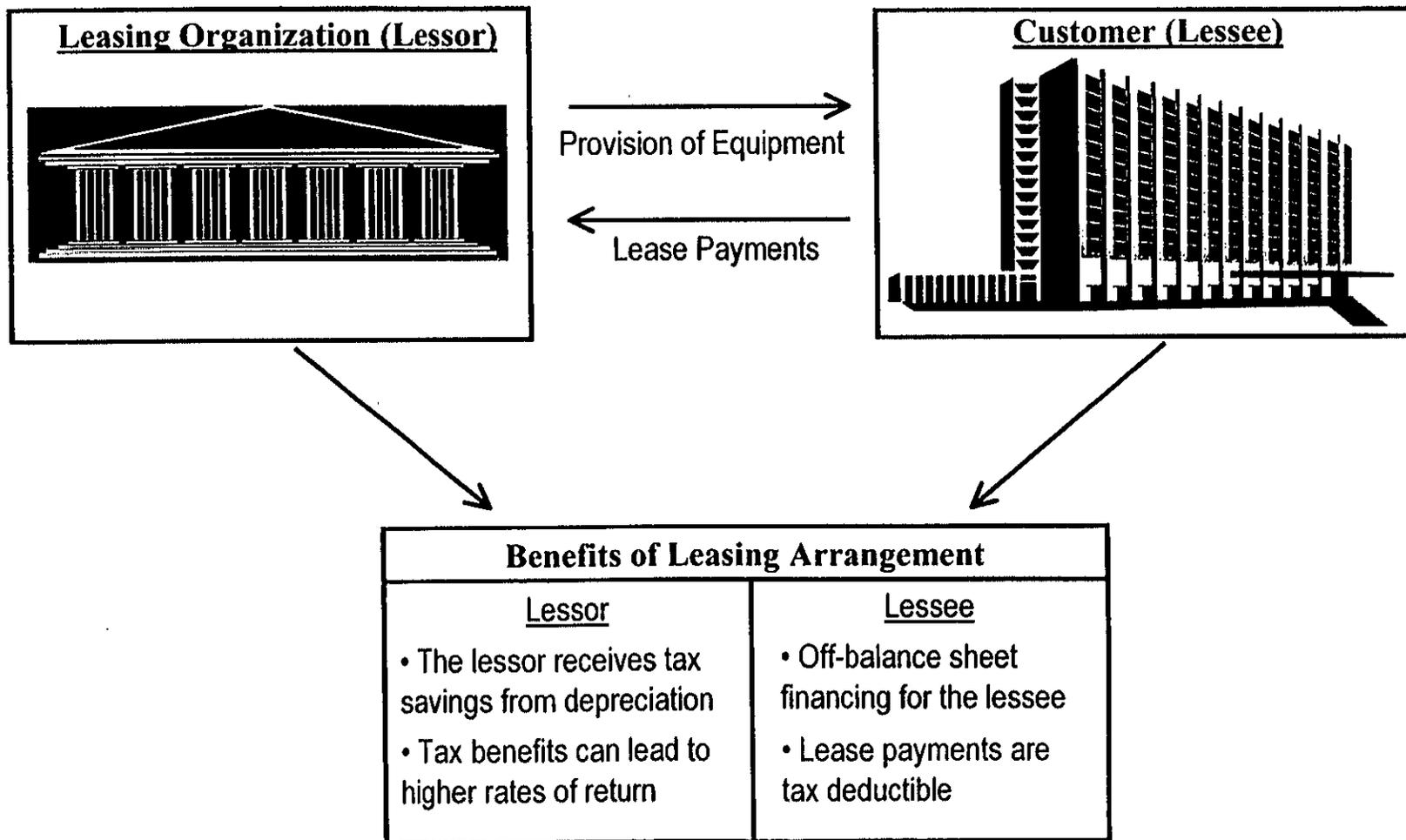
- Creditors have full recourse to the customer (project sponsor)
- Risks are diversified across the sponsor's portfolio of assets



Energy Efficiency and Environmental Management Project Finance Model

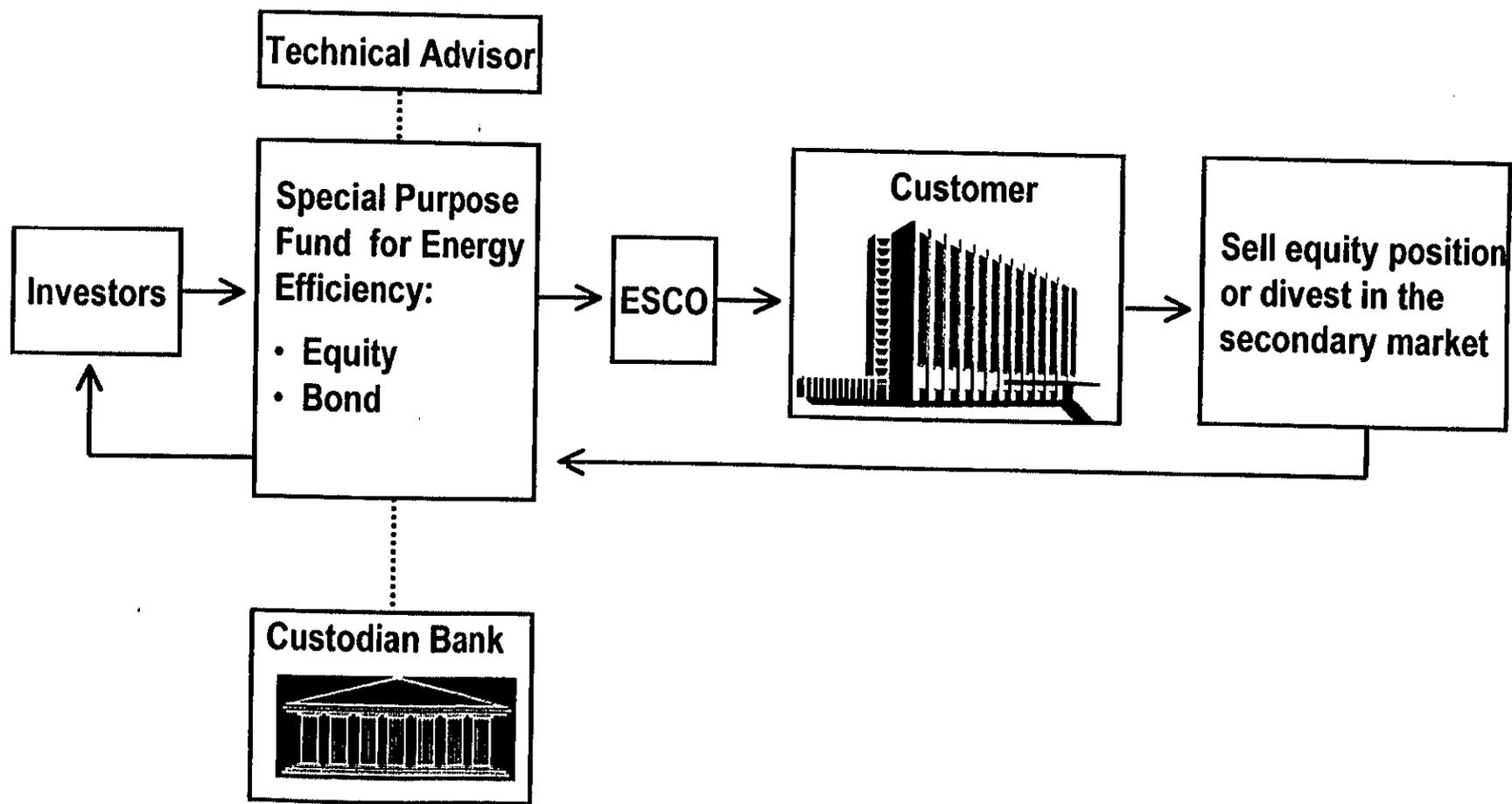


Energy Efficiency and Environmental Management Capital/Financial Lease Model



48

Energy Efficiency and Environmental Management Special Purpose Fund Model



-49.

Egyptian Environmental Policy Program
and the
National Energy Efficiency Strategy Development

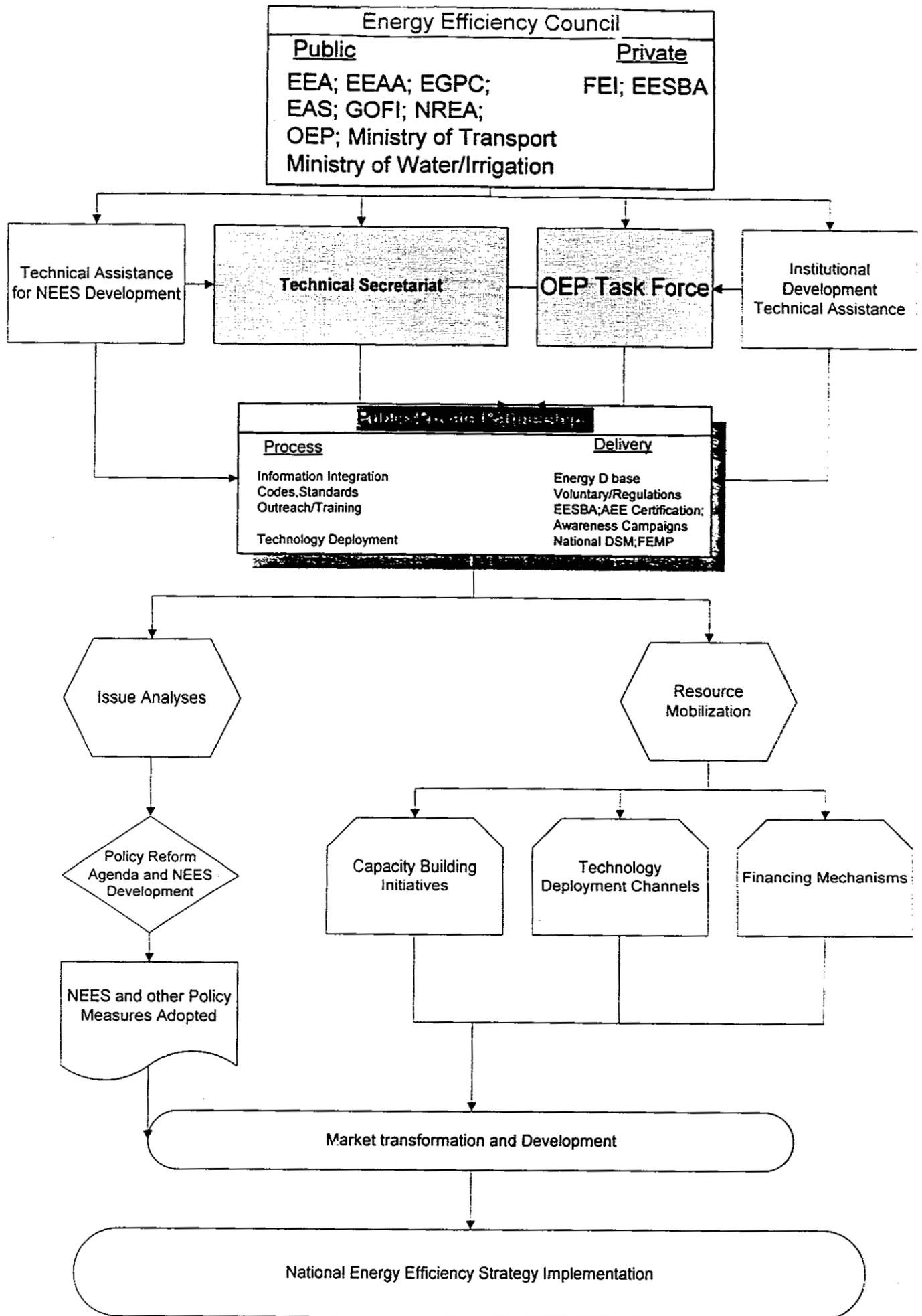
EGYPTIAN ENVIRONMENTAL POLICY PROGRAM (EPPP) AND THE NATIONAL ENERGY EFFICIENCY STRATEGY (NEES)

The *Ministry of Petroleum and Natural Resources, MOP*, is one of three Ministries collaborating on the *Egyptian Environmental Policy Program, EPPP*. The other Ministries are Tourism and Environment. Within the EPPP, the MOP activities are being carried by the *Organization for Energy Planning, OEP*, as part of its role of coordinating the development of the *National Energy Efficiency Strategy, NEES*.

The OEP has helped establish the *Energy Efficiency Council, EEC*, an eleven-member *public/private partnership* that is collaborating on the development of the National Energy Efficiency Strategy. Members of the EEC include representatives of the Ministries of Petroleum, Electricity and Energy, Industry and Technological Development, Environmental Affairs, Transport, Communications and Civil Aviation, and Public Works and Water Resources as well as the Federation of Egyptian Industries and the Egyptian Energy Services Business Association.

The EEC oversees and directs a technical secretariat. The Chairman of OEP heads the secretariat. The secretariat is carrying out *issue analyses* in four key areas as part of the NEES development: *Codes and Standards, Public-Private Partnerships, Information Integration* and *Training and Outreach*. The issue analyzes will include a thorough review of existing policies as they relate to energy efficiency. The intent is to identify existing and potential barriers to energy efficiency implementation and factor them into the NEES. An *associated policy reform agenda* and *plans for implementation of energy efficiency throughout key sectors of the economy* are being prepared. The NEES development is estimated to take one year. Technical assistance is being provided to the EEC members as they develop associated work-plans as well as to the private sector and financial community to help mobilize resources for implementation of the strategy.

The NEES is expected to stimulate a *market for energy efficiency goods and services of some \$1 billion plus*. *Widespread implementation of energy efficiency* in the country can lead to annual *energy savings equivalent to 15% of annual oil exports* and help create employment. This is *equivalent to around 1% of gross domestic product, GDP*. In addition, it will reduce *greenhouse gas emissions* to help the country meet its international Climate Change Convention commitments.



Egyptian Environmental Policy Program

and the

National Energy Efficiency Strategy Development

Energy Efficiency Council Members

**Energy Efficiency Council
(EEC)**

- 1) Organization For Energy Planning (OEP)
- 2) Egyptian Environmental Affairs Agency (EEAA)
- 3) Egyptian General Petroleum Corporation (EGPC)
- 4) New And Renewable Energy Authority (NREA)
- 5) Egyptian Electricity Authority (EEA)
- 6) Federation of Egyptian Industries (FEI)
- 7) Egyptian Energy Services Business Association
- 8) Ministry of Public Works And Water Resources
- 9) General Organization For Industrialization (GOFI)
- 10) Egyptian General Organization For
Standardization & Quality Control (EOS)
- 11) Ministry of Transportation

مجلس كفاءة الطاقة

- ١) جهاز تخطيط الطاقة
- ٢) جهاز شئون البيئة
- ٣) الهيئة المصرية العامة للبترول
- ٤) هيئة الطاقة الجديدة والمتجددة
- ٥) هيئة كهرباء مصر
- ٦) اتحاد الصناعات المصرية
- ٧) الجمعية المصرية لآعمال خدمات الطاقة
- ٨) وزارة الاشغال العامة والموارد المائية
- ٩) الهيئة العامة للتصنيع
- ١٠) الهيئة المصرية العامة للتوحيد
القياسى وجودة الانتاج
- ١١) وزارة النقل

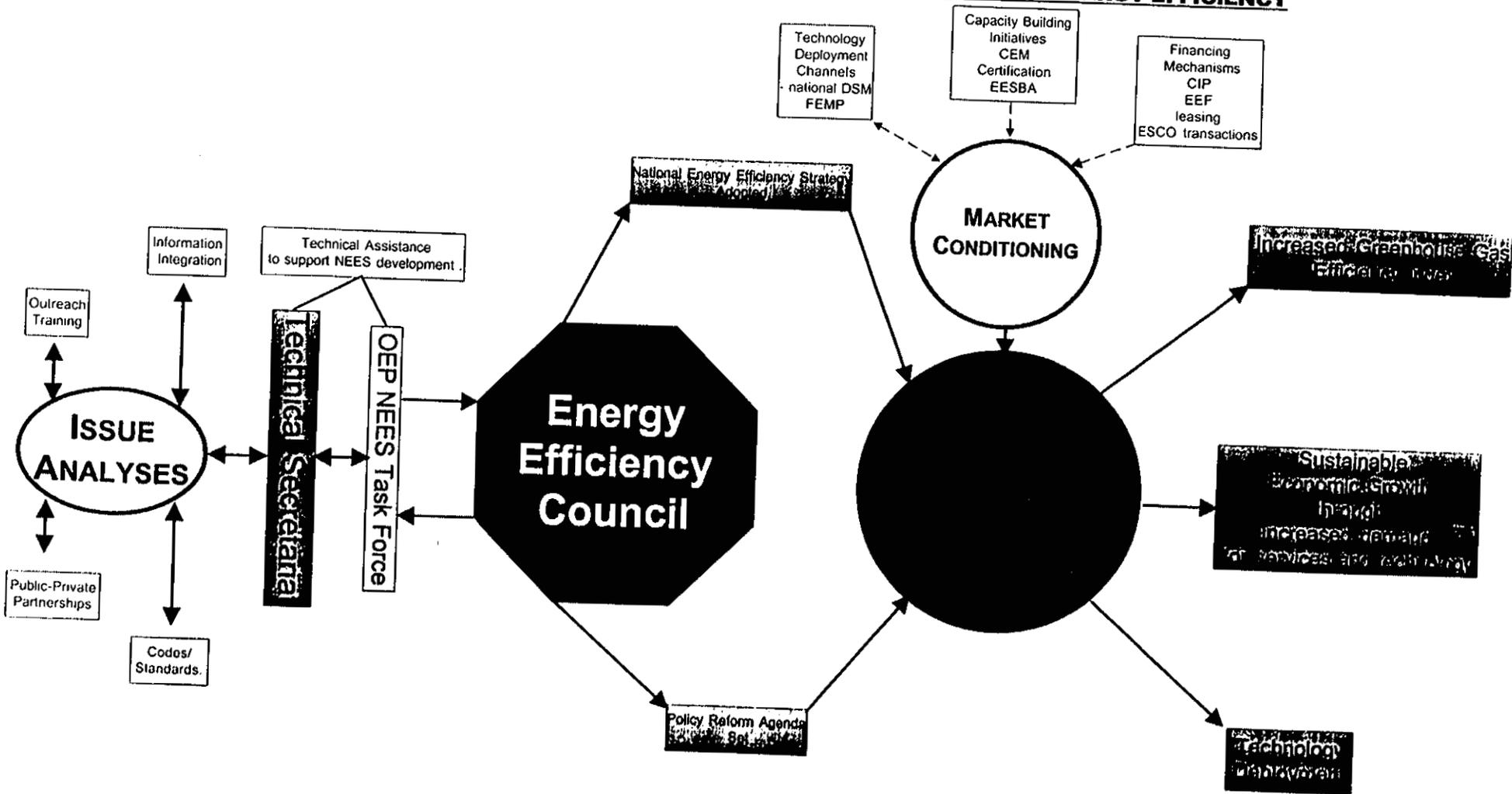
Energy Efficiency Council (EEC)

Goals

- 1- Cooperation in the field of energy information and data exchange .
 - 2- Investigate individual capabilities to plan for integrated scheme for further joint energy projects and studies .
 - 3- Achieve coordinated and cooperated efforts in energy planning and environment protection .
 - 4- Cooperation in the field of public awareness through media, seminars, training programs on energy conservation, renewable energies, energy demand management and greenhouse gas emissions .
 - 5- Conducting joint demonstration projects of energy efficiency utilizing environment friendly energy-saving technologies and renewable energies .
 - 6- Enhance the role of private sector, including the Energy Services Companies, in energy efficiency improvement and energy saving .
- * Organization for Energy Planning (OEP) is the coordinating body of the Energy Efficiency Council .

Egyptian Environmental Policy Program
and the
National Energy Efficiency Strategy Development
Road Map

IMPROVED MANAGEMENT OF THE ENVIRONMENT AND NATURAL RESOURCES THROUGH ENERGY EFFICIENCY



Year 1—Policy Preparation and Presentation | Policy Adoption—Years 2 - 5 | Policy Implementation Years 6 - 10

Egyptian Environmental Policy Program
and the
National Energy Efficiency Strategy Development
Technical Assistance

**SUPPORT TO THE DEVELOPMENT OF
A NATIONAL ENERGY EFFICIENCY STRATEGY IN EGYPT**

“ENERGY EFFICIENCY”

1. SUMMARY

Central to USAID/Egypt's development strategy is the U.S.-Egyptian Partnership for Economic Growth and Development, also known as the Gore-Mubarak Partnership. A high priority on the joint agenda of the Partnership's Subcommittee III, Sustainable Development and the Environment is combating Global Climate Change. The National Energy Efficiency Strategy will be a critical element in Egypt's overall global climate change strategy.

The planned USAID-supported activities will be guided by the objectives contained in the following: the USAID/Egypt Environmental and Natural Resources Strategic Framework; the agenda of the Gore-Mubarak Partnership (primarily Subcommittee III); and the EEPP policy matrix. In addition, to the extent possible, the technical assistance will seek to leverage complementary activities, including the GreenCOM public awareness component of the EEPP, the U.S. EPA energy efficiency work, and the USAID DTII activities as well as the UNDP/GEF project.

2. BACKGROUND

The USAID Mission to Egypt has maintained an on-going relationship with the energy sector in Egypt since the early 1980s. The support has been well-rounded and includes the development of infrastructure as well as helping establish new organizations, notably for energy planning and the use of new and renewable technologies. Initially, the support focused on supply-side infrastructure investments. Since the late 1980s, the USAID has placed increasing emphasis on policy reform initiatives of the electrical sector (independent private power, privatization of electrical distribution companies and the creation of a regulatory body (through the Ministry of Electricity and Energy) and support on the demand-side (the ECEP).

From 1989 to 1998, the USAID/Egypt supported a program to accelerate use of energy efficiency technologies and practices within the industrial and commercial sectors through its Energy Conservation and Environment Project (ECEP). In 1997, the Egyptian Environmental Affairs Agency (EEAA) made energy efficiency a cornerstone of its National Action Plan for Greenhouse Gas Emission reduction in anticipation of meeting its obligations under the UNFCCC by tapping the gains available from widespread replication of practices and technologies introduced through the ECEP. Additionally, the competitiveness of local businesses can be enhanced. This in turn permits wasted resources to be put to more economically productive uses.

The latter stages of the ECEP highlighted the need for an appropriate institutional framework and the development of local private companies to provide services and goods in the market place. Other ECEP work focused on promoting dialogue between private sector businesses and policy makers. Two key activities included support in formation of the Egyptian Energy Services Business Association (EESBA), and helping

the Ministry of Petroleum's Organization for Energy Planning, (OEP), outline an action plan for developing a National Energy Efficiency Strategy, (NEES).

The action plan was based on a strong partnership between the public and private sectors and was designed to provide the private sector with a strong voice in public decision-making, in turn stimulating the private sector to play a leading role in implementing energy efficiency projects and within a few months, some eleven organizations had agreed to become members of the Energy Efficiency Council and had formally signed a protocol for cooperation. They represent the leading players within the areas of energy and environment and collectively have the potential to shape an effective NEES.

The EEPP energy efficiency activity aims at maintaining the impetus toward the development of a policy reform agenda to promote widespread use of energy efficiency. The cornerstone will be the emergence of a NEES built around a meaningful public-private sector partnership dialogue targeted at private sector investment. To insure that this dialogue evolves in a meaningful manner, both sectors need to be armed with information and data that supports the decision-making process and therefore, the contractor will provide support in three broad areas i) institutional development; ii) capacity building; and iii) promotion and outreach.

Both institutional development and capacity building are necessary to ensure the sustainability of this dialogue result of this task order. Promotion and outreach activities will be as important to expand the participation of other interested private sector parties while increasing market awareness on the impact of policy reform. Increasing the awareness of and drawing the participation of financial institutions into this dialogue will be necessary to attract private investments.

Specific support will include helping the OEP set up a task force to administer, monitor, and evaluate success with respect to the goals and objectives set for NEES development. Support will also include providing assistance to those entities with leading implementation roles. Such assistance will include assisting in developing the work plans of the various individual implementation entities as well as helping to create sufficient resources and capacity.

The technical assistance will also support the OEP task force and others in formulating policy reform initiatives. Assistance will also be given to stimulate private sector involvement in shaping the policy reform agenda. Targeted promotional/outreach activities coordinated and implemented with GreenCOM, will be undertaken to ensure a strong private sector voice in all policy development.

In addition, the contractor will support the Energy Efficiency Council in interfacing and coordinating with other USAID-supported initiatives, including the EEPP Program Support Unit, the GreenCOM project, the DTII training program, and the EPA, to best leverage all potential resources for the implementation of the NEES.

3. STATEMENT OF OBJECTIVES

The USAID/Egypt objectives in providing support are as follows:

- to assist the Energy Efficiency Council in formulating a National Energy Efficiency Strategy (NEES) that creates a sustainable energy efficiency market through strategic partnerships between the public and private sectors.
- to support creation of a task force within the Organization of Energy Planning (OEP), to monitor, evaluate, coordinate and direct the development and implementation of a NEES targeting Global Climate Change through mitigation of GHG emissions
- to support Energy Efficiency Council members and other key player working groups to further specific EEP-related energy policy initiatives.
- to engage the public and private sectors in meaningful dialogue to formulate a policy reform agenda that rationalizes energy use, particularly fossil fuels, based on optimum environmental and economic considerations, and encourages a leading role for the private sector.
- to assist a transformation from a public sector-led market to a sustaining, robust and competitive market for energy efficient goods and services dominated by private sector investments and businesses.
- to stimulate trade and sustainable technology transfer to promote sustainable economic growth, enhance Egypt's competitiveness and ability to enter the global market.

4. TECHNICAL ASSISTANCE

Technical assistance under this task order will be directed at:

- assisting the GOE formulate a National Energy Efficiency Strategy and policy reform agenda, through meaningful dialogue between the public/private sectors, to rationalize energy use based on optimum environmental and economic considerations
- creating a sustainable energy efficiency market by transforming the energy efficiency business sector through strategic public and private sector partnership initiatives.