UNITED NATIONS DEVELOPMENT PROGRAMME
GLOBAL ENVIRONMENT FACILITY
PROJECT DOCUMENT

Number:	**PAL/97/G31/B/1G/31**
Title:	Energy Efficiency Improvements and Greenhouse Gas Reduction
Country Eligibility:	Under GEF-CEO letter of 2 August 1996 to the GEF Executive Council Members
Project Site:	Ramallah, Palestinian Authority, headquarters for national activities
GEF Focal Area:	Climate Change
Implementing Agency:	Palestinian Energy Authority (PEA
Executing Agency:	UNDP Program of Assistance to the Palestinian People (UNDP/PAPP)
Duration:	3 years
Estimated starting date:	June 1998

UNDP and cost sharing Financing:
GEF input.....$2,475,000
Government $250,000
UNDP/PAPP input. $200,000
Total:.....$2,925,000

Brief Description: This project is part of a regional initiative for energy efficiency joining Egypt and the Palestinian Authority. Similar to its Egyptian counterpart, this project will assist in reducing the long-term growth of GHG emissions from electric power generation and from consumption of non-renewable fuel resources. As part of such a regional initiative this project will focus on the Palestinian Authority. In responding to the new operating conditions, public and provate industry must invest in process modifications and new machinery to remain competitive, with excellent likelihood that their investments will have favourable rates of return based on savings from reduced operating costs. The funding for this project will leverage the new investments in ways that are most beneficial to the global environment.

The long-term policy and overall objectives will be achieved through:

- supporting efficiency improvement and loss reduction in the distribution of electric power;
- facilitating adoption and implementation of energy conservation measures in residential, commercial, and industrial sectors through education and promotion, financing, and standard-setting activities;
- stimulating and guiding the private sector in the development of a capability of end use energy efficiency service planning, feasibility analysis, conceptual design, and project implementation, including the manufacture of energy efficient products;
- assisting in the international and regional transfer of experience and technology that could be instrumental in GHG emission reduction;
- promoting public and private sector investments in energy projects that are beneficial for the global environment.

On behalf of:	Signature	Date	Name/Title (Please type)
The Palestinian Authority:			
UNDP/PAPP:			

PALESTINE-ENERGY EFFICIENCY IMPROVEMENTS AND GREENHOUSE GAS REDUCTIONS
TABLE OF CONTENTS

ACRONYMS

ATS	Auditing and Technical Services
B&F	Business and Finance (Work Group)
BOT	Build-Own Transfer
CFL	compact fluorescent light
CIG	Commercial, Industrial, Government (sector)
CO_2	carbon dioxide
CTA	Chief Technical Advisor
DSM	demand side management
DRTPC	Development, Research, Training, and Planning Center (Egypt)
DWG	Distribution Work Group
E&R	Economics and Regulation (Work Group)
EEA	Egyptian Electricity Authority
EDC	electricity distribution company
ES	energy services
ESCO	energy service company
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	greenhouse gas
GJ	Giga-Joule
GREU	Gaza Regional Electric Union
HLCC	High Level Coordination Committee
HQ	headquarters
IEC	Israeli Electricity Corporation
IRP	Integrated Resource Planning
JDECo	Jerusalem District Electricity Company
KV	kilo-volts (1,00 volts)
LPG	Liquid Petroleum Gas
LPSP	Letter of Power Sector Policy
MTOE	Thousand Tonnes (Metric) of Oil
NELCo	Nablus Electricity Company
NEU	Nablus Electric Utility
NIS	Shekels
P&O	Promotion and Outreach (Work Group)
PA	Palestinian Authority
PAC	Project Advisory Council
PAG	Palestinian Authority Government
PAPP	Program for the Palestinian People
PEA	Palestinian Energy Authority
PEC	Palestine Energy Research and Conservation Center
PEHL	Palestinian Energy Holdings Ltd.
PEnA	Palestinian Environment Authority
PERC	Palestine Energy Regulation Commission
PETL	Palestine Energy Transmission Ltd..

Acronyms, Continued

PPA	power purchase agreement
PPER	Project Performance Evaluation Report
PTD	Project Technical Director
RBAS	Regional Bureau of Arab States
SELCo	Southern Electricity Company
TOR	Terms of Reference
TPR	tripartite review
UNDP	United Nations Development Program
USAID	U.S. Agency for International Development

SECTION A

Section A: CONTEXT

The Palestinian Authority (PA) consists of territory in the West Bank and Gaza Strip that are under the limited control of the Palestinian Authority (PA), as the result of the Oslo II Interim Agreement of 1995. The concept of an independent Palestinian state has been at the forefront of regional and international attention since before the time of the State of Israel's creation in 1948. When Israel was created, control of the West Bank passed from Great Britain to Jordan; Egypt gained control over the Gaza Strip. The 1967 Six Day War between Israel and Jordan, Egypt and Syria altered the political landscape by transferring control over all the area in the Palestinian territories from Egypt and Jordan to Israel.

The Gaza Jericho Agreement of 1993 and the signing of the "Declaration of Principles" by Israel and Palestinian Liberation Organization (PLO) in September 1993, gave the PLO control over territory in the Gaza Strip and the City of Jericho. The subsequent Oslo II Interim Agreement and Paris Protocol Agreement of 1995, formally established the Palestinian Authority and created a new set of economic and political relations between the PA and both Israel and Jordan. Through these agreements, the PA further gained certain monetary, taxing, licensing, and police authority. However, the political and economic destiny of the PA remains closely linked to Israel. A large number of Palestinians are employed in Israel, which maintains certain controls over Palestinian imports and exports and polices all border crossings into the PA. Israel further exercises military and police presence within most of the area of the West Bank and about 1/3 of the territory of the Gaza Strip.

The official definition of the areas under the PA excludes all military positions and Israel settlements within both the West Bank and the Gaza Strip. The West Bank and Gaza Strip consist of around 6,185 square kilometers (km^2) and 2.65 million people. The West Bank contains the majority of this area and people, with an area of 5,820 square kilometers[1] and a population of approximately 1.8 million. The Gaza Strip consists of an area of 365 square kilometers and a population of about 850 thousand people. The PA's GDP as of 1994 was $2.5 billion or $928 per capita. Per capita GNP in 1994 was considerably higher (about $1,350) as the result of the large number of Palestinians that work in Israel. However, per capita GNP has declined to less than $2,000 since the Paris Protocol, as the result of border closures due to an increase in political tension between Israel and the PA.

The Palestinian economy is largely based on agriculture and services, as shown in Exhibit 1. Agriculture represents about one-third of total GDP; government and other services comprise about 40% of GDP. Industry and construction together account for less than one-quarter of GDP. The PA hopes, however, to develop a large industrial and infrastructure base that is independent

[1] Source: Applied Research Institute of Jerusalem (ARIJ), *The Status of the Environment in the West Bank*, October 1998.

of Israel during the remainder of this decade. There are plans to develop an airport and a seaport in Gaza. There have been discussions of developing a steel industry in the PA.[2] However, the environment of political risk and uncertainty that has prevailed during most of the brief history of the PA has inhibited investors from making large scale industrial investments. Continuing trade and immigration restrictions have prevented the PA from developing airport and seaports.

Exhibit 1: Economic Structure of GDP

Sector	Year		
	1992	1993	1994
Construction	13.0	16.4	16.8
Agriculture	35.5	29.0	33.3
Industry	7.4	8.4	8.2
Government	10.5	11.8	11.2
Other	33.6	34.4	30.5
Total	100.0	100.0	100.0
Employment (000)			
	204	232	249
Employed in Israel	116	83	68
Total	320	315	302

Source: IMF and Palestinian Economic Council for Development and Reconstruction

1. Description of Subsector

Overall, the Palestinian Authority uses 926 MTOE of energy. On a per capita basis, the PA uses about 350 kg of energy per person, placing it among the lesser energy intensive countries in the

Source: Palestinian Energy Research Council, PEC, *Palestine Energy Profile*, 1996.

developing world. Of the total 926 MTOE of energy used in the PA in 1996, 278 MTOE was used by the transportation sector. This energy use is outside the potential scope of this GEF project. Of the remaining 649 MTOE of energy that is used outside the transportation sector, the residential sector comprises 60% of total energy demand, as shown in Exhibit 2. The commercial sector comprises 18% of total energy demand and the industrial sector represents 19% of total energy demand. The government sector accounts for only about 3% of total energy demand.

Electricity accounts for nearly 60% of all energy use outside of the transportation sector. As the residential sector accounts for more than 60% of all electricity use, electricity use in the residential sector accounts for about 36% of all non-transportation energy use in the PA, making it the single largest source of energy demand in the country. Gas and oil comprise about 29% of all energy use. The industrial and commercial sectors account for nearly 2/3 of all oil/gas demand.

Exhibit 2: Non-Transportation Energy Use in the Palestinian Authority

Sector	Energy Usage by Type							
	Electricity		Oil/Gas		Other		Energy Use	
	MTOE	% of Total	MTOE	% of Total	MTOE	% of Total	MTOE	% of Total
Residential	230	62	79	41	83	100	393	61
Commercial	73	19	42	22	0	0	114	18
Industrial	50	13	70	37	0		120	19
Government/ Other	21	6	0	0	0	0	21	3
Total	374	100	192	100	83	0	649	100
% Fuel of Total		58		29		13	649	100

Source: *Palestine Energy Profile, 1996*, adjusted to account for estimated energy transportation and transformation losses.

The Letter of Power Sector Policy and Associated Action Plan (LPSP), signed by the Chairman of PEA and the President of the PA on July 6, 1997, provides the basis for a new organizational structure of the PA energy sector. The LPSP separates policy and regulatory functions of power

sector enterprises. Whereas the PEA previously had commercial roles for electricity supply, transmission, and distribution, the LPSP seeks to refocus and reorganize the PEA to be the main policy making body for the sector. PEA would continue to be responsible for energy sector coordination and policy, particularly in the areas of rural electrification, regional interconnection, energy conservation, and research. PEA would coordinate energy efficiency and conservation responsibilities with the Palestine Energy Center (PEC), an existing independent agency focusing on research and public education, and other NGO institutions working in this field. The new organization of the PAs energy sector is described below under Institutional Framework.

2. Host Country Strategy

The five major priorities for the PA energy sector are:

- **Institutional reform** - to implement regulatory and structural reforms of the PA energy sector as outlined in the LPSP

- **Efficiency improvement** - to increase the operating and technical efficiency of the distribution utility companies through energy end-use efficiency, energy conservation, and better load management

- **Network Rehabilitation and Upgrade** - to implement ongoing network rehabilitation and upgrade of the transmissions and distribution network.

- **Rural electrification**. To electrify rural areas of the PA in order to develop the agricultural, water supply, and other sectors in villages of the PA.

- **Independent Generation Sources** - to obtain new sources of generation that do not rely upon the Israeli Electricity Corporation (IEC)

These priorities and strategies for realizing them are largely articulated in the LPSP. Institutional reform is ongoing and should follow the schedule outlined in the LPSP. According to this schedule, reform legislation that is being prepared should be completed by October 1997 and presented to the PA Council in November 1997. By early 1998, an independent PERC and three new distribution companies (NEU, GREU, and SELCo) would be established. PEHL would be created by early 1999.

Electric network rehabilitation and upgrades are being implemented according to donor assistance programs that are discussed below. A rehabilitation project in Gaza that is being completed has already resulted in large electricity line loss reductions. Other rehabilitation projects should proceed shortly. A rural electrification project was initiated in July 1997.

The PEA recently selected a BOT bid from a Palestinian investment group for a 200 MW power project that will provide the PA its first major power source that is not connected with IEC. The PEA expects to conclude a power purchase agreement with these investors by Fall of 1997.

While the LPSP clearly indicates that energy end-use efficiency is a priority for the PEA and the PA as a whole, there have been little concrete programs, specific targets made for energy efficiency savings, or schedules for initiating energy efficiency improvements. The energy efficiency savings targets and initiatives created through this GEF project would therefore represent a major step within the PA towards the establishment of coherent and comprehensive strategy for achieving energy end-use efficiencies.

3. Prior and Ongoing Assistance

The PA is beginning to receive large amounts of technical and financial assistance for its energy sector, most of which has been for electricity distribution system rehabilitation and expansion. There has so far been little assistance in the area of energy end-use efficiency

Non-Energy End Use Efficiency Projects

The PA has begun to receive assistance for distribution system rehabilitation and upgrades, institutional strengthening, and management reform, through a number of donor programs. Most of these programs have come about through the coordination of the World Bank, which has established an office in Ramallah and has committed itself to a long-term plan of assistance in the PA. Most World Bank and other assistance has so far concentrated on distribution system rehabilitation. Other organizations working with the World Bank include development agents from Norway, Italy, and the European Investment Bank.

From these groups, nearly $75 million has been committed for distribution system rehabilitation of which $20 million is now being spent for rehabilitation in the Gaza. This program of assistance, which has been largely completed, has resulted in large improvements in system efficiency and reductions in electricity line losses of as much as 10%. Similar rehabilitation projects are now being funded for areas of the West Bank. See Exhibit 3.

Exhibit 3:
Selected Donor Assistance for the Palestinian Energy Sector

Region	Project	Status	Cost Million $	Donor
Gaza	Rehabilitation	Ongoing	20.0	World Bank

Exhibit 3: Selected Donor Assistance for the Palestinian Energy Sector				
Region	**Project**	**Status**	**Cost Million $**	**Donor**
Southern West Bank	Rehabilitation	Fund commitments	20.4	Italy
Central West Bank: Bethlehem, Jerusalem, Ramallah	Rehabilitation	Commitments	26.1	European Investment Bank (EIB)
Cent. West Bank, Jericho	Rehabilitation	Commitments	4.6	World Bank
Bethlehem	System expansion	Commitments	10.0	EIB
Overall PA	Rehabilitation project management	Commitments	2.5	Italy
	Institutional strengthening	Commitments	4.0	World Bank
	Energy efficiency research/programs	Ongoing	0.5	European Commission
Total		Ongoing Commitments Total:	20.5 67.7 92.2	

A $4 million program for institutional strengthening will help electricity distribution companies improve their operating efficiency. The World Bank will provide technical assistance in EDC financial and corporate management to JEDCo, which will in turn sign an agreement with SELCo under which JEDCo will assist SELCo with its financial and corporate management. In this way, technical expertise transferred to JEDCo through World Bank assistance will be transferred again to SELCo.

Energy End-Use Efficiency Programs

There has so far been only one significant donor-funded program in the area energy end-use efficiency in the PA. That program involved a $0.5 million grant from the European Community

to the PEC to perform energy end-use research and selected energy efficiency projects. Some of these projects have included numerous energy efficiency workshops and seminars, and ongoing pilot projects, one in Tibeh, near Jenin, and another in Sekar, near Hebron. The PEC hosts several workshops each month, at which it provides advice and guidance to energy end-users in the residential, commercial, and industrial sectors on how to use energy more efficiently. Under the Tibeh and Sekar pilot projects PEC is providing energy efficient refrigerators and lighting to residential customers. Customer energy use and savings are being evaluated using electrocute end-use monitoring equipment.

Through EU funding. PEC is also performing energy end-use efficiency projects in the areas of residential building thermal insulation and solar water heater standards.

4. Institutional Framework

The LPSP defines the official structure of the PA's energy sector, As shown in Exhibit 4, under the LPSP, the PEA would continue to be the sole agency responsible for the overall coordination of the energy sector, as well as for policy formulation and system development. Specifically, PEA shall have responsibilities in: (1) rural electrification, (2) regional interconnection, (3) energy conservation, and (4) research that cannot be realistically or efficiently commercialized. The PEA would coordinate energy efficiency and conservation responsibilities with other organizations working in the field, including the Palestine Energy Center (PEC), an existing independent agency focusing on research and public education.

Under the reorganization, PEA will divest itself of functions in:

- **Generation**, through conclusion of contracts with new private power generation sources under Build-Operate-Transfer (BOT) agreements. After the end of 15 year BOT period, the project could be transferred back to PEA, although arrangements could be made to assign any contracts to another party.

- **Distribution**, through the creation of three new commercially oriented regional utilities, one in Gaza (Gaza Region Electricity Union - GREU), and two in the West Bank (Nablus Electricity Utility - NEU and Southern Electricity Company - SELCo). The Jerusalem Electricity Distribution Company (JEDCo) is already established as a commercial electricity distribution entity in East Jerusalem and the surrounding area.

- **Tariffs and regulation**. A new, independent regulatory commission, the Palestine Energy Regulation Commission (PERC) would report directly to PA government leaders, would establish tariffs based on commercial considerations, subject to the needs of vulnerable segments of the population. PEA would make recommendations for PERC board members, who would include significant representation of the private sector. Board

member would be approved by the PA government.

Exhibit 4: Proposed Institutional Framework for the Palestinian Power Sector Power		
Sector	**Functions**	**Responsible Agency/Group**
Public	Sector coordination & development Policy formation System development	Palestinian Energy Authority (PEA)
	Energy efficiency and conservation	Palestinian Energy Research and Conservation (PEC)
	Transmission	Palestine Energy Transmission Ltd.*
	Tariffs and regulation	Palestine Energy Regulation Commission
	Government generation, transmission asset holding	Palestine Energy Holdings Ltd.*
Private	Generation	Private/semi-private groups
	Distribution	Semi-private regional utilities

* Currently organizationally situated within the PEA

Source: *Letter of Sector Policy*, 1997

The PEA would retain interests in transmission through the establishment of the Palestine Energy Transmission Company Ltd. (PETL). Once the PA obtains its own independent transmission assets, PETL, a transmission company organizationally situated within the PEA, would own, operate, and develop a Palestinian transmission network. Another entity, Palestine energy Holdings Ltd. (PEHL) would also be organizationally located within PEA. PEHL would ensure the efficient management of national assets. PEHL members would be recommended by PEA bwould have to be approved by the PA. In this regard PEHL may have some organizational independence from PEA.

Institutional Capabilities of Major Program Counterparts

The UNDP Program of Assistance to the Palestinian People (UNDP/PAPP) will have ultimate responsibilities for executing a program to which many Palestinian groups will make strong contributions. The major counterpart that will have responsibilities for the successful

performance of this GEF project will be PEA, which will be the primary implementing agency for this project and which will lead most of the work groups. It is however expected that PEA delegates major auditing and technical responsibilities to work groups that are built around existing Palestinian cadre in these fields.

Palestinian Energy Authority (PEA)

PEA will be the primary implementing agency for this GEF project. PEA was established in November 1994 and was granted concessions for generation, transmission, and distribution of electricity and all other types of energy in the PA. PEA's original mission was to ensure energy availability and to develop the PA energy sector. As mentioned above, PEA's original mandate has been focused primarily along policy lines; many of PEA's generation, transmission, and distribution responsibilities are being delegated to private and public sector entities in the PA. However, as the country's primary energy policy institution and as the signatory to major international contracts with private generators and multilateral donor agencies, PEA retains considerable influence within the PA. PEA will take on a major role in the PA's acquisition of the transmission network from Israel, the future rehabilitation and development of the PA's distribution system, and in the expansion of electricity supply to rural areas.

In addition to coordinating these large international contracts, PEA has directed and produced several studies of the PA's energy sector, including a study of the rehabilitation and development of the PA distribution network, generation planning studies, and interconnection studies. PEA is currently working to set up a specification and standards system for the energy sector. The PEA employs about 30 professionals in its Ramallah and Gaza offices.

Palestinian Energy and Environmental Research Center (PEC)

PEC is a non-profit, non-governmental organization that has national responsibilities for energy savings and renewable energy. Its responsibilities include formulating, coordinating, and implementing programs and actions. PEC is linked with universities and other national partners, and with the European Economic Community (its primary funding agent), and other international partners. PEC has a staff of approximately 30 people, located primarily in Nablus and in Gaza. About 10 of these staff are engineers, of which about half have skills and prior experience in energy efficiency. PEC contains among the only professionals in the PA that have prior experience with energy audits. In addition to the programs described above under Energy End-Use Efficiency Programs, PEC's other programs include:

- residential building thermal insulation program for development of national standards for thermal insulation
- solar heaters standardization program for the formulation of national solar heating

standards

- national gas supply for the evaluation of natural gas use and supply options in the PA
- electricity generation and transmission study, which will suggest and evaluate generation and transmission options for the PA
- regional interlinking of electricity grids study, to evaluate options for linking the PA with Jordan and other neighboring countries
- rural electrification program, which will evaluate technical options and financial mechanisms for increasing rural electrification.

Electricity Distribution Companies

This GEF project will also rely upon contributions and cooperation from four distribution companies that have been working with PEA and the World Bank to rehabilitate and improve the PA's distribution network. These distribution companies include one private company, Jerusalem District Electricity Company (JDECo), which supplies electricity to East Jerusalem and to the surrounding areas. JDECo is the PA's largest and first formally incorporated electricity distribution company. JDECo will be a recipient of financial, technical, and management assistance from the World Bank and will pass this experience along to the Southern Electric Company (SELCo).

The remainder of these distribution companies are still in the process of being created from municipalities, including the following three companies:

- SELCo, which serves Hebron and the southern area of the West Bank. Currently, 70% of the SELCo region consists of the municipalities of Bei Omar, Dahriyea, Dora, Hebron, Halhul, and Yatta. Other, smaller entities in the southern area of the West Bank comprise the remaining 30%. SELCo will receive financial and management assistance from the World Bank through JDECo
- NEU, Northern Electric Utility, which currently consists of the Nablus municipality, but will be expanded to include all of the northern area of the West Bank
- Gaza Region Electricity Utility, which will serve the entire Gaza area. Gaza City Municipality and other municipal entities currently serve this area.

These electric distribution companies currently retain electrical engineers and other individuals that have expertise in assessing losses and in evaluating rehabilitation projects. They have less

expertise in evaluating the consequences of upgrade and enhance projects, as there have not yet been any major projects in this area. The ability of the distribution companies to accomplish actions that are in the overall interests of the PA are limited in that each distribution company justifiably has its own interest in mind. For this reason, working with distribution companies is still best coordinated through PEA, at least for the next several years.

Other Counterparts

Other counterparts that will provide expertise for this GEF project include:

- Birzeit University, which may supply engineers and other technical experts that may serve as audit assistance for the 300 energy audits to be conducted under Output 1.2. Birzeit is a leading university with a strong department in electrical engineering, located in the West Bank and with relations with other university experts in Gaza

- Regulatory Staff of the Ministry of Trade

- Standards Staff of the Ministry of Industry.

In addition, this GEF project will rely upon the cooperation from various groups, including:

- Ministry of Planning & International Cooperation

- Palestinian Environmental Authority (PEnA)

- World Bank/Palestinian Mission Energy Sector Advisor.

Section B: PROJECT JUSTIFICATION

The PA has no economic domestic supplies of primary energy, with the exception of some solar and biomass energy that supplies about 9% of the PA's total energy. The PA has no economically recoverable oil, gas, or coal reserves and must import all of its 470 MTOE of energy resources (about 10,00 barrels/day). It uses little or no hydroelectric energy and lacks any significant hydroelectric potential. Furthermore, the PA lacks supplies of secondary energy in that it imports more than 95% of its electricity from the Israel Electric Company (IEC) in Israel.

The lack of available energy supplies also contributes to relatively high prices for all forms of energy. Petroleum prices are $4/GJ; gas prices are $5/GJ. The typical electrical user pays an average of 14 c/kWh for electricity at the retail level. Retail electricity prices range from 9.5 c/kWh in East Jerusalem to more than 19 c/kWh in Jenin.

The gross national product in 1994 was approximately $3,500 million, with a per capita income of $1,350. This is less than one-tenth the per capita GDP of Israel. The combination of the lack of indigenous energy resources and the low income of the population, the PA uses a relatively small amount of energy per capita. Its energy consumption per person is only about 350 kgoe, making among the lesser energy intensive economies in the developing world. Per capita electricity consumption is only 600 kWh per person, equivalent to the continuous operation of a 70 watt light bulb fore each resident. The PA's electricity consumption is 30% less than that of Syria and 40% less than that of Egypt. The PA's per capita electricity consumption is only about 1/8 that of Israel.

Electricity prices are likely to increase even more in the future, when Israel implements time-of-use rates for wholesale power purchases by the electric distribution companies. Currently, the PA buys electricity at an average wholesale rate of 8-10 c/kWh that does not vary by time of day. This rate does not take into account the fact that the PA consumes a higher percentage of its energy at peak periods than do Israeli consumers. In this regard and all other things being equal, consumers in Israel are subsidizing consumers in the PA. This cross-subsidization will end when time-of-use rates are implemented. Electricity rate increases in the PA will accompany electricity rate reductions in Israel.

In spite of its low level of energy use and relatively high electricity prices, a relatively low level of efficiency characterizes the PA. The PA uses about 0.35 kg of oil per unit of GDP, a level that is twice as high as the world average. Energy efficiency has become worse as energy consumption has grown steadily during the 1990's, despite a decline in the PA's economy since 1994.

Current Situation with Electric Consumption

Existing homes account for 68% of all electricity sales in the Palestinian Territories. Near-term, most growth in electrical demand will come from new homes, intensified electrical use

in existing homes (including villages receiving new connections), and population-serving businesses (such as food stores, restaurants, service businesses). Due to border closures, difficulty in moving raw materials into the PA, and investment risks outside the housing sector, near-term industrial growth is expected to be modest. Thus the residential sector is an excellent target for achieving efficiency in power use.

The PEA reports that as of mid-1997, 340,000 residents (42,000 - 50,000 households, with household size averaging 6.6 persons in the West Bank and 7.8 persons in Gaza Strip) have no electricity. The Bureau of Statistics, however, reports that only 2% of the population (about 50,000 people, or 7,000 households) have no electricity, while another 400,000 people have electric service that is limited to 8 hours per day. The future pace of village electrification is unknown, but the general assumption is that many villages will wait at least five years before they receive electricity.

Primary electric end uses are believed to be refrigerators, lighting, space heating and possibly water heating. Refrigerators use an estimated 35-70% of household electricity, depending on the community and mix of electrical equipment used. Lighting is believed to be the second largest use. Together these two end uses may account for 70% or more of household electric consumption.[1] The West Bank housing stock is of mixed vintage; homes built in the last 10 years have central heat, which is primarily electric.[2] The estimated penetration of solar water heating is 80% (undocumented). Beyond this, little analysis has been done of the primary end uses of electric energy in homes.[3] There is an unknown proportion of residential energy consumption from gas oil (kerosene), LPG and other fuels. A substantial amount of housing construction has occurred in Gaza in recent years. If this continues there will be increasing demand for electricity and household appliances. Approximately 5% of PA's total energy use is estimated to rely upon non-commercial fuels for non-electric villages.

Potential for Energy Efficiency

There has so far been little or no research on the amount of energy efficiency that is possible within the PA. The low degree of energy efficiency in practice, as measured by energy use per unit of GDP, is indicative of a substantial amount of remaining energy efficiency potential to be tapped. Furthermore, the limited research that has been conducted so far, combined with information on the characteristics of energy using equipment in place, are also

[1] A recent field research project in Morocco revealed that refrigerators and lighting account for 73% of residential electric use.

[2] The mission was told consumers choose electric heat because the municipal electric distribution companies are known to be lenient if Palestinian households fall behind on paying their electric bill, whereas fuel suppliers (e.g. LPG) demand cash in advance before making fuel deliveries.

[3] Some end use data may be available soon from Prof. Mohamed Ziara of Birzeit University through the results of his recent in-depth research project on household energy. This information was not available during the July mission.

indicative of a very high level of remaining energy efficiency potential in the PA.

The PEC has been conducting pilot projects in Tibeh, near Jenin, and in Sekar, near Hebron that will evaluate energy efficiency potential in the residential sector. This study is measuring residential electricity consumption before and after introduction of energy efficient equipment such as high efficiency refrigerators and compact fluorescent lights. The results of this pilot program are expected some time during 1998. The characteristics of energy using equipment that is typical in the PA indicate that this and other studies should find a high level of energy efficiency potential.

Discussions held in July 1997 by the UNDP/GEF mission team revealed that at least 40% of consumers buy older models of used equipment from the Israeli market. In Gaza this may be as high as 80%, while in the West Bank it may be around 20%. These have much lower efficiency than the more energy efficient new models available on world markets (and probably from the Israeli market). The most energy efficient new refrigerators manufactured for industrialized countries may consume as little as 27% (a 73% savings) of the energy consumption of the older models bought on the second-hand market. Compared to the typical new models sold in industrialized countries, new energy efficient models can still save 44% of electric consumption. Since households consume 68% of all PA electricity, and refrigerators account for 40-70% of this electricity, refrigerators alone account for 30-40% of the PA's entire electric consumption. If households adopted compact fluorescent lamps in place of incandescent lamps, lighting energy could be reduced by 66% - 80% per light fixture. The savings would be 50-60% in fixtures that now use fluorescent tube lamps if these were changed to CFLs, and by 25% if watt-saver lamps and energy efficient ballasts were used.

Residential electric consumers pay 0.33 to 0.52 NIS per kWh (the equivalent of U.S. $0.10-0.15 per kWh) for electricity. One might think that such high electricity prices, relative to local incomes, would provide significant consumer motivation to use energy efficient appliances and equipment.

However, this does not appear to be the case in Palestine. Purchases of energy efficient household appliances and equipment do not occur due to four barriers:

1. Energy efficient equipment is not readily available in the local market
2 Lack of consumer awareness of the benefits of energy efficient models in reduced running andcosts, and therefore there is a lack of consumer demand for these models
3. Lack of product labeling information to help the consumer determine if a model of certain equipment (e.g. refrigerator, water heater) is energy efficient or not
4. Tendency of consumers to buy on first cost basis, and ignore the promise of long term savings in running costs from energy efficient models; in parallel, limited use of credit or installment payment terms to remove the first cost barrier of buying energy efficient models.

SECTION B

Industrial and commercial sector customers use little energy efficient equipment, because of difficulties in maintaining this higher-technology equipment properly. The pumps used for domestic water supply and irrigation are largely old and inefficient. In most countries facing these conditions, it is typical to identify the potential for non-residential facilities to improve their energy efficiency by 15-20%, and even higher in many commercial facilities such as office buildings, hotels, retail and food stores. One study of street lighting performed by PEC found a potential for a 67% improvement in street lighting around parking lots and factories in the Nablus area.

1. Problem to be Addressed -- the Barriers to Energy Efficiency

The PA's low level of energy efficiency has resulted from the relatively low priority that has been given to energy efficiency and to several important barriers to greater efficiency.

Low Priority of Energy End Use Efficiency

Improving the efficiency of energy at the end-user level has not been a priority for either the private or public sectors in the PA. In the public sector, government agencies and multilateral development banks have focused most of their attention upon two issues:

1. Reducing distribution losses, which have been until recently as high as 40%. The World Bank and development banks in Italy, Norway, and other countries have so far disbursed about $20 million dollars for distribution improvements in Gaza. Another $60 million of commitments have been approved for other regions in the West Bank.

2. Obtaining a supply of energy that is independent of the state of Israel. PEA just concluded a 15 year BOT agreement for electricity supply from a Palestinian investment group.

In the private sector, few if any customers have given much attention to improving energy end-use efficiency. In meetings held with industrial and commercial sector energy end-users, customers stated that their energy use decisions were nearly all focused upon supply side options such as obtaining back-up generation to obtain electricity service at a lower cost or with greater reliability. Businesses had to be repeatedly reminded that energy efficiency was even an option for helping to solve energy problems.

Limited Information.

Due to the relatively low priority given to improving energy efficiency, there is little energy end-use and energy efficiency information and a very low level of awareness of energy efficiency potential among energy end-users There is currently only limited information

available on energy use. Through the efforts of PEA and PEC[4] there is currently published information on fuel consumption, electricity generation, generating capacity, peak demand, and energy prices, both throughout the territory and on a local level. Some of this energy use information is available on a sectoral level.

As mentioned above, PEC and other groups are only now beginning to assess energy efficiency potential. Information that is available now is only indicative of a large amount of energy savings potential that exists in the residential, industrial, commercial, and government sectors of the PA. There is little or no systematic information on energy consumption by type of equipment or the energy use characteristics of the type of equipment that is being used and/or is now available in the PA.

A lack of information on energy consumption and energy efficiency potential poses barriers to potential energy efficiency product and service providers. In an environment where the size of the market is unknown and where business opportunities are poorly defined, potential energy service providers have little or no ability to develop market strategies. They furthermore have little or no idea of the energy efficiency concerns of potential customers, energy consumers, potential energy efficiency providers, and electricity sector planners. Potential energy service providers therefore have very little basis for developing business strategies. Not surprisingly then, there are no private sector companies currently engaging in energy service provision.

A lack of energy efficiency market information also affects energy consumers. Without basic information, consumers have little basis for making informed judgments about such issues as the trade-offs between initial purchase costs and life cycle energy costs. Most customers are not even aware of all their energy use equipment options. Policy makers and energy planners have little ability to evaluate the potential role of energy efficiency in meeting the PA's long-term energy needs.

Awareness.

In part due to this lack of energy efficiency market data, customers have relatively little awareness of energy efficiency potential, the availability of energy efficient equipment, and the associated savings on running costs.

Customers lack awareness of energy efficiency potential on all levels, lacking:

- Awareness of overall energy efficiency potential
- Awareness of simple maintenance and operating procedures that can save energy at practically no cost
- Awareness of low-cost measures such as capacitor fittings or lighting efficiency

[4]See: *Palestine Energy Profile; Electricity Energy Status in the Gaza Strip: Analytical Study;* and *The Present Status of Electricity Services in the West Bank*

improvements
- Technology awareness of the energy efficiency that might be achieved through investments in new equipment.

This lack of awareness means that consumers are not considering possible energy efficient retrofits of existing facilities and that consumers pay little attention to the energy use implications of equipment purchases and business investments.

There have been few or no systematic efforts to improve customer awareness of potential energy savings in any of the sectors, other than a series of seminars and outreach programs performed by PEC. For more than a year, PEC has provided several forums each month at which business and industry leaders or residential customers can receive guidance on energy savings measures that they can implement.

These forums have had at least three limitations. First, only a small portion of the population has received the type of guidance that such forums can offer. Forums for the commercial and industrial sectors have not yet been well attended, according to PEC. While forums for the residential sector have been well attended, they have only reach 1,000-2.000 people in a country of more than 2.65 million.

Second, the forums have not necessarily been provided in the most targeted way possible. Energy savings forums can be more effective if they can target the largest potential sources of energy use and/or savings. However, careful targeting of forums has not been possible, because data on energy use and potential savings is just now becoming available in the PA through the coordinated efforts of PEC and PEA. Because this data has not historically been available. PEC has had to adopt more of an ad hoc approach to forums than they otherwise would have.

Third, forums need to be coordinated with more one-on-one programs such as can be provided through energy audits where energy service professionals can meet with energy users at their facilities and provide specific energy savings advice and recommendations targeted to their facility. To be truly effective, audits must also be directed to the financial and technical decision-makers at energy use facilities. Finally, audits require a program of follow-up to ensure that energy savings recommendations are made.

Business Barriers

There is a relatively strong pool of Palestinian business representatives, both inside and outside the PA that offer relatively high level of business acumen and that give a high priority to customer service. However, leexists of the very specific business issues that are essential to a viable, long-term energy efficiency business.

More so than most businesses, provision of energy services is a relationship business. To be successful, businesses need a strong relationship with potential customers so that they can

identify and understand energy use problems, work effectively with maintenance and operating staff, and find creative solutions to energy efficiency problems.

In highly developed energy efficiency markets, the advanced "relationship orientation" of energy services results in "performance contracts" under which customers payments for energy efficiency services depends upon the value of verifiable and measurable energy savings. The energy service business thus stakes the financial future of its business on its ability to deliver savings. To be successful, performance contracting requires outstanding cooperation between the energy service business and the customer. Energy service companies much have access to customers' facilities to install and use energy savings verification equipment. Customers and energy service businesses need to have a strong, contractual understanding about how to measure savings and how to deal with unexpected problems that might change the value of savings significantly (e.g., a decision to operate equipment much more or less than originally planned).

Consumer Cost Perspective Barriers

Nearly all energy use decisions in the PA are made on the basis of equipment's initial cost. When buying new energy use equipment, Commercial businesses, industrial managers, government leader, and residential customers all make decisions in order to minimize initial costs. The environment of considerable political and economic uncertainty that exists in the PA has contributed to a short-term reasoning that promotes very poor long-term energy use. In the government sector, for example, the majority of procurement rules favor equipment bids with the lowest initial costs. Government procurement policies either consider life cycle energy implications of equipment purchases very badly or do not consider them at all.

Equipment Availability Barriers

Consumers face two types of equipment purchase restrictions that influence them to buy energy inefficient equipment. First, consumers and vendors are restricted in the equipment that can be imported because of trade restrictions that persist under the current Paris and Oslo protocol agreements. The electrical equipment available for sale in the Palestinian Territory is heavily controlled by Israeli regulations for technical specifications and the country of original manufacture. For example, there are explicit limits on the numbers of specified equipment that can be imported from Jordan and Egypt each year without regard to Israeli trade and import regulations.

Most equipment sold to Palestinians is also sold in Israel, understanding the energy efficiency of Israeli equipment is therefore important. Israeli electrical appliances are not subject to minimum energy efficiency standards. Instead, this equipment is subject to regulations that require revealing the energy consumption and environmental impact information, which a consumer can then use (or not) to select individual appliances. There is a requirement that all refrigerators, air conditioners, and washing machines offered for sale in Israel must display a label that informs the consumer of the energy consumption of that individual model. There is

also a Green Mark program that awards a symbol to appliances and equipment that have a minimal impact on the environment. One of the criteria for awarding this Green Mark is energy efficiency. An estimate of the current energy efficiency of new appliances that Palestinians are buying depends on whether the equipment is bought from Palestinian shops or in Israel; if the latter, then efficiency depends on how the Palestinian consumers respond to the energy consumption labels, and whether Hebrew labels can be understood.

Thus it is not immediately apparent that import regulations and trading rules necessarily have either a positive or negative effect on the energy efficiency of residential equipment available in the Palestinian Territory. An investigation is required to determine the exact nature of barriers to the purchase of energy efficient new appliances.

In addition, many appliances and equipment are bought in the Palestinian Territory on a used basis, with most of this equipment formerly used by Israeli households. The used equipment commonly sold ranges in age from 5 to 10 years; and is sold at 25-75% of original cost, depending on the equipment's condition. For Palestinians buying used refrigerators, air conditioners, or washers from Israelis, the degree of energy efficiency will depend on the dates Israel's informational standards were put in place, the age of the used equipment entering the Palestinian market, and the degree to which Israeli consumers originally chose energy efficient (lower operational cost) equipment.

It is especially true for businesses and industry that even in cases where equipment can be imported, certain taxes, certification, and other requirements can make purchasing imported equipment difficult.

The exact nature and extent of these restrictions and their effect on energy efficient equipment imports is poorly understood, because there have been no systematic studies examining this issue. Until these problems are better understood, resolving them will be difficult, and some energy efficiency barriers will remain.

Second, a lack of equipment maintenance capabilities in the West Bank and Gaza influences many industrial and commercial sector consumers not to purchase energy efficient equipment with computer or other electronic components. Consumers may appreciate that such equipment is more reliable, cost effective, and has lower life cycle costs due to its high energy efficiency. However, businesses are often reluctant to purchase this equipment, because they have no access to competent maintenance assistance in the West Bank or Gaza. The maintenance abilities that exist in Israel are often not useful, because of their high cost or the threat that maintenance workers will not be able to travel from Israeli due to frequent border closures.

Financial Barriers

There is a shortage of debt to finance energy efficient equipment purchases and business investments at low rates over medium to long term. Debt is rarely extended for periods of

longer than 4-6 months. There is no commercial lending such as mortgage lending. While Palestinian banks have had money, they have been unwilling to make loans in face of the political risks undermining the current situation in the PA. As a result, consumers have to pay 100% of the up-front costs of new energy using equipment. Because energy efficient equipment generally costs more than inefficient equipment, consumers must choose to spend more of their own money in the future in order to realize future savings. The mission heard reports that Palestinian consumers buy mostly on a first-cost basis, and are reluctant to spend more for higher quality (therefore including most energy efficient) equipment. The GEF project formulation mission was informed by one equipment vendor that consumers may be willing to spend more up-front to buy quality for some "performance -critical" equipment such as space heaters, to minimize break-downs and the associated loss of comfort. Only in these cases was there a perception of value for a higher-cost, quality piece of equipment.

Even equity has been in short supply, despite the large pool of expatriate capital from Palestinians outside the PA. Palestinian investors have been wary of making large-scale investments due to the climate of extreme political uncertainty that has prevailed since early 1996.

Donor agencies are interested in making loans in the energy sector. However, there has been little or no consideration given yet to financing energy efficient investments, because no tangible energy efficient projects have so far been identified. It has taken several years to ideand finelectricity distribution loss reduction projects. Municipalities, PEA, electricity distribution companies, and others have just begun identifying energy efficiency projects.

Power Factor Incentive Barriers

Consumers currently have few price or regulatory incentives to improve power factors. Because most municipal and other distribution company rates do not include penalties for low power factors, customers often use capacitors and other equipment that cause low power factors and high electricity line losses. Distribution companies wind up paying for lower power factors through penalties that are charged by IEC. The PA as a whole pays for lower power factors through increased distribution line losses and lower efficiency.

From a regulatory perspective, there are no standards governing the quality of capacitors in lighting, motors, and other types of energy using equipment. Consumers therefore are free to purchase new and used equipment with poor capacitors. The poor quality of power factors in turn leads to low power factors and high distribution line losses.

Distribution System Technical Project Evaluation Barriers

The PA currently lacks the capability to evaluate and prioritize new distribution line projects. PEA, municipalities, and distribution companies have so far been pre-occupied with the enormous problems of retrofitting the system. These retrofit efforts are beginning to show large benefits in terms of lower losses in the Gaza area and should reduce losses in the West

Bank within the next 1-2 years. Now that some of these retrofits have been completed and others have been funded, the PA needs to turn to new challenges in terms of investing in new projects.

The experience of distribution retrofits indicates that completing new projects will take time. Both the PA and the donor agencies have a limited capacity for providing and using funds over time. The PA therefore needs to prioritize projects effectively, to make sure that the projects with the largest social benefits are completed first. However, the PA lacks the computer software and technical expertise to evaluate projects effectively. To be effective, this expertise needs to be centrally organized rather than regionally distributed. Otherwise, the municipalities and distribution companies with the best software and greatest degree of technical competence will be the ones that get done first.

Demand-Side Power Resource Planning Barrier

The vast set of problems facing the Palestinian electric system has dictated that power planners focus first on repairing the antiquated distribution system ("fixing the major leaks in a sieve"), developing plans for two initial independent power projects to supply affordable power to Gaza, and commencing steps to improve distribution operational efficiency through consolidated regionalized companies supported by commercial management assistance. There is no capability within the PEA at this time to assess the potential to either reduce demand or slow its growth through customer-initiated energy efficiency, system load management, and targeted investments to reduce distribution losses. To turn the potential to improve efficiency and cut system losses by 15-20% or more into a true resource, PEA must eventually adapt its energy forecast methods, conduct resource investment analyses that include demand-side and distribution system options, analyze the customer segment and equipment factors contributing to peak loads, and create a planning process that allows all resources to compete for limited investment funds. Until local evidence is produced of the efficiency gains that can be achieved, and at what cost, it will be difficult to include these options in the power planning agenda.

2. Expected End of Project Situation

The GEF project will attempt to make significant progress in removing each of barriers to energy efficiency presented in Section 2. The strategy outlined in Section 4 removes these barriers, while simultaneously achieving energy efficiency improvements and greenhouse gas reductions. There are thus two aspects to accomplishments of this GEF project that should be evident in the end-of-project situation -- removed barriers and capabilities for responsive action.

The GEF Project will accomplish the following to remove barriers to energy efficiency:

- ***removed information barriers*** by collecting information on energy efficiency potential and business opportunities and disseminating this information to potential

energy service providers, equipment vendors, and residential, industrial, commercial, and government sector customers;

removed customer awareness barriers by providing 400 energy audits and 25 customer energy efficiency awareness seminars in the industrial, commercial, and government sectors with recommendations for energy savings, and public information campaigns to promote consumer purchases of energy efficient equipment;

removed business barriers by performing three energy service company demonstration projects, providing business seminars on the experience of these projects, and providing vendors with information about efficient products and their market demand to assist in planning inventories of efficient equipment;

- ***removed consumer cost perspective barriers*** by working to implement "life cycle" government procurement policies that consider energy use implications of all equipment purchases;

- ***removed equipment availability barriers*** by implementing a pilot program for maintaining energy efficient equipment, urging reforms in trade policies currently inhibiting the acquisition and use of energy efficient equipment in the PA, and stimulating market demand for efficient products from local vendors;

removed financial barriers by identifying as many as 100 projects in need of finance, advising sponsors of these projects on how to obtain finance, assessing the types of financial incentives needed to stimulate greater energy efficient equipment purchases, instituting hire-to-purchase terms for efficient refrigerators and other equipment, and introducing a leasing program for efficient fluorescent lighting;

removed power factor incentive barriers by developing capacitor regulations and power factor penalty rates that will influence customers to improve power factors and reduce electricity line losses;

- ***removed distribution system technical barriers*** by helping authorities to identify and assess distribution line efficiency improvement projects;

- ***removed resource planning barriers*** by producing information and offering training needed by power planners to incorporate demand-side and distribution investment options into power investment plans.

While removing these barriers, the GEF project will simultaneously achieve the energy savings and greenhouse gas reductions described in Section 5. Important capabilities that will be created include:

- expanded inventories of efficient appliances and equipment available from local

vendors

- financing tools that assist people to reflect a longer-term perspective of savings in their equipment selection

- businesses that can offer relationship-based energy services to CIG power users

- planning capabilities within PEA to consider DSM and distribution investments in resource plans.

3. Target Beneficiaries

The target beneficiaries of the project will include:

- industrial, commercial, residential, and government sector energy users who take advantage of energy efficiency information and technical assistance offered through: energy audits, energy efficiency awareness seminars, the energy efficiency center and promotional activities;

- local and international private sector and local NGOs involved in energy services consultation, design, installation, financing, and management, specifically regional counterparts will be encouraged in the Palestinian market, for example through the associated project in Egypt;

- buyers of new energy efficient equipment that will be available in the Palestinian market as the result of the GEF Project's trade reform efforts and the pilot equipment maintenance program, as well as from any financial incentives tmay result infrom the GEF project;

- recipients of financing from multilateral and other sources that may result from the GEF project's efforts to identify and assist energy efficiency projects in need of finance; and

- PEA's staff and organization that will receive training and capacity building under the GEF project.

4. Project Strategy and Implementation Arrangements

Project Strategy

Overall Strategy

The overall project strategy is to undertake an initial set of activities that will target the greatest opportunities for improving electrical energy efficiency, reducing the growth of

demand for electrical power, and as a result slow the rate of greenhouse gas production from the power sector and certain direct use of fossil-based energy. The strategy will entail removing barriers to achieving this efficiency, using channels that can sustain themselves beyond the project completion, and creating an institutional framework to champion continuing attention to efficiency opportunities through government policy, power sector planning, trade regulations, and exposing the financial self-interest of efficiency actions by both electric consumers and energy services and equipment businesses.

This strategy has been developed to reflect both the PNA's Letter of Power Sector Policy (LPSP) and the goals and guidelines for the GEF's Operational Programme #5 of the GEF Operational Strategy. The LPSP establishes several new principles to guide future development and oversight of the power sector. These include:

- Separation of the policy and regulatory functions from the commercial functions of power enterprises, with these activities to be assigned to PEA, PEC, relevant institutions, and regional distribution companies, respectively.
- Increased commercialization of distribution companies, with a transition toward private sector ownership or participation of both generation and distribution, with minimal government financial support.
- Increased operational and technical efficiency of the distribution companies through end-use efficiency, conservation, and better load management.
- Retention in the public sector of certain functions such as policy and system development (including investment promotion), as well as for certain conservation and research functions that cannot be realistically or efficiently commercialized.

Unlike the case in Egypt, little has occurred in the Palestinian Territory in the way of energy efficiency research, analysis of potential, capability-development or pilot projects. Yet, there is an acceptance and eagerness to pursue efficiency initiatives that stems from the high levels of professional education in the PA, and exposure to some of the programmatic concepts and approaches being adopted in other countries.

For these reasons, the Palestinian UNDP/GEF project is designed to learn with and from the experiences of others in the region, undertake a limited number of projects that will both establish the significant potential and merits of efficiency locally, and actively engage implementing and cooperating organizations that have not previously addressed energy efficiency activities. In the process, this project should build local capability, establish models for wider application to electric users and their electrical end uses, and create a focal point for continued policy leadership and action within key organizations. An overview of the project's four immediate objectives and their expected outputs is presented in Figure 5 below.

SECTION B

Exhibit 5:
Overview of Objectives
Energy Efficiency CO_2 Reduction Program for the Palestinian Authority

Objective 1:
Industrial/Commercial/ Government Sector Energy Efficiency

Outputs:

1.1 EE Market Information
1.2 Energy Audits
1.3 EE Awareness Forums
1.4 Energy Service Business Advice
1.5 EE Government Procurement
1.6 EE Equipment Maintenance
1.7 EE Finance Facilitation
1.8 Power Factor Rates & Standards

Reductions by 2005

- Sector energy consumption: 10%
- Total energy consumption: 3%
- CO_2 emissions: 60 MM tons

Objective 2:
Residential Sector Energy Efficiency

Outputs:

2.1 Equipment Trade Barrier Removal
2.2 EE Equipment Commitments
2.3 Consumer Awareness Campaign
2.4 Refrigerator Labeling System
2.5 EE Financing Mechanisms
2.6 Fluorescent Leasing Program

Reductions by 2005

- Sector energy consumption: 10%
- Total energy consumption: 7%
- CO_2 emissions: 120 MM tons

Objective 3:
Distribution Line Loss Reduction Project Identification

Outputs:

3.1 Identification of Priority Projects
3.2 Distribution System Codes & Standards

Reductions by 2005:

- Electricity consumption: 2%
- Total energy consumption: 1%
- CO_2 emissions: 20 MM tons

Objective 4:
Planning Framework/ Energy Efficiency Information Network

Outputs:

4.1 Energy Service Provider Information
4.2 Consumer Information
4.3 Performance Evaluations
4.4 EE Information Network
4.5 Power Sector Resource Planning
4.6 EE in National Energy Strategy

No specific reductions. Objective contributes to success of other Objectives.

SECTION B

Strategy by Objective

Objective 1: The strategy for overcoming barriers in the commercial, industrial, and government (CIG) sectors is to:

1 first, remove information and awareness barriers to the PEA, end users, and supporting businesses about the potential for energy efficiency improvements;

2 second, to produce documented energy efficiency improvements and greenhouse gas reductions from no or low-cost measures; and

3 third, in the process, to develop a strong information base that can help focus and guide future user and business awareness activities to target the most promising operational and technological improvements for efficient energy utilization.

1 and 3 above will produce the desired long-term impact on greenhouse gas reduction.

This will be accomplished through a coordinated program of information gathering, customer audits, customer awareness forums, and business advisory services to help businesses to provide efficiency services and equipment to CIG facilities.

Objective 2: This objective will address the domestic market that is responsible for 68% of all electric use in the PA. This objective will target the two largest domestic electric uses (refrigerators and lighting) and achieve increased user adoption of efficient refrigerator and lighting technologies through

- modification of trade regulations that currently restrict the availability of energy efficient products,
- building awareness among consumers of the benefits of these products and the relative energy use of individual models, and
- developing financing mechanisms that can help consumers manage the higher first costs of efficient products in order to receive the longer term benefits of lower electric bills.

In the process, this objective aims to enlist the ongoing involvement of electric distribution companies in lighting leasing services; refrigerator manufacturers, vendors, and lending organizations in hire-to-purchase arrangements that can produce positive cash flow for consumers who purchase efficient refrigerators; and government energy policy and equipment standards organizations to use their authority to champion further improvements in energy efficiency.

Objective 3: The strategy for reducing losses on the distribution system is to upgrade the skills of existing engineers in the newly organizing regional power distribution companies (NELCO, JDECO, SELCO, and the Gaza Region Electricity Utility [GREU] area) to undertake

measurement, simulation analysis, and priority setting to develop better plans for distribution system improvements. This will support preparation of investment proposals for consideration by the regional electric companies and international lenders and donors. Assistance will be directed , as resources permit, at the GREU and/or NELCO where the greatest losses occur. This objective will also reduce technical electricity line losses by improving operating practices through the development of a codes of practices and standards that will be used by distribution companies throughout the PA. The findings and experiences of this approach will be shared with other engineers in the through information channels such as seminars and newsletters.

Objective 4: The strategy here is to establish a high quality, accessible information system that reports both the potential and actual achievements of energy efficiency, and can supply the information needs of a wide range of audiences including policy analysts, power planners, electric distribution companies, businesses interested in energy efficiency products and services, and consumers. This system will be used to reduce many information and awareness barriers to energy efficiency. Much of the contents of the information system will be developed by the work activities of Objectives 1-3. Objective 4 will establish a common framework for data definitions, reporting, and quality that will guide the collection of data in the other objectives; this will then be compiled in a format for use by others. Execution of this strategy will require preparing useful formats for data, identifying and developing effective channels of communication with target audiences, and assisting others to deploy mechanisms that apply this information to energy policy and power planning.

Strategy for Overcoming Specific Barriers

The lack of priority for end use energy efficiency will start to be overcome with the initiation of this UNDP/GEF project, and its emphasis on identifying and quantifying achievable levels of energy efficiency and GHG reduction. Assigning the information management role to PEA will ensure the organization charged with administering power sector policy and guiding power system development develops the information it needs to perform its assigned responsibilities. Objective 4 is singled out as one of the project objectives to ensure this receives PEA's full attention. The creation of the Project Coordinating Committee and the Business Advisors Council will elevate the attention paid to energy efficiency and create accountability for PEA, PEC, and the Ministry of Industry and Trade and Economics. (See Outputs 4.3, 4.5, and 4.6.)

Information barriers must first be removed in order to identify and effectively promote energy efficiency through other initiatives. Planners need a greater understanding of energy use and savings potential. Existing information on energy use and savings potential must be organized and understood. New data must be collected on equipment energy use and on energy savings potential by sector and region. This barrier will be removed by first compiling data on energy consumption and prices, efficiency potential, and energy using equipment options (See Outputs 1.1 and 2.1.)

This information would be organized in a way that is useful to energy consumers, energy efficiency product and service providers, and policy planners. This information would be provided to consumers, providers, and planners in several seminars and other outreach forums that are part of Objectives 1 and 2. PEA will perform part of this responsibility through its energy information network and will publicize and distribute this information to target audiences for energy efficiency information. (See Outputs 1.3, 1.4, 2.1, 2.2, Objective 3, and Outputs 4.1-4.3.)

Customer awareness barriers will be removed by a coordinated program of audits and customer awareness forums for CIG users, and by a public information campaign and refrigerator labeling system for consumer households. (See Outputs 2.3 and 2.4.) The specific content of these efforts will be influenced by the energy use and savings information obtained by Outputs 1.1 and 2.1.

The CIG data developed in Output 1.1 will also be used to help select a group of customers for an energy audit program. These customers would be selected based on the size of their energy usage and the degree to which their energy use and savings problems were typical of those throughout the PA. The information from these initial audits would then be use to refine PEA's base of knowledge about energy savings potential in the PA. By combining information collected under Output 1.1 with information from the initial audits conducted under Output 1.2, PEA could select a target audience and an agenda for a focused group seminar program of energy savings that would provide more relevant advice that targeted the largest energy problems for the largest energy users. (See Output 1.3.)

Business barriers would be removed through a combination of energy efficiency market data given to businesses to stimulate their participation in offering products and services; removal of trade barriers and restrictions; and demonstration projects and seminars that show the potential service providers how to establish customer-oriented, energy service businesses that can profit from selling efficient equipment (refrigerators, lighting) or from offering performance contracting. These demonstration projects will inform businesses about new ways to work with customers; it will rely upon the business acumen of established international experts as well as the experience of other businesses in the Middle East. The seminars will report on the successes and failures of these demonstration projects and provide business knowledge that is lacking throughout the PA. In this way, this portion of the GEF project helps to contribute to increased inventory of efficient products among retail sales outlets, as well as the establishment of one or two ESCOs in the PA by the year 2005. (See Outputs 1.1, 1.4, 1.6, 2.1, 2.2, 4.1, and 4.6.)

Consumer cost perspective barriers will be removed through efforts to develop and implement "life cycle" government procurement policies and new forms of consumer credit for purchase of energy efficient products with higher first cost. Under a life cycle procurement policy the government would make equipment procurement decisions based not only on initial cost (as it

does now), but on the full cost of owning and operating equipment during its life, including the costs of energy. Similar policies that have been implemented in the U.S. and other developed countries have radically improved the energy efficiency of equipment purchased by governments. These policies have also provided a positive example and a cost calculation methodology for private sector companies to emulate. A similar principle applies to consumer credit that stretches out the payment terms for equipment, and allows the extended payments for the higher cost equipment to be more than offset by monthly electric bill savings.
This GEF project will assist the PA to develop life cycle government procurement policies by: developing a clear and easy-to-use cost calculation methodologies that the government can implement through regulations; and urging government leaders to implement these policies through an organized lobbying campaign. For residential consumers, the project's information campaign will stress the idea of the life cycle benefits of efficient products The project will also develop labeling system to help consumer identify refrigerator operating efficiency and cost, a hire-to-purchase loan program for refrigerators, a lighting leasing program for energy efficient fluorescent lamps. (See Outputs 1.5, 2.3, 2.4, 2.5 and 2.6.)

Equipment availability barriers will be removed through two programs. First, this GEF project will take steps towards eliminating trade barriers to equipment that is highly energy efficient, whether made in Israel, obtained from Egypt or Jordan, or imported from more distant countries. Elimination of trade barriers might involve negotiation of trade agreements with Israel, prohibitions on "dumping "old inefficient equipment in the PA, adopting or improving upon certain Israeli technical, energy, and environmental standards for equipment. (See Outputs 1.6, 2.1 and 2.2.)

Second, equipment availability barriers will be removed by implementing a pilot program for maintaining energy efficient equipment. This program will provide training to equipment maintenance specialists for a few select types of energy efficient equipment that are important to the PA's overall use of energy. This program will provide maintenance expertise to the PA that will encourage greater use of equipment that be maintained by Israeli firms today. (See Output 1.6.)

Financial barriers will be removed through four activities. This project will help potential CIG energy efficiency projects to obtain funding by providing coordination and advisory assistance. PEA will act as a financial coordinator by compiling a central list of as many as 100 projects in the commercial, industrial, and government sectors that need funding. This central list will encourage multilateral development banks, private foundations, and others to provide a dedicated block of energy efficiency funds in the PA. The project will also facilitate the provision of financial advice from international energy efficiency finance experts on how the sponsors of CIG investment projects can develop stronger projects with lower risks that will have an easier time obtaining financing. A refrigerator "hire-to-purchase" loan program will be developed to support purchase of energy efficient new refrigerators, and a lighting leasing program will be

administered by one or more electric distribution companies to enable more consumers to purchase fluorescent lamps, and especially compact fluorescent lamps to replace incandescent bulbs. (See Outputs 1.7, 2.5, and 2.6.)

Power factor incentive barriers will be removed through a two-part program of pricing and regulatory reform. First, this project will assist PEA to work with electric distribution companies to develop power factor penalty rates and encourage the use of these rates by the distribution companies. The penalty rates will attract attention to improvements that can be made to existing facility equipment to improve power factor. Second, this project will help PEA to work with the Ministry of Industry and the Ministry of Trade & Economics to develop capacitor regulations for all new electrical equipment where power factor can be a problem. These standards will ensure that consumers buy only new equipment that maintains a high power factor level, thereby helping the distribution company to minimize losses. (See Output 1.8.)

Distribution System technical project evaluation barriers that inhibit the financing of good power distribution projects will be removed by providing to PEA and one or more electric distribution companies the instrumentation, computer hardware and software, and technical training needed to evaluate and prioritize potential distribution system investments. The assistance from this GEF project will allow PEA and the distribution companies to act as informed decision makers to identify and select the best investment projects from competing demands for distribution system investments. The experiences and benefits of the one or two participating distribution companies will be shared with other distribution engineers through seminars and newsletters. (See Outputs for Objective 3.)

Demand-Side Power Resource Planning Barriers will be removed by first producing information from the CIG and residential equipment activities, and the distribution system loss analyses that can be used in resource planning. Then this information will be applied through training activities with PEA power resource planners to identify techniques to incorporate this information into their existing demand forecasts, resource expansion plans, and investment priorities. (See Output 4.4 and 4.5.)

Implementation Arrangements

This project will be executed by UNDP/PAPP, with implementation responsibility assigned to the Palestinian Energy Authority (PEA). As is described below, specific work assignments will be made to other entities through sub-contracting arrangements. PEA is the implementing agency in charge of all work groups. It is however expected that the Auditing and Technical Services (ATS) Work Group as much as possible comprises existing national cadre, especially that which is available within PEC.

UNDP/PAPP Responsibilities. The UNDP/PAPP will hold the execution responsibility for this

project. Under this arrangement, UNDP/PAPP will be responsible for selecting the Project Technical Director in consultation with PEA, reviewing all staff assignments proposed by the PTD, administering all major contracts (smaller contracts below a specified dollar value may be delegated to the PTD or the PEA), and other customary execution duties including project administration, disbursements, financial tracking, procurement of major equipment, and supplying guidelines to the PTD regarding procurement of supplies and certain sub-contract services.

PEA Role. At this time there are two core organizations with the knowledge, experience, and/or authority to conduct the majority of activities for this project. These are the Palestinian Energy Authority (PEA) and the Palestinian Energy and Environmental Research Center (PEC). In the Palestine National Authority's Letter of Sector Policy for the Power Sector, signed July 6, 1997, the PA has assigned responsibility for overall coordination of the power sector development, and the associated policy formation and administration, to PEA. PEC is an existing independent agency that will continue to focus on research and public education for energy efficiency and conservation. It seems at the moment that PEC will establish specific administrative ties to PEA and will be integrated into the PEA organization. In light of the above, it is clear that PEA takes lead implementation responsibility of the current project, keeping in mind the need to utilize existing national cadre within the PA, especially the cadre that exists or existed with the PEC.

Furthermore, it is advisable that the project draws on PEC experienced staff when the project is in need of technical know-how, entrepreneurial capabilities, and experience in mobilizing public seminars and community meetings. Emphasis should however, be placed on "institutionalizing" long-term resident knowledge, policy analysis and interagency coordination, and large scale follow-through on implementation strategies at PEA.

This project contains many activities that require a combination of expertise -- technical, financial, regulatory, and promotional. Thus PEA must be assisted on trade and regulatory issues by selected staff from other Ministries such as the Ministry of Industry and the Ministry of Trade and Economics. For specialized requirements, PEA must call upon the assistance of national expertise (as the one that exists with PEC), outside experts from the PA, surrounding region, and international consultants.

Project Technical Director. To ensure all activities are carefully coordinated, a Project Technical Director will serve on a full-time basis, be hired through UNDP/PAPP in consultation with PEA, and be housed at PEA offices in Ramallah. It is essential that the PEA participate in the selection of the PTD since this person most likely would be a candidate for employment with the PEA at the completion of the project. The PTD shall report administratively and substantively to the General Director (or an equivalent position should the organization be revised) of the PEA and to the UNDP Special Representative. The PTD should report to the UNDP/PAPP office on important, substantive issues, although the PTD would be responsible for all day-to-day tactical decisions and would bear substantial responsibility for the overall success

and failure of the project. Personnel assignments and contractual matters will be negotiated among the PTD, UNDP/PAPP, and General Director of PEA, consistent with the execution authority of the UNDP/PAPP. The PTD would be responsible for project administration, financial tracking and procurement of equipment, supplies, and sub-contract services, although the PTD would need to coordinate these activities with the UNDP/PAPP, which may hold the ability to overturn important decisions. The PTD is also to hold regular coordination sessions with his counterpart in Egypt to plan, coordinate and implement regional initiatives between the PA and Egypt on the subject matter of the project. This regional coordination role is a vital one for the PTD to ensure information exchange and lessons learnt. The terms of reference for this position be found in Annex 2.

Steering Committee. The project will have a Steering Committee comprised of senior level officials or their designees from the key parties to the project's objectives. The PEA and UNDP/PAPP should agree upon the final composition of this committee at the time the project commences. Members should include:

PEA General Director
NGO representation, preferred PEC Chairman
Ministry of Planning & International Cooperation- Minister's designee
Ministry of Industry - Director of Standards Department
Ministry of Trade & Economics - Minister's designee
Palestinian Environment Authority (PEnA) - Chairman's designee
UNDP/PAPP Unit Head of Environment, Water & Employment Generation
World Bank/Palestinian Mission Energy Sector Advisor (to be invited, if interested)

The Steering Committee will meet no less than quarterly to observe general progress with the project and offer guidance for its successful completion. Specific duties shall include review of the annual work plan and budget, review of work progress and major policy initiatives, and identification of problems and issues with suggestions on how the PTD might address or resolve these. Positions are unpaid, but the project will support expenses directly related to participating in meetings. The terms of reference for this committee can be found in Annex 2.

Staffing Arrangements. The combination of needing a wide variety of expertises and having limited project budget dictates that work activities be assigned to individuals who will devote only a part of their time to project activities. This means that virtually all staff time will be drawn from individuals assigned to the project on a part-time basis who will have other responsibilities with their employing agencies. The Project Technical Director, auditors on the ATS Work Group, and a Director of Information and Promotion will be employed on a full-time basis throughout the duration of the Project. The Directors of the Business and Finance Work Group and of the Economics and Regulation Work Group shall be employed on a full time basis for considerable periods during the project. Other employees shall be employed on a part-time or a

temporary basis. Project funds have been budgeted using UNDP and PNA salary scales (depending on the organizations providing personnel) for the portion of time these individuals will be assigned to project activities. Terms of reference for all positions can be found in Annex 2.

Project location. The PTD will be housed at PEA offices in Ramallah. Although the majority of project staff probably will be located at organizations and institutions in the West Bank, certain staff should be assigned from each organization's Gaza office to support activities that take place there, in view of the limited mobility of individuals between the two regions of the PNA. In addition, it is hoped that two electric distribution companies will agree to participate in the lighting leasing program, with one of these in Gaza. Key personnel on the project will need travel clearances to work in both the West Bank and Gaza Strip.

Project Work Groups, Staffing and Organization. Exhibit 6 displays the implementation work groups that are recommended for this project. It shows PEA as the implementing agency (under the execution authority of the UNDP/PAPP) responsible for achieving the objectives described in this project document. The project activities will be conducted through four work groups comprised of staff and individuals from several organizations. These are: Technical Services, Economics and Regulation, Business and Finance, and Information and Promotion

The anticipated responsibilities and membership of each work group are outlined below. Details of each work group's responsibilities for project outputs and specific activities are described in Section D Immediate Objectives, Outputs and Activities. Again it is important to emphasize that existing experience at PEC should be utilized in both the Technical Services, the Information and Promotion work groups, and also (but to much lesser extent) in the Business and Finance work group. The PTD will have responsibility for the implementation of each of the four objectives. Responsibility for the individual outputs under each objective will be assigned to a work group, which may call upon another work group for assistance on specific issues.

Business Advisors Council. In addition to the project staffing, it is recommended that the Project Technical Director, together with the PEA Chairman and the NGO Representative, preferably PEC Chairman, form an unpaid business advisors council to PEA (that would include the senior project staff member from the NGO). This advisory group should be given sufficient prestige and promise of useful information for business purposes to attract the kinds of business leaders needed to ensure the project works -- now and after the project's completion. This could facilitate the eventual success of market-based energy efficiency services in the PA. Participants would receive the benefits of early access to the project's research on market, technology, trade, and consumer decision issues, as well as the cost-benefit analysis of efficient technologies. Additional business value would be obtained from discussions and insight into the market, strategies, outreach techniques that are likely to secure energy efficiency purchases by domestic, business and industrial consumers. The terms of reference for this council can be found in Annex

2.

Composition of Work Groups

1. Auditing and Technical Services (ATS)
Responsibilities: Undertake research, analysis, technical consultations and technical training needed to support activities involving efficient end use technology and equipment, commercial/industrial energy audits, and distribution system improvements.

Manager: Director, Auditing and Technical Services (ATS)
Members: Data Specialist, Audit Specialist, Audit Assistant[5], Energy Efficiency Engineer/Technology Analyst (it is advisable that PEA capitalize on PEC experience in these areas)
Members (from within PEA): Energy Efficiency Engineer, Data Specialist/Statistician, Distribution System Loss Specialist
Members (outside PEA): Regional Technology Specialist, International Auditor/Trainer

As shown above, the ATS Work Group shall be comprised primarily of technical specialists, an organization employing many of the leading energy efficiency experts in the PA and perhaps the only organization employing individuals with prior energy efficiency audit experience. As PEA has limited cadre on issues regarding energy efficiency and conversation, it is advisable that the UNDP/PAPP office leads the official implementation/execution of the recruitment and the activities of the ATS Work Group.

2. Economics and Regulation
Responsibilities: Undertake activities relating to economic and regulatory aspects of equipment trade, technical regulations and standards. Identify laws, regulations, or administrative practices that would need to change to better support Palestinians' adoption of energy efficient equipment. Ensure information from project outputs and accomplishments is transferred and applied to power sector resource planning activities and policy matters, to administer PEA's responsibilities under the Letter of Sector Policy.

Director: Economics and Regulation (from PEA staff)
Members (within PEA): Rate Analyst, Power Resource Specialist (assigned from resource planning staff)
Members (outside PEA): staff assigned by the Ministry of Industry, Ministry of Trade & Economics, and Ministry of Finance (as required), International Energy Efficiency Economist,

[5]May be selected from Birzeit University, from PEA, or from some other university.

International Resource Specialist, International Program Design Specialist.
This work group will also be assisted on technical issues by the Technical Services Work Group.

3. Business and Finance

Responsibilities: Design programs and services that enlist businesses and non-governmental organizations to support energy efficiency services and equipment sales as private market transactions. Develop and offer information that assists these business to understand and respond to the business opportunities from energy efficiency.

Director: business and Finance (from within or outside of the PEA)
Members: Domestic Energy Services Specialist, Financial Specialist. Market Analyst
Members (from within PEA): Financial Analyst
Members (from outside PEA):. International ESCO. International Finance Specialist. International Program Design Specialist

4. Information and Promotion

Responsibilities: Develop and implement information management activities to promote and support achieving energy efficiency. Identify best communication channels to convey information about energy efficiency opportunities and benefits for target audiences among power sector planners, business service providers, and electricity consumers. Compile data and other information from Objectives 1-3 and organize it in formats useful for target audiences.

Manager: Director, Business and Finance (PEA)
Members (within PEA): Promotion and Outreach Specialist, Data Specialist/ Statistician, Engineer, Economic and Regulatory Specialist, Resource Planning Specialist
Members (outside PEA): Domestic Energy Services Specialist, Promotion and Outreach Specialist, Ministry of Industry staff, Ministry of Trade & Economics staff, International Consultants for Resource Planning, Data. Evaluation, and Outreach/ Communications, and Regional Consultant for Promotion and Outreach.

Note: the above work groups consist of like-activities by individuals drawn from several organizations. It is not intended to conform to any specific organizational structure of PEA. If it became necessary for PEA to integrate work group assignments under the direction of PEA organizational units. the following assignments of work groups might be made to correlate to the July 1997 draft revised PEA organization.

Project Document Work Groups	PEA Organization under Discussion
Project Technical Director (Liaison to PEA Executive Director)	Liaison to Chairman's Office

Technical Services	System Development Dept.
Economics and Regulation	Policy & Research Dept.
Business and Finance	Finance. Administration and Public Relations Dept.
Information and Promotion	Finance. Administration and Public Relations Dept.

Other organizations are expected to cooperate with the activities of the work groups on an unpaid basis. These include equipment and appliance vendors who will contribute ideas on program design for promoting purchase of energy efficient equipment; lenders and other credit-service organizations who will contribute to the design of the refrigerator lending program; electric distribution companies that will participate in the fluorescent lighting leasing program and supply sales data for use in monitoring program impacts; and government energy efficiency organizations from the region, including Israel, Jordan, and Egypt, that will be consulted regarding regional approaches to efficient equipment standards, trade regulations. and/or training collaboration.

Project Inception Activity. After the project has been approved and the project assignment is formally dedicated. the PTD will prepare a detailed work plan that supplies more detail on specific project staff assignments and the schedule than can be contained in this project document. The PTD will also hold a meeting of the coordinating Committee and invited other stakeholders to review the project's objectives, planned work activities, and ensure cooperation from participating organizations. This meeting will also provide an opportunity to publicize the project to invited stakeholders, such as engineering professionals, chambers of commerce, equipment vendors. and consumer organizations.

5. Reasons For UNDP/GEF Assistance

The proposed project will work to strengthen the capacity of the Palestinian National Authority to implement and sustain long-term sound energy measures. that have a well documented positive impact on both the global as well as the local environment. At the same time, the project is in line with the PA's sustainable development objectives and its Letter of Sectoral Policy which sets out the national policy for the development of the sector. In the PA, the project is perceived as being a crucial facilitating factor and one of several catalytic steps for the effective organization and efficient operation of the emerging energy sector.

Being in line with the objectives of the Global Environment Facility, the long-term goal of the project is to reduce the growth in greenhouse gas emission resulting from the combustion of carbon based fuels and the consumption of electric power. and thereby contribute to mitigation of Climate Change.

The project funds are devoted to removal the of barriers as a cost effective mechanism of institutional strengthening and capacity building within the Palestinian Energy Authority in

specific, hence achieving the desired impact on the long-term growth of greenhouse gas emissions. Furthermore, the project will support the energy sector on a broader basis by involving the emerging regional utility companies and several other players in the Palestinian energy industry including NGOs and research institutions such as Birziet University.

Specifically the barrier removal mechanism, will ensure the effective adoption of energy efficient measures in the Palestinian energy sector including the introduction and viability of energy services and conservation in the private and public sectors. The project thereby conforms with Operational Programme number 5 "*Removing Barriers to Energy Efficiency and Energy Conservation*" of the GEF Operational Strategy.

Through the barrier removal mechanism, the project will also address the need for greater efficiency, self-sustainability and for the introduction of appropriate technologies and concepts within the Palestinian energy sector. Furthermore, barrier removal, institutional strengthening and capacity building on the demand side of the Palestinian energy sector will facilitate the implementation of follow-up "win-win" projects. Lastly, The project will also provide a policy and action framework for meeting Climate Change mitigation objectives within the existing system in a cost effective way.

Even though the Palestinian energy sector has considerable donor activity, it does not, contrary to this project, ensure the transfer, replication and widespread use of energy efficient technology and concepts. The UNDP/GEF assistance provides a level continuity and project sustainability that will set an example for other donor programmes.

Anticipated greenhouse gas reductions

The GEF project at hand will, in the long-term, achieve substantial greenhouse gas reductions. As shown below in Exhibit 7, CO_2 emissions curtailed by the year 2010 will amount to 265,000 tons per year.

Exhibit 7
Estimate of Total Energy Savings and CO_2 Reductions
(Annual Savings by 2010)

Objective	Energy Savings	

	Total (MTOE)	% of Total Energy Consumption[6]	CO_2 Reductions (000 Tons)[7]
1	31.6	4.9	79.8
2	45.1	7.0	140.7
3	14.2	2.2	44.5
4[8]	0	0	
Total	90.9	14.0	265.0

6. Special Considerations

Due to the under developed energy situation of the West Bank and Gaza contributions of this project can be significant and go beyond those of similar GEF projects. In particular this project have three major considerations.

The first is capacity building of energy institutions in the West Bank and Gaza Strip that are being presently formed: PEA, the four distribution companies, PEC and other organizations. The project will assist PEA in many aspects including provision of consultants and experts, monitoring equipment and know-how in drawing out codes of practice, regulations and standards for distribution systems and energy consuming appliances and activities. PEC and other organizations' cadre capabilities will be strengthened by assistance and expertise in carrying out energy audits and public awareness campaigns and at a later stage the establishment of ESCOs. The distribution companies will also benefit from a development of their planning capabilities in distribution system design and loss reduction and the supof some monitoring equipment.
The second is assistance in fostering economic development in the West Bank and Gaza Strip. One of the many impediments to industrialization and economic growth is the very high cost of energy, particularly electricity. By enhancing energy efficiency and conservation, as well as reduction of energy losses, (by audits and other means) the industry can significantly economize its energy costs, which will improve feasibility of industrial enterprises and encourage economic activity in the West Bank and Gaza Strip.

[6]Relative to current energy consumption of 926 MTOE

[7]Based on 100% petroleum products in electricity generation.

[8]Not assumed to create energy efficiency and CO_2 reductions independently. Rather, this objective facilitates the overall achievement of efficiency and CO_2 reduction goals in Objectives 1-3.

SECTION B

The third and last special consideration is that of regional cooperation. Due to its special political circumstances the West Bank and the Gaza strip were isolated from the region. Practically all countries of the Middle East and North African region have established many venues for cooperation in energy matters, as well as prospects for electricity interconnection. The West Bank and Gaza Strip remained isolated from such favorable regional cooperation. This GEF project, being part of a regional project, will open new venues for the energy specialists and institutions in the West Bank and Gaza Strip to cooperate with their neighbors, particularly in Egypt through the associated project and learn of its experiences. Networking will be established, as well as exchange of experts, joint seminars and utilization of already established energy standards and codes of practice from Egypt. It is hoped that this project will be the first of other regional GEF projects that benefit the energy sector in the West Bank and Gaza Strip and integrate this sector into the regional activity.

7. Coordination Arrangements

The energy sector in the West Bank and Gaza Strip is still in the formation stage. The success of the project depends to some extent on a number of other coordination arrangements. These can be national as well as international coordination. It is expected that this coordination will be built-up during the institution building stage which is now taking place.

National Coordination

The initiation of the four distribution companies, as described in section A-4, is essential for the healthy development of the electricity supply industry in the West Bank and Gaza Strip. For the achievement of certain targets of this project future coordination is required with the four distribution utilities. These utilities will be responsible for a large proportion of final energy distribution and their development as institutions is essential to significantly reduce distribution losses (Objective 3) and allow for a program of demand side management. It is expected that PEA, as the implementing Agency, will establish the required coordination with these four distribution companies.

PEA should attempt to coordinate with institutions involved in the energy sector, including PEC and its cadre which is deemed vital for the fulfillment of some of the project objectives. The mobilization of these institutions and their cadre and experience, can play an effective role in achieving the objectives of energy efficiency and conservation through public awareness, information dissemination as well as through energy audits and contact with the industry and large energy users. PEA has previously coordinated with other institutions in organizing successfully conferences, seminars, and other venues.

SECTION B

National coordination will be achieved through a multi-agency Coordinating Committee that will oversee this GEF project. It will be composed of representatives of PEA, the Palestinian Environmental Authority, the Ministry of Planning and International Cooperation, the Ministry of Industry, the Ministry of Trade and Economics, UNDP/PAPP, and the World Bank. This Board will ensure the efficient implementation of the project through establishing proper national coordination arrangements with the organizations and utilities involved in execution.

The Chambers of Commerce and Industry, which exist in every major city in the West Bank and also in Gaza Strip, may be able to serve as useful links for coordination with industry and major commercial enterprises. Energy is a major concern for these institutions.

International Coordination

It is advantageous to coordinate this project with the activities of the World Bank and other donors active in the energy sector in the West Bank and Gaza Strip. Such activities, like the establishment of the four distribution companies will significantly enhance the prospects for the GEF project success. Some donor agencies have expressed interest in assisting in future energy efficiency activities (like the project for an energy bus proposed by the EU but did not materialize yet). PEA has to ensure that there is no duplication but coordination with any future international activities that aim to assist the West Bank and Gaza Strip in energy efficiency.

As already explained in Section A-4, some international coordination can be accomplished through regional coordination, particularly with Egypt which is part of this regional project. Other countries in the region are also undertaking GEF energy efficiency projects and coordination can also be established with them in the future.

8. Counterpart Support Capacity

PEA and the UNDP/PAPP will receive the support it needs to successfully execute this GEF project from sources both within and outside the PA. From within the PA, PEA and UNDP/PAPP will receive support from: (1) technical experts at PEC, (2) staff of the ministries of Trade and Industry, and (3) experts from local universities such as Birzeit University. PEA and UNDP/PAPP will also work with the PA's four distribution companies that will both receive assistance from PEA and this GEF project and will work to help identify distribution enhancement projects and to develop a code of standards and practices. The capabilities of all of these domestic organizations are described in Section A.4 under Institutional Arrangements. The ministries of Trade and Industry, the Ministry of Planning & International Cooperation, and PEnA will further help implement many of this program's support.

From outside the PA, PEA and the UNDP/PAPP will receive support from both international and regional consultants. International consultants will provide both: (1) training to PEA, PEC,

distribution companies, and others, and (2) technical support for the successful completion of objectives.

Regional experts include:

- **audit/trainers**. The GEF project will have the opportunity to utilize the substantial technical expertise that resides at such institutions as DRTPC and the Tabin Institute in Egypt. These specialists will provide training to PEC staff in audit delivery and will also help execute initial audits of this GEF project (Output 2.2). The amount of assistance that is needed in this area is minimal, given the previous audit experience residing at local institutions such as the PEC.

- **regional outreach experts**. These experts could include the same firms that may provide similar support to recently implemented GEF projects in Egypt and Syria.

- **regional experts in energy end-use technology and in distribution**. These experts could come from any one of the neighboring countries that have had more experience in the autonomous operation of electric utilities than has been possible in the PA. Here Egypt (especially Alexandria Electricity Distribution Company) and Jordan are the obvious well placed candidates. Energy end-use technology experts could include firms that have benefited from the substantial technical assistance that has been provided under US AID's ECEP project. These experts will provide training in the evaluation of distribution system losses and in the use of distribution system design software. They will also help execute several outputs in both Objectives 2 and 3 (Outputs 2.1, 2.2, 2.4, 2.6, 3.1, and 3.2).

This GEF project will also gain regional support through attendance at seminars that are discussed in more detail below.

In addition to the Project Document Preparation Consultants that have already been retained for this GEF project, the international consultants retained for this GEF include the following positions:

- **international ESCO specialist** - help implement pilot, customer-oriented audit projects and who will provide business advice on establishing energy efficiency businesses (Output 1.4)

- **international finance specialist** - help identify projects in need of finance and will help guide local entities in the successful solicitation of loans, grants, or other types of assistance (Output 1.6)

- **energy efficiency outreach and promotion specialists** - advise on energy efficiency awareness forums for the commercial, industrial, and government sectors (Output 2.3), and advise on energy efficiency promotion activities for the energy efficiency information network (Outputs 4.1 and 4.2)

- **energy efficiency economist** - advise on capacitor regulations and power factor penalty rates (Output 1.8)

- **energy resource planner/specialist** - advise and train PEA staff on the implementation of energy efficiency information and concepts into long-term energy resource planning (Outputs 4.3, 4.5, and 4.6)

- **international energy efficiency data specialists** - advise on the collection and use of energy efficiency data for energy efficiency service providers (Output 4.1), and on the structure of the energy efficiency network (Output 4.4)

- **international energy efficiency evaluation specialists** - advise on the content of information provided to energy efficiency providers (Output 4.1), and on the evaluation of energy efficiency data (Output 4.3)

- **international program design experts** - advise on the overall program to provide information to the residential sector (Output 2.1 and 2.6)

A full description of the duties and the qualifications for each of these positions is shown in Annex 2.

9. Regional Framework

This program will take place within the larger context of energy efficiency barrier removal and business development within the entire Arab region. This GEF Project can benefit from significant energy efficiency program market experience that has taken place in several neighboring countries, especially Egypt.
The following provisions have been made to take advantage of energy efficiency activities that are taking place in other countries.

- PEA will have the opportunity to review the type of information that Egypt and other countries in the region are maintaining and distributing on energy use and energy savings potential, in order to promote greater energy efficiency. (Output 1.1, 1.3, 2.1, and 4.1)

- Audit experts from Egypt (e.g., the Tabin Institute, DRTPC) and possibly other countries

in the region will be invited to provide auditor training to audit staff (Output 1.2)

Regional technology and promotion/outreach experts (most likely from Egypt) will also be used as consultants on Outputs 2.1, 2.2, 2.4, and 2.6 (technology), and on 2.3 for promotion and outreach.

- Staff from PEA and other energy efficiency market practitioners will have the opportunity to attend seminars or training being provided under the Egypt GEF project for subjects of business transformation (Output 1.4), consumer awareness (Output 2.3), energy labeling systems (Output 2.4), and the Alexandria lighting leasing program (Output 2.6).

- This GEF project will assess trade policies of Egypt, Jordan and other countries that encourage and impair energy efficiency, in order to determine the types of policies that should exist in the PA (Output 2.1)

- The list of projects in need of finance that PEA identifies will be coordinated with similar lists in other countries in order to generate a larger, regional pipeline of projects in need of assistance, thereby help potential funding sources to aggregate the market and create more efficient funding vehicles. (Output 1.7)

- Regional experts in distribution line loss and distribution project and system design will be retained by this GEF projects as consultants in Objective 3.

These provisions are critical to the success of this GEF Project. The PA has yet to develop strong institutional capabilities in the energy efficiency area. The expertise that has been developed in neighboring countries represents a cost-effective resource to this project that will allow the PA to develop these capabilities efficiently and expeditiously.

Section C: DEVELOPMENT OBJECTIVE

The PA has committed to a policy of sustainable energy development by incorporating energy efficiency goals into its Letter of Sector Policy and by establishing PEA and PEC as government and non-governmental agents to implement energy efficiency goals. The PA's need to promote energy efficiency results from both environmental motives to reduce greenhouse gas and economic motives to conserve energy in a country that has little or no indigenous resources and that pays high prices for all of its primary and secondary energy resources

To meet suppressed and still growing power and energy demands through reliable, efficient and rational consumption patterns, thereby reducing greenhouse gas emissions, protecting the local environment while at the same time reducing Palestinian dependency on imported power and fossil fuel.

This UNDP/GEF project will contribute to meeting the above objective by removing barriers to energy efficiency and conservation measures through the initiation of energy audit activities, promoting energy services, encouraging sound energy policy, encouraging maximum private sector participation and lastly by making key information readily available to all players in the Palestinian energy sector.

SECTION D

Section D: IMMEDIATE OBJECTIVES, OUTPUTS, AND ACTIVITIES

Immediate Objectives

1. Industrial/Commercial/Government Sector Energy Efficiency Improvements
2. Residential Sector Energy Efficiency Improvements
3. Electricity Distribution Line Project Identification
4. Energy Efficiency Center

Improvement Targets (by the year 2005)

By the year 2010, the four objectives will reduce energy consumption by a total of 14% compared to current levels and reduce CO_2 emissions by 265,000 tons per year.

Objective 1: To improve industrial, commercial, and residential sector energy efficiency by 17% by reducing awareness, information, financial, business, technology, and other barriers to energy efficiency, eliminating nearly 80,000 tons of CO_2 per year.

Objective 2: To improve residential sector energy efficiency by 11% by reducing information, financial, equipment, and other barriers to energy efficiency, thereby reducing CO_2 emissions by more than 140,000 tons of CO_2 per year.

Objective 3: To facilitate a 2% reduction in electricity distribution line losses by identifying and evaluating potential priority projects for multilateral development bank or other funding, therefore reducing nearly 45,000 tons of CO_2 per year.

Objective 4: To facilitate the above activities by promoting increased customer awareness and strategic actions by public and private sector energy market participants through an energy efficiency center.

IMMEDIATE OBJECTIVE 1: INDUSTRIAL/COMMERCIAL/GOVERNMENT SECTOR ENERGY EFFICIENCY IMPROVEMENT

To reduce energy consumption by 10% in the industrial, commercial, and government sectors by the year 2005 through a four year program to: increase energy efficiency awareness; promote development of an energy services industry; expand energy-efficient equipment availability; and encourage energy-efficient consumer behavior.

The implementing agency responsible for achieving this objective shall be PEA, under the execution authority of UNDP PAPP. The PEA shall perform many of the outputs and activities of this objective with the strong support of Auditing and Technical Work Group. An

SECTION D

Industrial/Commercial/Government (CIG) Director within PEA shall be primarily responsible for helping the UNDP Project Technical Director to execute these tasks. The CIG Director shall be assisted by electrical engineering and energy efficiency specialists, business and market consultants, and regulatory and policy analysts at various institutions, including Birzeit University and the Palestinian Energy and Environmental Research Center (PEC)

Success Criteria

By the end of this project, PEA and its supporting institutions will have:

- developed and made public available information resources on energy efficiency opportunities in the industrial, commercial, and government sectors to facilitate the execution of successful energy efficiency business strategies in these sectors

- performed approximately 300 audits of industrial, commercial, and government sector facilities to provide recommendations for low/no cost energy savings

- provided energy efficiency awareness seminars for industrial and commercial sector customers on five different energy end-uses and made seminar information available to all industrial and commercial sector energy users in the West Bank and Gaza Strip

- performed demonstration projects and provided business seminars to provide instruction on the development of successful energy efficiency businesses

- developed and helped implement "life cycle" government procurement policies that consider efficiency implications of all energy using equipment purchases

- developed a program to enhance equipment maintenance capabilities in the PA in order to increase the use of energy efficient equipment in the PA

- developed a list of energy efficiency projects in need of finance and assisted the sponsors of these projects to obtain loans, grants, or other funding.

- developed capacitor regulations and power factor penalty rates and begun to implement these regulations and rates in the PA.

Summary of Outputs

Output 1.1 Energy efficiency market information (on topics such as the amount and type of energy efficiency demand) that will assist potential providers of energy efficiency equipment and services to assess, develop, and execute profitable business strategies.

Output 1.2 Audits and energy savings advice to approximately 250 commercial, industrial, and government sector customers targeting low/nc cost energy savings measures, including those provided in Output 1.2.

Output 1.3 Public forums that instruct industrial, commercial, and government sector facility managers to perform maintenance and other low/no cost energy savings measures with respect to five different energy end-uses (e.g., lighting, gas combustion analyzers, boiler settings, capacitors and power factor corrections)

Output 1.4 Advice on the successful conduct of an energy efficiency business to potential energy services providers through performance of demonstration projects and presentation of examples from these demonstration projects and case studies from other countries

Output 1.5 'life cycle" government procurement policies that considers energy costs associated with the purchase of all energy-using equipment, and encouragement of the adoption of these policies in the Palestinian Territory

Output 1.6 Development of a pilot training program in energy efficient equipment maintenance

Output 1.7 Development of a list of energy efficient projects in need of finance and financial advisory assistance to energy efficient project sponsors

Output 1.8 Capacitor regulations and power factor penalty rates and assistance in enacting these regulations and rates in the PA

Output 1.1: Energy Efficiency Market Information

Energy efficiency market information that will assist potential providers of energy efficiency equipment and services to assess, develop, and execute profitable business strategies. This information collected, assessed, summarized, and organized in this output will cover topics including recent customer energy consumption patterns (by sector and end use) and energy end-use equipment characteristics. Based upon this information, this task will make estimates about the demand for energy efficiency services by sector and region.

PEA shall be the implementing agency responsible for achieving this output. PEA's Information and Promotion Work Group shall be wholly responsible for hosting all meetings with industrial and commercial groups (Output 1.1.2) and for coordinating information from these meetings (Output 1.1.7). It is strongly advised that PEA delegate to the Auditing and Technical Work Group the data collection activities under Outputs 1.1.1 and 1.1.3 through 1.1.6. In this capacity,

ATWG shall be accountable to PEA for the successful performance of these activities.

Information from this output will be used internally at PEA. All of the work products and assessments from this output will be made available to the public through forums and at PEA's energy efficiency information center. The Auditing and Technical Work Group shall have access to information from this output to the extent that such information is necessary for the successful completion of activities any further activities.

Activities for Output 1.1

1.1.1 Compile public data available from statistics bureaus, university research, electric utility connection data, import data, and other sources on energy end-use patterns (e.g., by region, segment)

1.1.2 Conduct a series of 5-10 meetings and seminars with groups in the PA that may have collected and/or used energy information (e.g., universities, research organizations, industry and commercial groups, multi-lateral development banks) to:

- discern status of any ongoing information collection activities
- determine the type of information that potential energy efficiency market participants will find useful.

This activity will help to:

- increase the effectiveness of data collection activities
- provide a forum for publicizing data collection and assessment activities of this project
- allow center to discern major energy efficieof business and industry

1.1.3 Collect information on the ages, types, sources, and efficiencies of equipment in use, and currently for sale (new and used) through surveys of industry and commercial businesses and groups. This data collection should be limited to 10-20 major types of equipment in 10-20 different industrial and commercial industries. The total demand of this equipment should be equal to one-half or more of all the energy use in the commercial and industrial sector.

1.1.4 Estimate the potential percentage increase in energy efficiency by sector and region based on the difference between the prevalent level of equipment efficiency and a target efficiency that is based on the most energy efficient equipment that may be available

1.1.5 Enhance estimates of energy consumption by sector, equipment type, and region developed in the above activities by conducting selected end use measurement studies, and industry and commercial surveys

1.1.6 Develop estimates of potential for energy savings by sector, energy end use, and region based on the energy efficiency potential discerned in Activity 1.1.4 and the energy consumption estimates developed in Activity 1.1.5. Summarize findings in a brief report that shall be made publicly available.

1.1.7 Supplement information obtained in Activity 1.1.2 on the major energy efficiency concerns of businesses and industries by conducting surveys of industry and commercial groups. Surveys shall discern both the level of interest and awareness in energy efficiency and the types of concerns that industries and commercial businesses have. Summarize findings in a brief report on the energy efficiency concerns and awareness of industry and commercial businesses that shall be made publicly available.

Output 1.2: Energy Audits

Audits and energy savings advice to approximately 300 commercial, industrial, and government sector customers focusing upon low/no cost energy savings measures in a few key industries and energy end-uses. The energy audits provided in this output will be coordinated with the energy efficiency awareness programs of Output 1.3. Phase I audits provided in this output will serve as a basis for learning, thus will be shared with other participants in energy efficiency seminars. Participants at these seminars will in turn be asked about their interest in Phase II audits.

The UNDP/PAPP office shall be the executing agency responsible for achieving this output and shall delegate all activities the Auditing and Technical Work Group, which will be responsible for conducting audits and preparing reports. The Auditing and Technical Work Group shall contract work to local universities (e.g. Birzeit University), PEA staff, and others, subject to the comment and recommendations of PEA. Responsibilities assigned to Auditing and Technical Work Group shall be reconsidered if the PA officially rescinds responsibilities assigned to PEC under the LSP. The Auditing and Technical Work Group shall report to PEA on a regular basis by providing annual reports, audit results, and other information to PEA that shall reside at the energy efficiency center. PEA shall also review and comment upon the plan developed by the Auditing and Technical Work Group under Activity 1.2.2.

The 300 audits to be conducted under Output 1.2 shall be divided into Phase I and Phase II audits. The purpose of this division is to provide a formal means of coordination between Output 1.2 and Output 1.3, Energy Efficiency Awareness Seminars. The energy efficiency awareness seminars shall be based partly on the initial experience of the Output 1.2 audits, in the type of end-uses discussed and the solutions for these problems shall reflect the Phase I Audit Program

experience. In turn, the initial energy efficiency awareness seminars conducted in Output 1.2 shall provide guidance for the Phase II audits. Furthermore, the types of problems experienced by energy consumers attending the energy efficiency awareness seminars shall be targeted during Phase II audits.

Activities for Output 1.2

1.2.1 Develop specification for an audit program to evaluate potential energy savings in 300 industries and commercial businesses

- identifying the types of customers and energy end-uses for which audits should be conducted
- defining the scope of audits (in terms of the types of equipment and potential low/no cost energy efficiency measures)
- developing a schedule for performing audits in two phases (see Activities 1.2.4 through 1.2.)
- describing the content of audit reports.

The types of customers and equipment chosen should reflect prevalent energy end-uses in the PA and should probably target: industrial motors; commercial and industrial lighting; and water pumping. The important industries and businesses would likely include asphalt, wood, stone cutting, building materials, and textiles. The selection of industries will depend upon the market assessment performed for Output 1.1.

1.2.2 Develop and execute a plan to develop auditing capabilities at the local level (PEC, universities ..) through:

- identification of staffing needs for an audit staff of approximately four auditors
- recruiting, hiring, and training of staff
- specification of overhead requirements

1.2.3 Prepare and deliver an auditor training program through development of course outlines, preparation of course materials, and delivery of auditing courses. An initial one-month, initial training course will be provided to auditors on the performance of low/no cost audit programs for selected energy end-uses and industries in the commercial and industrial sectors.

This activity will endeavor to draw upon auditing expertise developed in Egypt for trainers. Auditors will also receive a one-week follow-up training session after

SECTION D

Phase I of this auditing program at which time auditors will review problems they have experienced and receive guidance on how to resolve these problems in the future. After the beginning of Phase II, auditor trainers will provide "trouble shooting" assistance on an as-needed basis subject to the limitations of the training budget.

1.2.4 Publicize program and contact potential recipients for initial audits under Phase I of this Output. Phase I audits shall comprise approximately 0.5 years of experience or approximately 50 audits. Facilities to receive audits under Phase I shall reflect important energy end-users in the PA and should be representative of the audits that will be performed in both phases of this Output. Develop a schedule for performing Phase I audits during a period of approximately one-half year.

1.2.5 Deliver Phase I audits targeting low/no cost energy saving measures. Prepare reports for each audit that shall be similar in structure to those to be provided under GEF's energy efficiency project in Egypt. Like these audits, audit reports shall:

describe energy savings potential
assess costs and benefits of energy efficiency measures
provide guidance on how to implement recommended measures.

Also as in Egypt, two types of reports shall be prepared: (1) a brief, executive-level summary of findings, conclusions, and recommendations, describing the economic and financial impacts of each recommendations; and (2) a supporting report providing documentation for findings, conclusions, and recommendations. Given the "low/no cost" focus of this program, the supporting reports do not need to be extensive, but should provide sufficient documentation to provide credibility for conclusions and recommendations.

1.2.6 Perform promotion to encourage participation in Phase II of this audit program, using interested attendees at seminars provided in Output 1.3 as one potential source of recipients. Develop a schedule for performing audits at each facility.

1.2.7 Perform 250 additional audits (Phase II) and prepare audit reports using a similar structure as the reports prepared in Phase I.

1.2.8 Follow-up with audited customers (one year after audits). Follow-up assessments will:

- identify recommended measures performed and not performed

- assess customers' reasons for performing or not performing measures
- estimate (apprterms) the level of savings actually obtained as the result of audits
- provide guidance to customers not installing measures

1.2.9 Develop an ongoing record of experience from both phases of the audit program that identifies the approximate level of savings potential due to specific types of recommendations in different industries and end-uses. The record should also consider the program's experience in persuading customers to implement audits, providing lessons from the program on barriers to energy efficiency that discourage customers from implementing program recommendations. The record of experience should be provided at the energy efficiency center.

Output 1.3: Energy Efficiency Awareness Forums

Public forums that instruct industrial, commercial, and government sector facility managers to perform maintenance and other low/no cost energy savings measures with respect to five different energy end-uses (e.g., lighting, gas combustion analyzers, boiler settings, capacitors and power factor corrections) in 5-10 different industrial and commercial groups.

PEA shall be the implementing agency responsible for achieving this output and shall be the official hosting agency for all forums. Within this capacity, PEA's Information and Promotion Work Group shall be responsible for approving all: seminar invitation lists (Activity 1.3.2); seminar agendas and materials (Activity 1.3.3); seminar publicity (Activity 1.3.4); seminar follow-up (Activity 1.3.6). The record of the seminars maintained under Activity 1.3.7 shall reside at PEA's energy efficiency information center. PEA shall delegate to the Auditing and Technical Work Group responsibilities for preparing seminar agendas. ATWG shall be accountable to PEA for the successful performance of these activities.

Activities for Output 1.3

1.3.1 Identify no/low cost measures and types of industries and commercial establishments to be targeted at forums based on energy end use market research conducted in Output 1.2 and initial audits performed for Output 1.2.

1.3.2 Develop list of potential forum attendees from the industry and commercial groups identified in Activity 1.2.1. Potential attendees should reflect a regional diversity and concentrate upon the largest energy end-users and should include participants in initial audits performed for Output 1.2.

1.3.3 Prepare agenda and seminar materials for each of the five different energy end-uses. Agenda and materials should build upon workshops previously conducted

by PEC and information obtained in initial audits performed for Output 1.2. The information to be presented at the seminars should provide enough technical information to end-users so that they have clear guidance on how to improve energy efficiency for a number of end-uses. Seminar materials should be based in part upon the input of international and regional energy efficiency experts.

1.3.4 Publicize seminars through direct contact with industrial and commercial businesses, local chambers of commerce and other local organizations

1.3.5 Conduct a total of 35 seminars over a two year period (approximately seven seminar for each energy end-use identified). Initial seminars for each energy end-use would rely upon international experts

1.3.6 Perform ongoing follow-up from each seminar to determine:

- whether attendees were able to learn and apply energy savings recommendations presented at seminar
- the type of follow-up, if any, that attendees need to apply energy savings recommendations, including any interest in receiving an audit under Output 1.2.
- how future seminars may be improved.

1.3.7 Maintain a record from seminars and seminar follow-up for the energy efficiency center, including: seminar proceedings, end-users major energy saving priorities, problems encountered by facility managers in the implementation of recommendations and solutions to solve them. Use this information both as an information resource to assist end-users in the future and to help guide future activities.

Output 1.4: Energy Services Business Advice

Advice on the successful conduct of an energy efficiency business to potential energy services providers through performance of demonstration projects and presentation of examples from these demonstration projects and case studies from other countries.

This output will provide potential energy efficiency providers insights into the unique aspects of the "energy services" industry to provide guidance to potential energy service providers in the PA about the types of companies that they may wish to create. The energy efficiency business is unique in that it depend greatly upon close relationship between customers and service providers. Energy efficiency providers can provide the greatest service to their customers only when they have the opportunity to work closely with facility managers and others responsible for energy use decisions. At the extreme under "performance contracting", energy efficiency providers receive

payment only to the extent that their work results in defined, verifiable energy savings. In exchange for this guarantee, energy efficiency providers obtain full access to customers' facility and may even become responsible for all decisions that affect energy use at a facility. This output will help companies work towards this relationship-oriented model.

PEA shall be the implementing authority for this output through its Information and Promotion Work Group. The Work Group shall rely upon the expertise and experience of energy service companies from Europe or the U.S. and potential energy service providers in the PA to help implement demonstration projects and provide lessons from these projects at seminars. It is advisable PEA shall assign responsibilities for one demonstration project to an external entity (PEC, NGO or university). This entity shall furthermore be eligible to perform two other demonstration projects under a competitive solicitation conducted by PEA. PEA may delegate responsibilities for other activities under this output to other organizations as it deems appropriate. All information collected in this output shall reside at PEA's energy efficiency information center.

Activities for Output 1.4

1.4.1 Obtain information on case studies of successful energy efficiency provision through performance contracts and other relationship-oriented energy efficiency provisions. To the extent possible, these case studies should include projects from the Middle East region. One or two examples of such relationships already exist in Egypt.

1.4.2 Select approximately three facilities for energy service demonstration projects, drawing upon experience from initial Phase I audits performed in Output 1.2 and energy use problems of attendees to seminars in Activity 1.3. One pilot projects shall be assigned to an external entity. Selection of the other two pilot projects shall be subject to a competitive solicitation. Facilities should include one or two facilities each in the West Bank and Gaza Strip. Obtain agreements from approximately three facility managers to perform energy efficiency improvements.

1.4.3 Develop specifications for energy efficiency improvements for the three facilities, including:

- Types of measures recommended
- Amount of energy to be saved
- Schedule for implementing measures
- Access to customers' facilities
- Procedures to verify savings

Specifications should be based on follow-up visits to facilities at which international ESCOs and potential energy service providers in the PA have the opportunity to consult closely with facility managers about their energy efficiency problems.

1.4.4 Execute demonstration projects over a six month to one year period, including:

- Development of comprehensive list of
- Implementation of energy efficiency measures
- Initial verification of savings
- Recommendations for additional savings based on observations made during project execution.

1.4.5 Develop a record of demonstration projects, describing the activities performed. problems encountered, solutions found, and lessons learned.

1.4.6 Develop materials for a seminar on the energy efficiency businesthat in:

- General description of an "energy efficiency business relationship concept" and a discussion of the relevance of this concept to the PA
- Description of case study projects from other countries
- Detailed record of experience from case study countries

1.4.7 Identify and contact potential attendees for at least two seminars, one each in the West Bank and Gaza Strip. Potential attendees should include businesses and government officials with interests in energy efficiency. Perform all logistical arrangements to develop these seminars.

1.4.8 Present seminars in the Gaza strip and West Bank. Use the conclusion of the seminar to identify potential next steps and future priorities for energy efficiency market participants in the PA.

1.4.9 Prepare detailed record of case studies and seminar proceedings. Maintain this record at the energy efficiency information center.

Output 1.5: Energy Efficient Government Procurement Policies

"Life cycle" government procurement policies that consider energy costs associated with the purchase of all energy-using equipment, and encouragement of the adoption of these policies in the PA.

PEA shall be the implementing agent in charge of implementing this output through the

Economic and Regulatory Work Group. PEA shall work with domestic and international consultants on an as needed basis in order to research life cycle procurement policies in other countries and to prepare effective and enforceable guidelines.

Activities for Output 1.5

1.5.1 Assess current procurement rules with regard to requirements to evaluate energy and all other life cycle costs

1.5.2 Identify barriers, if any, to the implementation of life cycle cost requirements in the PA. Barriers may include perceived complexities in evaluating life cycle costs, lack of clarity with respect to existing procurement requirements, and perceived difficulties in enforcing life cycle cost procurement (e.g., equipment warranties provided for only one year). Identification of barriers should be based on interviews with government procurement officials and an assessment of procurement rules in other countries.

1.5.3 Develop draft, preliminary procurement guidelines for several categories of government equipment, including computers, lighting, and vehicles. Procurement guidelines should:

- describe the cost items that need to be considered under life cycle procurement
- explain how bids should be prepared to allow evaluation of life cycle costs, including any externality penalties for air pollution or oil import impacts associated with low efficiency products
- describe how life cycle cost estimates can be enforced over time

1.5.4 Submit draft, preliminary procurement guidelines to selected government officials for comment. Make appropriate revisions and prepare draft guidelines

1.5.5 Develop a promotion strategy to advocate life cycle procurement policies. Promotion strategy should consider:

- key decision makers
- important motivating factors
- possible need for and role of promotional materials
- information and communications channels

1.5.6 Submit draft procurement guidelines to appropriate government officials

1.5.7 Promote life cycle procurement policies in appropriate forums based on

promotion strategy developed in Activity 1.5.5.

1.5.8 Make changes to procurement policies as needed in order to ensure their implementation

Output 1.6: Energy Efficiency Equipment Maintenance Assistance and Training

Assessment of the equipment maintenance barriers to the use of energy efficient equipment and provision of a pilot energy efficient equipment maintenance program.

PEA shall be the implementing agency responsible for achieving this output through PEA's Regulatory and Economic Work Group. This work group shall be assisted by international and domestic technical contractors specializing in the maintenance of energy efficiency equipment. Information obtained in this output shall reside at PEA's energy efficiency center.

Activities for Output 1.6

1.6.1 Assess the impact of the low availability of electrical equipment maintenance capabilities in the Palestinian Territories on commercial and industrial customers' purchase and use of high efficiency equipment for 2-3 major classes of equipment (e.g., high efficiency motors, water pumps. The selection of this equipment will depend in part on the market assessment performed in Output 1.1 and 1.2) by interviewing equipment vendors and industrial and commercial firms and organizations. These interviews may be conducted simultaneously with those performed in Activity 1.6.1.

1.6.2 Based on the assessment conducted above, develop a profile of the kinds of equipment that would be purchased if there were better maintenance capabilities in the PA. Compare this equipment to the type of equipment currently be used as revealed by activities conducted under Outputs 1.1 and 1.6. Estimate in approximate terms the potential efficiency gains for each type of equipment that might be realized through better maintenance capabilities in the PA.

1.6.3 Select a type of equipment for providing technical assistance and training in equipment maintenance on a pilot basis, based on the results of 1.6.10 and on an assessment of the ease of providing maintenance skills in the PA (equipment for which maintenance skills be more easily taught would, all other things being equal, be more likely to be selected for the pilot program).

1.6.4 Develop the specifications for a pilot training program by identifying the number of people to be trained, the length of training required, the need for follow-up training, and other factors.

1.6.5 Implement a pilot training program in one region of the PA.

Output 1.7: Energy Efficiency Financing Facilitation

Identification of projects in need of financing and assistance in financing by: (1) finding loans, grants, and other financial assistance from multilateral banks, export credit agencies, foundations, and other potential funding sources; and (2) advise on loan and grant solicitation.

PEA shall be the implementing agency responsible for achieving this output through PEA's Financial Work group. This work group shall be assisted by international specialists in energy efficiency finance. All analyses, documentation, and data used to prepare this assessment shall be kept at the energy efficiency center for use both in developing incentive programs and as part of long-term resource and system planning.

Activities for Output 1.7

1.7.1 Maintain a list of potential energy efficiency projects in the industrial, commercial, and government sectors that may need capital investments of $500,000 or more. For each project, identify the energy end-user, the size of the project in terms of cost and energy savings, the estimated simple pay-back period, and any equipment or service providers that have been identified.

1.7.2 Update the above list as needed and provide to multilateral development banks, export credit agencies, private foundations, and others who might be interested in providing energy efficiency funds to the PA.

1.7.3 Develop specifications for a financing workshop at which those seeking grants, loans, and other financial assistance for energy efficiency projects can receive guidance needed to such financial assistance from export credit agencies, multilateral development banks, foundations, and other sources on funding, including:

- Development of agenda
- Identification of attendees
- Retention of international experts in energy efficiency finance.

1.7.4 Present workshop covering information needed to obtain grants, loans, and other assistance for energy efficiency projects. Topics covered should include: grant and loan applications, project development, risk management, and credit conditions of potential funding sources.

1.7.5 Preparation of a guide book on energy efficiency finance, drawing from the seminar as well as guide books already prepared in Egypt and other Arab countries.

Output 1.8: Power Factor Rates and Standards

Recommendations for power factor rates and codes and standards to regulate capacitor installation on new energy using equipment. PEA sbe the imagency responsible for implementing this output, through the Regulatory and Economic Work Group.

Activities for Output 1.8

1.8.1 Perform international assessment by reviewing capacitor regulations and retail power factor penalty rates used in other countries, especially in Middle East.

1.8.2 Perform economic and technical assessment by analyzing:

- the types of capacitors that would be required to achieve power factors of at least 0.92 for major equipment types used in the PA
- the retail power factor penalty rates that would both: (1) compensate municipalities and electricity distribution companies for power factor penalties imposed by IEC, and (2) provide sufficient disincentives to customers to maintain low power factors.

1.8.3 Develop draft capacitor regulations and preliminary retail power factor penalty rates based on assessments performed in Activities 1.8.1 and 1.8.2

1.8.4 Identify any equipment, customer or other barriers to the adoption of regulations and rates developed in Activity 1.8.3. Assessment based in part upon discussions and investigations with distribution companies and their direct service companies.

1.8.5 Develop promotion campaign to overcome barriers identified in Activity 1.8.4

1.8.6 Implement promotion campaign. Work with distribution companies to resolve technical implementation issues for both power factor rates and penalties.

1.8.7 Solicit comments on power factor regulations and retail power factor penalty rates from interested parties, including equipment vendors, energy end-users, and government officials.

SECTION D

1.8.8 Prepare final power factor regulations and power factor penalty rates.

1.8.9 Assist municipalities and distribution companies to implement power factor penalty rates by providing support on an as-needed basis.

Immediate Objective 2: Improve average unit efficiencies of purchased refrigerators and lighting as follows:

- Improve unit refrigerator efficiency by an average of 55%, to be achieved for an average 15% penetration of the annual market of replaced and new refrigerators during years 2-4 of the refrigerator program. Expect penetration of 5% in year 2, 15% in year 3, and 25% in year 4. Establish market support to increase penetration in successive years to rise to 70% of annual market by the 6th year anniversary of the start of the refrigerator program.

- Improve average household lighting efficiency by 40-50% for an initial 20,000 households (5-6 percent of the estimated 360,000 total households in the West Bank and Gaza Strip) by the end of year 3 of the lighting leasing program, with subsequent penetration of 40% of households by the 5th year anniversary of the lighting leasing program's commencement.

Together, these outputs are expected to reduce electricity consumption by an average of 119,000 MWh, or 7% of total 1996 electric consumption[1] by the year 2005, through a program that expands the inventory of energy efficient equipment in stores, builds consumer awareness of energy efficiency cost-savings opportunities, creates a system to identify the expected energy use of individual appliances, and develops financing mechanisms that assist consumers to purchase energy efficient equipment.

The implementing agency responsible for achieving this objective shall be PEA, under the implementation authority of UNDP-PAPP. This activity shall be designed and managed by a program designer/manager based at PEA who is assisted both by other staff of PEA as well as outside organizations and individuals that offer a range of technical, business, and consumer marketing capabilities. This work will be performed under the general direction of the full-time Project Technical Director.

Work assignments will be given to:

- **local institution outside PEA**, preferably the Palestinian Energy and Environment Research Center (PEC) or PEC personnel for field research, data gathering, and the

[1]These savings are calculated and compared to a base of the estimated total 1996 Palestine electric use. It is expected that without the current power distribution system delivery constraint, and if the Palestinian economy were to regain or surpass its previous economic health, electric use would increase (both in total and per household) and the project savings would decrease on a percentage basis. Since there is no energy forecast available by consumer sector, let alone correlated to possible future economic factors, electric savings can be presented only in comparison to current electricity use. All calculations were made for the existing 365,000 households, without estimating the number of new dwellings that might be constructed and occupied in future years.

design of program activities;

- staff of the Ministry of Industry (regarding the issue of technical standards for manufactured equipment);

- staff of the Ministry of Trade and Economics regarding issues of Israeli trading regulations for electrical appliances and equipment, and imports from Jordan and Egypt;

- one or more electric distribution companies (ideally one in the West Bank and one in Gaza Strip) that will implement the fluorescent lighting leasing program. [Note that this participation is expected to be on an in-kind basis, with project funds committed only to modifying billing systems to add the lighting lease payment and supplying a computer to handle payment calculation at each participating electric company.]

- an international consultant with expertise in the design of efficient equipment programs;

- two regional consultants (e.g. from Egypt or Jordan) with experience in technology efficiency and consumer promotion techniques for energy efficient appliances and equipment; and

- subcontracts for market research, billing/leasing software, and development of promotional material.

Although no other paid assignments have been planned, it is anticipated that an association or trade group representing retail refrigerator manufacturers and vendors association, and a similar professional association of consumer lending institutions, will volunteer some of their staff or members' time to help review and comment on the design for the "hire-for-purchase" financing program for efficient refrigerators.

The details of all these assignments are contained in the following pages of detailed outputs and activities.

Success Criteria:

By the end of this project, PEA and its supporting institutions will have:

- assessed the effect of trade or regulatory restrictions on the sale of energy efficient equipment in the Gaza strip and West Bank and begun overcoming any such restrictions by initiating changes in Israeli or Palestinian government trade policies or regulations

- secured the cooperation of appliance and equipment vendors to stock greater numbers of energy efficient models suited to Palestinian consumer demand and power conditions

- established consumer awareness of the availability and favorable economics of buying and using energy efficient appliances and equipment, and demand for these products

- arranged for all new and used refrigerators (aged five years or less) that are offered for sale through commercial vendors or re-sellers to be labeled with the expected annual electricity consumption of that specific model, based on independent test data

- developed financing mechanisms that can assist consumers to purchase energy efficient refrigerators and lighting equipment when these equipment cost more than equipment of lesser efficiency

- implemented a program to promote the purchase and/or purchase-to-hire arrangements for energy efficient refrigerators and fluorescent lighting in homes

- increased sales of energy efficient refrigerators and residential lighting equipment sold in the Palestinian territory and

assessed the merits of extending the energy efficiency program (especially the energy consumption labeling requirement, promotion campaign, and financing mechanisms) to other electric appliances and equipment.

Summary of Outputs

Output 2.1 Trade actions that ensure more energy efficient refrigerators and lighting equipment models can be purchased from local vendors of consumer appliances.

Output 2.2 Substantially greater numbers of energy efficient models are stocked by appliance and equipment vendors.

Output 2.3 An information campaign that increases consumer awareness of the benefits of energy efficient models of refrigerators and lighting, and stimulates consumer demand for energy efficient equipment, especially for refrigerators and fluorescent lighting.

Output 2.4 An enforced information or labeling system that enables consumers to identify the energy use of individual refrigerator models for refrigerators sold by commercial vendors and re-sellers, and to buy energy efficient models.

Output 2.5 A hire-to-purchase (installment purchase) financing mechanism that enables consumers to buy energy efficient equipment, beginning with refr. which may hahigher first costs than less efficient equipment.

Output 2.6 A self-supporting leasing program offered by one or more power distribution companies to assist customers to manage the initial cost of installing compact fluorescent lights or fluorescent tube fixtures.

Output 2.7 A plan for expanded initiatives that the PEA could undertake or support to transfer project activities more broadly throughout the Palestinian Territories, and to increase energy efficiency of other electric appliances and equipment. The plan should estimate the possible reduced rate of growth in electrical demand, and any public sector costs to achieve this, to be used in power sector resource plans.

Output 2.1: Equipment Trading Barriers Identified and Reduced

It is essential for the work of Objectives 1 and 2 to develop a detailed understanding of Israeli and Palestinian trade regulations and associated technical standards for equipment that could hinder Palestinians' access to energy efficient equipment manufactured locally (in the Palestinian Territory and Israel), regionally (in Jordan or Egypt), and from global vendors located in Europe. Asia, and North America. Gaining this understanding will be accomplished through an assessment of the effect of trade or technical restrictions on the sale of energy efficient equipment in the West Bank and Gaza Strip. This output will undertake subsequent initiatives to overcome significant restrictions through changes in Israeli or Palestinian government trade policies or regulations.

Trade regulations will be reviewed and actions taken to ensure that energy efficient equipment (such as residential refrigerators, commercial/industrial and residential lighting, air conditioning units, industrial motors and pumps, including water supply pumps) is available in sufficient quantities to meet the potential Palestinian demand.

This task will be performed jointly with Objective 1. Output 1.6, Activities 1.6.1 to 1.6.8 of regarding trade barriers to energy-consuming equipment used in commercial, industrial, and governmental facilities. Project resources devoted to Output 2.1 will perform the analysis of residential equipment. Output 1.6 will provide similar resources for the non-residential technologies.

This output will be the prime responsibility of PEA, assisted on trade and regulatory issues by assigned staff of the Ministries of Industry, and Trade and Economics. Field data collection and an assessment of Israeli vendor stocks of energy efficient equipment will be performed under contract by an organization such as the PEC.

Activities for Output 2.1

SECTION D

2.1.1 Compile and document the applicable technical standards, import and trade regulations. and energy efficiency regulations applicable to major energy-using equipment manufactured or distributed to Palestinian consumers through Israeli, Jordanian, or Egyptian suppliers.

Task should be performed by staff from the Ministry of Industry and the Ministry of Trade and Economics.

2.1.2 Determine the baseline mix of major electric-consuming equipment now purchased (types of equipment, new versus used purchases, equipment cost, energy efficiency, and sales volumes) through interviews with equipment vendors and a review of Palestinian Authority and Israeli government trade and customs data. Equipment should include all those listed above in the description of Output 2.1.

Experience of an entity such as PEC, which has undertaken similar activities in the past. should be drawn upon in this activity.

2.1.3 Send two NPP personnel to Egypt to participate in Egypt's one-week training course overview of appliance efficiency standards and labeling under their UNDP/GEF project. The Palestinian participants will pay their own travel and contribute a fee (estimated at $1,500 each) to the Egyptian training sponsor.

Task should be performed by PEA and the program design personnel.

2.1.4 Determine whether vendor ordering of energy efficient equipment for inventory is impaired in any way by trade regulations. Document the extent of vendor efforts to obtain energy efficient models of equipment.

Task should be performed in conjunction with Activity 2.1.2, an by the entity assigned to undertake the said activity, under contract to PEA.

2.1.5 For major electric equipment, estimate the annual volume of purchased new/used equipment that would be needed to fully meet local appliance demand, identify the cost-benefit of purchasing and using energy efficient equipment, and estimate the portion of the market that would have a lower life-cycle cost from the purchase of energy efficient equipment. Compare this estimated demand to the current volume of imports/sales of all equipment, and the portion that is energy efficient. Identify specific regulations, standards, or other non-demand factors constraining the availability of equipment, both energy efficient and of standard efficiency.[2]

[2]This should include a review of the Israeli-Palestinian Interim Agreement on the West Bank and the Gaza Strip (September 28, 1995) relevant annexes (Annex V Protocol on Economic Relations, and

Economics, supported by PEA.

Output 2.2: Vendor Commitment to Stock Energy Efficient Equipment in Inventory

Once activities are initiated to address trade or technical standard regulations that are barriers to energy efficient equipment entering the Palestinian Territory, equipment vendors would be free to carry energy efficient products. However, there is no guarantee these vendors would do so. This output will ensure that vendors carry such equipment in inventory and make it readily available for consumer purchase. This effort will focus initially on refrigerators and lighting, and emphasize models and features that are suited to Palestinian consumer demand (e.g. size and features) and power conditions. (e.g. lighting products suitable for variable power quality conditions).

Activities for Output 2.2

2.2.1 Discuss with representative equipment vendors the findings of activities 2.1.4-2.1.6 (appliance demand, energy and costs savings potential, and equipment trade regulations and standards) and 2.3.1 (model-specific comparative information), and plans for the consumer campaign of Output 2.3, the refrigerator labeling of Output 2.4, and the financial assistance mechanisms of Outputs 2.5 and 2.6. Discussions should inthese vendors of the potential demand for energy efficient equipment, enlist their support in pursuing one or more mitigation actions, and encourage the vendors to carry more inventory of energy efficient electric appliances and equipment, especially refrigerators and fluorescent lighting. In return, the project will support vendors' efforts with the activities discussed below in 2.2.2 - 2.2.4. Consultations must include representatives of manufacturers serving Israel, Jordan, and Egypt.

Task should be directed by PEA, with assistance obtained from the international equipment program consultant and the regional technology consultant.

2.2.2 Provide vendors with information on energy efficient products, specifications, and sources to assist vendors to order energy efficient equipment for their inventories. Include information on fluorescent lighting products that are best suited to Palestinian conditions of variable power quality.

Task should be performed by an entity (PEC, University, NGO, etc....), under the general direction of PEA, with assistance from the international equipment program consultant and the regional technology consultant.

2.2.3 Compile a list of vendors who have agreed to carry energy efficient models of refrigerators and lighting products. Include this information in both the consumer awareness campaign of Output 2.3 and the information and outreach services of Objective

4.

Task should be performed by PEA.

2.2.4 Develop and give participating vendors camera-ready promotional advertising materials that they can place (at their own expense) in appropriate media or locations to promote energy efficient equipment.

Task should be performed by PEA, with assistance through a subcontract for the development of promotional materials.

Output 2.3: Consumer Awareness Campaign

An information campaign is required to increase consumer awareness of the benefits of energy efficient equipment models of refrigerators and lighting, create consumer demand for this equipment, and inform consumers of retail vendors that carry such equipment. The consumer awareness campaign will inform residents about the typical monthly and annual energy cost savings from efficient models, life cycle cost principles (in terms of total energy bill savings over the expected live of the equipment), and names and addresses of vendors carrying the products. It is reported that Palestinians tend not to read newspapers or brochures for consumer information: and no television stations serve the Palestinian territory exclusively. Stations come either from Israel or Jordan. Therefore the best media for this campaign must be identified.

Activities for Output 2.3

2.3.1 Apply the knowledge gained from Outputs 2.1 and 2.2 to develop comparisons on equipment purchase cost and annual running costs for average and efficient models of major brands and models of refrigerators and lighting systems (fluorescent and incandescent).

Task should be performed by an entity (PEC, University, NGO, etc....), under the general direction of PEA and with assistance from the international equipment program consultant.

2.3.2 Conduct market research through focus groups and surveys of consumers and equipment vendors to determine their level of awareness and knowledge of energy savings opportunities from efficient equipment, and test the best ways (through media or other publicity measures) to present meaningful information on this subject to consumers and vendors.

Task should be performed by a local market research sub-contractor, with technical guidance from international equipment program consultant and, if possible, PEC cadre.

2.3.3 Assign the PEA promotion/outreach staff member to attend the promotion and marketing training program under Egypt's UNDP/GEF project (their output 2.7 in Component 2), with the PA project paying for travel expenses and making a contribution (estimated at $1,500) to the Egyptian training course sponsor.

Task will be performed by the PEA promotion/outreach staff member.

2.3.4 Using the information obtained in 2.3.1 and 2.3.2, design a publicity campaign that can overcome identified gaps in consumer and vendor awareness and knowledge. This task should include a selection of appropriate

a) media (radio, Israeli/Jordanian television programs that appeal to Palestinian viewers, newspapers, hand leaflets, bus advertising),
b) other outreach mechanisms (such as information distributed through appliance vendors using point-of-purchase displays and sales material, electric distribution companies, municipal agencies, consumer information sources, public markets, community events, etc.), and
c) key points to emphasize through each method that is chosen.

Consider the expected number of times that consumers must receive this information to be persuaded to consider energy efficiency. Select the best communications methods after weighing the number of contacts needed against the cost of each form of publicity. In the case of refrigerators, publicity should promote the existence and value of the information contained in energy consumption labels, as will be developed in Output 2.4.

Task should be directed by PEA, the regional promotion/outreach consultant and the international equipment program consultant. Technical input from PEC could be helpful.

2.3.5 Develop the communications materials and conduct the awareness campaign.
Task should be performed by PEA, with guidance from the regional promotion/outreach consultant, and specific activities assigned to appropriate organizations, based on the campaign details developed in activity 2.3.4.

2.3.6 Perform follow-up evaluations of the effects of the campaign (e.g. awareness, knowledge, motivation, behavior) on consumers and equipment vendors.

Task should be performed by the international equipment program consultant, together with a local market survey research company, under the general management of PEA.

SECTION D

Output 2.4: Refrigerator Labeling System for Energy Consumption

Building on the vendor discussion in Activity 2.2.1, the market research of Activity 2.3.2, and consumer demand for energy efficient equipment (especially refrigerators) prompted by the consumer campaign of Activity 2.3.4, this output will create an enforced labeling system to allow consumers and vendors to easily identify the energy use of individual refrigerator models available for sale by vendors, and hopefully to buy energy efficient models.

Activities for Output 2.4

2.4.1 Investigate an effective and affordable solution to providing consumers with information on the likely energy use of specific models of equipment or, alternatively, energy efficiency features that consumers should look for when buying a new or used refrigerator. Options include

- borrowing data that may be available from nearby countries (e.g. Egypt, Israel, Jordan, or European Union requirements),
- asking manufacturers (or wholesale distributors, or retail vendors) to provide this information to a Palestinian Authority organization, or
- requiring manufacturers or retail vendors to apply energy labels on equipment that is offered for sale in the Palestinian Territory or to Palestinian households.

This task should be performed by PEA with assistance from the Ministry of Trade and Economics and the international equipment program consultant. Consultations will be held with representatives of manufacturers and government or power sector staff handling energy efficiency labeling and standards programs in nearby countries, including Egypt, Israel, and Jordan.

2.4.2 Decide the types of products to which this labeling or information system will be applied. At a minimum, this should include all refrigerator models being purchased for the first time (new) and that are the typical sizes of refrigerators used in residential settings. Other types of refrigerators that could be included in this system are large refrigerators used in restaurants, food stores, or other commercial establishments; used refrigerators less than a specific age (such as five years old) regardless of the vendor; or just used refrigerators sold through commercial vendors (and not sold by individual households).

Task should be performed by PEA with assistance from the Ministry of Trade and Economics and the international equipment program consultant. Consultations will be held with representatives of manufacturers.

2.4.3 Develop a system to give this information to consumers. Examples of methods include a directory showing the energy consumption or electric running costs for specific models, labels placed on individual equipment units reporting the same information, and/or an energy quality mark system that uses some symbol to designate either the relative energy

efficiency of products (e.g. one star, two stars, ... four stars) or only high efficiency products (such as a 'green' mark that could be given to products that have a minimal impact on the environment).

Assign an experience promotion/outreach staff member of an appropriate entity dealing with these issues, to attend the promotion and marketing training program under Egypt's UNDP/GEF project (their output 2.7 in Component 2), with the PA project paying for travel expenses and a contribution (estimated at $1,500) to the Egyptian training course sponsor.

Include manufacturers, representatives of vendors and sales staff in discussions of system selection. Obtain cooperation of major manufacturers of efficient refrigerators to participate in and support the GEF project. Identify the specific requirements and activities for each party (manufacturers, vendor, salespersons, Ministry of Industry, Ministry of Trade and Economics, PEA).

Task should be lead by PEA with the participation/implementation of local expertise possibly available at PEC, the international equipment program consultant, and the regional promotion/outreach consultant.

2.4.4 Develop necessary regulations and enforcement mechanisms to authorize adoption of this system, including an allocation of costs among manufacturers, retail refrigerator vendors and the PEA; identification of enforcement mechanisms; and specification of sanctions for non-compliance.
(The GEF budget has made an allowance of 10 person months from the Ministry of Industry and 1 person month from the Ministry of Trade and Economics, in addition to technical and promotion staff of PEA and local counterparts, to cover the PA's share of implementation and enforcement responsibilities shown for Activities 2.4.5 and 2.4.6).

Task should be performed by the Ministry of Industry and Ministry of Trade and Economics, assisted by the PEA and the international equipment program consultant.

2.4.5 Implement the system as developed in Activities 2.4.3 and 2.4.4..

Task should be performed by manufacturers and vendors, under rules established by Activity 2.4.4, overseen by the Ministry of Industry, and with technical assistance of PEA.

2.4.6 Enforce the system as agreed above, including the use of spot checks capable technical/consumer organization available locally: their findings should be referred to the Ministry of Industry for any further required action, such as warnings or sanctions against manufacturers or vendors for non-compliance.

Task should be directed by the Ministry of Industry, with possible field checks assigned to local organizations.

Output 2.5: Installment-Purchase (or Hire-to-Purchase) Financing Mechanisms Available to Facilitate the Sales of Energy Efficient Refrigerators

One or more functioning financing mechanisms that assist consumers to purchase energy efficient equipment having a higher first cost than non-efficient models. The GEF project will focus on refrigerators. All financing mechanisms are referred to in the following text as "loans" for the simplicity of discussion in the text. Mechanisms may include:

- market-rate loans not previously available,
- below-market-interest loans,
- relaxed loan terms (longer borrowing period, smaller down payment, relaxed credit criteria or collateral), or
- lending by new types of lenders (manufacturers credit arrangements, vendor financing, private lenders, and/or electric distribution utility companies).

Financing mechanisms are needed to target equipment (such as refrigerators) for which electricity prices are sufficiently high to make efficient equipment a good consumer investment when viewed on a life cycle cost basis. However, there may be a need for attractive financing terms to help consumers get over the hurdle of higher first cost for energy efficient equipment. This is especially the case for consumers deciding between new high efficiency refrigerators and a used, less-efficient refrigerator where the first cost differential can amount to $600 with a simple payback of 4 years. The financing mechanism will not offer any capital cost subsidy. In the course of project activities, it will be critical to identify all vendor and lender issues that must be overcome if attractive lending terms eventually can also be offered for other energy efficient equipment, hopefully without government or power sector financial support.
Note that electric distribution utility loans or leasing are <u>not</u> advised for high cost equipment such as refrigerators due to the history in the PT of a significant portion of utility customers being in arrears on their electric bills due to the difficult economic conditions. It is reported by some power companies that customers choose electric heat (for example) because they know the power company is very lenient if a household falls behind in paying its bill.

<u>Activities for Output 2.5</u>

2.5.1 Use information developed in Activity 2.3.1 to perform consumer market research on the degree of a first cost barrier that may still exist after life cycle cost information on efficient refrigerators is made available to consumers. If there remains a first cost barrier, identify the degree of "subsidy or soft terms" that are required to motivate consumers to select efficient refrigerators.

Task should be performed by a local market survey research company, under the general direction of the PEA and/or the program design staff member, with assistance from the international equipment program consultant.

2.5.2 Determine the willingness of equipment vendors, bank consumer lenders, and other consumer loan programs (such as the current Engineers Association home appliance loan program for professional engineers that makes loans for refrigerators, water heaters, and televisions) to make loans or improve loan terms to encourage the purchase of efficient (or, for that matter, any) refrigerators. Provide these lenders with information about the economics of standard and efficient refrigerators. Identify loan terms that could be offered to consumers for efficient refrigerators. Determine if any kind of government guarantee is needed to spur lenders to participate in a program to facilitate the purchase of efficient equipment.

Budget funds have been provided to allow the local finance specialist to attend a regional conference or travel within the Mediterranean region to participate in an appropriate conference or forum addressing issues of financing techniques to support purchases of energy efficient equipment.

Task should be performed by the local finance specialist, assisted by the international equipment program consultant.

2.5.3 If it appears some form of government guarantee of an initial financing program will be required, the following activities have been planned. Identify alternative mechanisms, likely risks, market penetration, and expected costs of offering such a guarantee. Decide if such a guarantee is actually needed, or "merely desired as an extra insurance policy". If needed, decide if the GEF project should arrange for a guarantee to stimulate sales of efficient refrigerators. If so, constrain the size of the guarantee program to a pilot scale that can produce information that offers a track record of payment and default experience that can be used to guide subsequent private finance activities. [Note: the GEF project budget has not included any funds for such a guarantee.]

Task should be performed by the project finance staff, with assistance from the PEA program design staff member and the international equip program consultant.

2.5.4 Design and implement a financing mechanism that is palatable to lenders or other financing authorities, and is sufficient to motivate consumers to purchase efficient refrigerators.

Task should be performed by PEA, with assistance from the local finance specialist and international equipment program consultant.

2.5.5 Promote the availability of financing through refrigerator manufacturers, vendors, and lenders. Seek cost-sharing of promotional expense from all of the four parties (including PEA). The GEF budget assumes the PEA will contribute 25% of promotional costs, which is reflected by a publicity allowance of $20,000 in the budget.

Task should be performed by PEA promotion/outreach staff member.

Output 2.6 Compact Fluorescent Leasing Program

Design, package, and market a CFL leasing program similar to the program being considered in Egypt (by the Alexandria EDC and EEA) to be carried out by at least one electric distribution company in the West Bank and one in the Gaza Strip. By eliminating a financing barrier to energy efficiency lighting purchases, and ensuring monthly lease costs are less than the electric bill savings from using efficient lamps, the customer will experience a positive net cash flow. This should eliminate risk, ensure savings, and stimulate market demand.

PEA shall be the agency responsible for implementing activities under this output.

Activities for Output 2.6

2.6.1 Review and analyze the residential CFL leasing program designed by the Alexandria, Egypt and Egyptian Electric Authority and any other comparable programs. Schedule a one-week trip to Alexandria, hopefully that will coincide with a meeting of the OME (Mediterranean ring energy efficiency consortium, sponsored by the EU). Determine program marketing and implementation materials, and expectations for cost-benefit, market penetration, peak demand and energy savings estimates. Identify features that might be similar for a Palestinian program, and what might be different (e.g. cost-effectiveness of lighting technology in view of Palestinian electric prices, ability to successfully import efficient equipment, and/or technical specifications to ensure equipment operates under fluctuating voltage conditions). Identify changes that would be needed for a Palestinian program. Budget allows for one-week trip to Alexandria, Egypt, by one person.

Task should be performed by local staff assigned (but by, but not necessarily recruited from PEA), assisted by the regional technology consultant.

2.6.2 Design a Palestinian program to lease CFLs to power distribution company customers and recover lease payments through existing billing mechanisms. Lease payments should be designed to cover all costs of the program operations and supervision. The program design should specify:

- eligible CFL or other fluorescent lamp technology measures

- customer eligibility requirements
- lamp delivery and installation procedures
- need for any new/revised laws or regulation to authorize power companies to operate leasing programs
- expected costs for equipment when purchased in large quantities directly from manufacturers
- leasing payment terms to customers
- cash flow projections and amount of working capital needed to support lamp purchases and possible guarantees for the financial risks of non-payments to power distribution companies
- need for financial support (if any) to the power distribution companies implementing the program (e.g. to modify billing system software to include lease payments)

Features of this project should include self sufficiency to cover all program expenses, including a provision by which distribution companies participating in the program agree to cover payment details in excess of 10%. Task should be performed by existing local cadre in this field, with assistance by the international equipment program consultant and the regional technology consultant

2.6.3 Package the program so that it is attractive to power distribution companies to implement. In packaging the program, specify the program benefits to power companies and the environment in terms of:

- avoided cost of wholesale power purchases
- economic savings to power companies by reducing any unprofitable residential sector sales
- customer service and relations benefits
- reductions in peak electricity demand and deferral of new capital investments on the distribution system
- reductions in GHG emissions

Task should be performed by already existing local cadre in this field (former PEC program design staff member is an option), together with the PEA resource planner, with assistance by the international equipment program consultant.

2.6.4 Arrange to implement the leasing program with at least 2 EDCs (preferably one each in West Bank and Gaza Strip). Develop and distribute promotional material. Publicize the program design in public forums.

Task should be performed by the PEA. with the assistance of the regional technology consultant, in cooperation with one or two power distribution companies.

2.6.5 Provide implementation assistance to participating EDCs. Provide guidance based on the experience of the program's history to date in Egypt, as well as from similar programs in other countries. Provide suggestions for solving problems encountered by EDCs. Provide other implementation assistance as required.

Task should be performed by The PEA, with assistance from the regional promotion/outreach consultant.

Output 2.7 Program Impact Assessment and Plan for Extension of Project Activities to Other Products and Throughout the West Bank and Gaza Strip

Activities for Output 2.7

2.7.1 Evaluate results and cost-effectiveness of consumer awareness campaign, vendor inventory actions, energy efficiency labeling method, and financial assistance mechanisms for refrigerators and lighting.

Task should be performed by a local market research firm, guided by the international equipment program consultant, and under the general direction of the PEA.

2.7.2 Using findings of Activity 2.7.1, determine if

a) any additional cost sharing by the government or power sector toward the higher incremental cost of efficient equipment might be needed to spur greater market penetration. To make this assessment, perform a cost-effectiveness analysis of the incremental cost of efficient equipment as a demand side resource investment, considering the benefits to generation, transmission, and distribution infrastructure investments. Take into consideration the residential sector electric demand forecast, with attention to the expected numbers of new households to be served by electricity, appliance holdings, and the expected trend in intensification of electric use as appliance holdings or household incomes could increase.

b) a Palestinian energy efficiency standard should be adopted to mandate a minimum level of efficiency for all new refrigerator sales.

Recommend a course of action (if needed) to improve the program market penetration and associated energy savings for refrigerators and lighting.

Task should be performed by the PEA, with assistance from the international equipment program consultant.

2.7.3 Assess the change in sales of other appliances and equipment with regard to their energy efficiency, and whether the refrigerator and lighting publicity activities have in any way transformed the market for other types of efficient equipment.

Task should be performed in conjunction with Activity 2.7.1 by a local market survey firm, under the general direction of the PEA, and with technical assistance from the international equipment program consultant.

2.7.4 Apply the experience from the above activities to assess whether similar activities may be warranted for other major electrical appliances or equipment (such as water heaters, air conditioners, or space heating equipment). If so, identify the type of equipment and action needed (labeling, promotion, vendor technical assistance, and/or financing mechanisms). Perform cost-benefit analysis of possible additional program activities, and recommend a course of action to the PA government, appliance vendors, and/or power companies that identify future programs (as needed), their features, expected participants, and possible funding sources.

Task should be performed by the PEA, with technical assistance from the international equipment program consultant.

SECTION D

Immediate Objective 3 : Distribution Line Loss Reduction Project Identification

To reduce distribution line losses in the PA's four distribution companies by 2% by facilitating the financing of distribution system projects by identifying and evaluating potential projects, and providing technical assistance and advice on distribution system operation and maintenance.

Success Criteria

By the end of this project, PEA and the PA's distribution companies will have:

- reduced distribution system losses by 2%, over and above the amount by which distribution losses would have increased due to ongoing donor-funded distribution system rehabilitation programs
- identified and brought to the attention of the international donor and investment community. 50-100 priority distribution system enhancement projects in areas with high line losses
- developed and implemented codes of practice and standards on distribution system operation and maintenance, for use in companies' future plans and operations for distribution line loss reduction
- developed a cadre of trained engineering staff capable of selecting and implementing distribution system enhancement and loss reduction projects and skilled in the use of sophisticated metering equipment, distribution system design software, and other techniques, and implemented a training system for enhancing this expertise on an ongoing basis.

Summary of Outputs

Output 3.1 Identification and evaluation of high priority distribution system enhancement projects and development of a list of projects that may be financed by multilateral and bilateral donors and other lenders

Output 3.2 Development of a code of practice and standards to be used by distribution companies in the PA.

Output 3.1 Identification of Priority Distribution System Enhancement Projects

Identification and evaluation of 50-100 priority projects to enhance distribution systems and reduce distribution line losses throughout the PA. The projects identified in this output shall be brought to the attention of multilateral and bilateral donors, private foundations, and other

lenders and investors that might provide funding, expertise, and other assistance for these projects.

PEA shall be the implementing agency in charge of accomplishing this output. PEA shall receive training and technical assistance to complete this output from international experts in distribution line loss and distribution system optimization. PEA shall work closely with distribution companies in identifying projects and shall provide technical training and assistance to distribution companies based on the technical training and assistance provided by international experts. This output provides no specific funding to distribution companies, other than travel expenses and training.

Activities for Output 3.1

3.1.1 Specify in detail the type and amount of energy distribution system metering equipment needed, using the equipment list shown in Annex x as a starting points. Need for equipment should be based on the following factors:

- Assessment of accuracy of existing metering equipment
- Identification of any need for energy metering equipment at major substations in areas of high losses.
- Inspections of distribution systems (on an as needed basis)

International experts in distribution system analysis should review the metering equipment selected and confirm the need and cost-effectiveness of this equipment.

3.1.2 Conduct training program in distribution system loss measurement to train engineers on:

- methods for electricity line flow measurement, meter calibration, and energy loss calculation;
- parameters for electricity line loss assessments; and
- primary and secondary causes of electricity distribution line losses (e.g. distribution system layout and design, power factors, load factors)
- specification of metering facilities, especially those needed to evaluate areas of high losses

This training program provided to PEA by an international distribution system expert will be attended by representatives from each of the four distribution companies. PEA will in turn provide the same training to each of the four distribution companies, with the assistance of distribution company

representatives in attendance.

3.13 Install distribution system design software at PEA and each of the four distribution companies, using the equipment list shown in the attached Annex as a starting point. Prepare and issue bids for distribution system design software packages that are capable of assessing distribution system designs that minimize line losses in urban and rural networks. Procure appropriate software packages and test and evaluate performance of software through distribution system simulation studies.

Training shall be provided to PEA and representatives of each of the four distribution companies by a skilled engineer (preferably from the software house supplying the software package as part of the package's sales contract). This training shall show how to use the software to design distribution system modifications that can reduce losses in urban and rural areas similar to those in the PA. Similar to Activity 3.1.2, PEA and distribution company representatives shall in turn provide training on this software to other personnel at the four distribution companies.

3.1.4 Identification of potential high priority of projects on the distribution company side of the meter that requires further evaluation. This assessment shall be based on previously prepared reports and studies and other existing information belonging to PEA and the distribution companies.

3.1.5 Evaluation and analysis of potential high priority projects on the distribution company side of the meter. This evaluation shall entail installation of monitoring and measuring instrument to identify, under actual operating conditions, the extent of losses and to evaluate the underlying factors that may contribute to losses (e.g., how do losses vary with changes in demand, power factor, and load factor?).

This analysis should clearly indicate the extent to which losses are due to technical factors and the extent to which losses result from non-technical factors such as theft. This analysis should also discern the extent to which losses might be reduced through improvements in operation rather than capital investment (See Activity 3.2.1). To the extent necessary, this analysis shall use available information on distribution company operations (e.g., amount and timing of bulk electricity purchases and sales by customer class).

Based on this assessment, identify projects that can reduce losses using the system design software packages provided under Activity 3.1.3.. International experts shall assist PEA and the distribution companies in the use of this software for the

first 3-5 project designs, as an extension of the training provided in Activity 3.1.3. For each project, quantify the economic value of these projects in terms of lower line losses, greater system reliability, etc.

3.1.6 Identification of major, potential projects that are closely associated with the electricity use of large industrial customers, that have significant benefits for electricity system distribution losses. For each distribution company, electricity losses will be evaluated at major feed points or distribution substations, for a few large industrial consumers.

At each site, projects, metering equipment, instrumentation, appropriate computer software will be used to continuously monitor the energy consumption of large consumers with large losses. The causes of losses will be evaluated based on their interaction with customers' consumption parameters (e.g., maximum demand, load factor, power factor). This analysis shall discern the extent to which problems may be addressed through improvements in distribution system operation rather than through capital investments (See Activity 3.2.1)

Bon this assessment, identify pand other investments by distribution companies that will reduce electricity distribution losses. To the extent that losses can be reduced by investments on the customer's side of the meter, these projects should also be identified.

3.1.7 Develop and maintain a list of distribution system enhancement and other projects that can reduce electricity system losses that can be: funded by multilateral and bilateral donors, private foundations, and other lenders; or undertaken by private companies specializing in distribution system enhancement on a fee for service basis. For each project, this list should provide the location, description, and estimated costs of the project, as well as a description of the project's benefit in terms of reduced losses, improved reliability, and other factors. The PEA and distribution companies shall maintain documentation on each project based on the evaluation and analysis conducted in Activities 3.1.4 through 3.1.6.

Output 3.2 Development of Distribution System Codes of Practice and Standards

Development of codes of practice and standards for distribution system operation, with the primary purpose of reduce distribution line losses and improving energy efficiency of distribution system operation of the four distribution companies in the PA.

Codes of practice and standards will be directed towards important areas affecting distribution system performance, including: operation of transformers; possible re-direction of electricity loads; and redistribution of consumers among major feed lines. Codes or practice and standards

will be specifically directed to reducing losses and improving distribution system efficiency in areas of high distribution losses. This output will complement the activities of Output 3.1, which will produce a list of capital investment projects for distribution system enhancement, by finding low cost improvements in operation that obviate the need for new capital investment.

PEA shall be the implementing agency in charge of accomplishing this output. PEA shall receive technical assistance and expertise from the same international experts in distribution line loss and distribution system optimization that provided support for Output 3.1. PEA shall work closely with distribution companies in identifying areas of high distribution system losses where operational improvements might be effective. Distribution companies shall also provide commentary on the codes of practice and standards prepared in this output. However, no specific funding of distribution companies is provided under this output, except for travel expenses. Distribution companies shall receive benefits of technical assistance and expertise provided by international distribution system experts.

Activities for Output 3.2

3.2.1 Identify and assess sections of distribution networks that experience high losses, where operational improvements may reduce losses. In part, this assessment shall be based on the research analysis performed in Activities 3.1.5 and 3.1.6 above. This assessment may further rely upon distribution system design and system simulation software provided under Activity 3.1.3.

For each area analyzed, determine target values for loss reduction that may be achieved through the following types of operational changes and low cost improvements:

- rearrangement of consumers
- transformer operation changes
- transformer sizing
- installation of power capacitors
- optimization of capacitor locations.

PEA and international consultants will work closely with distribution companies to identify and evaluate problems and possible solutions.

3.2.2 Have distribution companies implement operational changes and other low cost solutions identified in Activity 3.2.1 for a subset of areas addressed in Activity 3.2.2 (approximately 5). Compare the loss reductions experienced with the losses projected in Activity 3.2.1.

3.2.3 Proceed with further problem evaluation or solution implementation, depending

on the results of Output 3.2.2. To the extent that actual loss reductions are much lower that projected, PEA and distribution companies should re-evaluate problem areas and solutions addressed in Activity 3.1.1. To the extent that actual loss reductions are approximately the same or higher as projected in Activity 3.1.1, have distribution companies continue to implement solutions.

3.2.4 Interpret and assess the experience of Activities 3.2.1 through 3.2.3. Based on this experience and utilizing the expertise of international distribution system consultants, prepare a draft manual of standards and codes of practices that can reduce distribution system electricity line losses. These standards and codes of practice should address electricity service to different categories of consumers, with varying demand and voltage levels (both low voltage distribution networks and high voltage networks up to 33 KV).

3.2.5 Have distribution companies review and comment upon the codes of practice and standards prepared in Activity 3.2.4. Incorporate comments and release final manual for distribution to distribution companies throughout the PA.

SECTION D

Immediate Objective 4: Permanent Framework For Strategic Planning And Energy Efficiency Information Network

To facilitate the achievement of the energy demand reductions estimated under Objectives 1-3 and therefore facilitate the realization of the estimated 265 million tons of CO_2 per year by the year 2010. This will be achieved through a three-year promotion program, institutionalized on a sustainable basis through an energy efficiency center. This will aim to

1. increase customer/consumer awareness of- and strategic action on energy efficiency issues by public and private sector energy market participants such as potential energy service providers, equipment vendors and manufacturers, energy industry/sector professionals and energy end users;

2. incorporate the findings on the impacts, emissions benefits and associated costs of end use efficiency and distribution efficiency improvements into power sector resource and investment planning methods.

PEA shall be the implementing agency responsible (under the execution authority of the UNDP/PAPP) for achieving the outputs stated under this objective. The Information and Promotion Work Group shall be primarily responsible to the PTD for carrying out the identified tasks for Outputs 4.1, 4.2, and 4.4. The Economics and Regulatory Work Group shall have primary responsibility for carrying out the identified tasks for Outputs 4.3, 4.5, and 4.6. The Technical Services, and Business and Finance work groups shall assist by providing the results from the work under Objectives 1-3. Several international consultants (for resource planning, public outreach and communication, data management, and program evaluation) and a promotion and outreach consultant from the region will assist national staff to perform these activities.

Success Criteria

By the end of the project PEA will have:

- developed an information system that can produce market information from data collected regarding energy efficiency market information on customer electricity use, energy savings potential, feasibility studies, market size and potential, energy efficient technologies, monitoring, measurement and verification.

- developed strategies and mechanisms for distributing energy efficiency information effectively among public and private sector energy market participants such as potential energy service providers, equipment vendors and manufacturers, energy industry/sector professionals and energy end users.
- developed planning capabilities that allow PEA to fairly evaluate the contributions of energy efficiency investments (as a demand side resource) and distribution system

improvements relative to traditional supply side resources, based on an objective assessment of the costs, impacts and reliability of demand-side and distribution efficiency projects.

- begun using these planning capabilities strategically in policy formulation, and development of an overall plan for efficiency initiatives, thus ensuring the proliferation of athat reduce greenhouse emissions, while contributing to the ongoing effort to meet demand and solving supply resource problems.

Summary of Outputs

Output 4.1 Information management capabilities and dissemination strategies for providing essential information to *potential energy service providers* to help overcome information barriers currently inhibiting the energy services industry.

Output 4.2 Information management capabilities and dissemination strategies to help service providers and the PEA to overcome barriers of customer awareness by providing information for *consumers* (end-users) on the benefits of energy efficiency.

Output 4.3 Evaluations of the performance and efficiency gains of the activities conducted in Objectives 1-3 for use in information dissemination, national power sector policy and power resource planning.

Output 4.4 A country-wide energy efficiency information network consisting of a national center (and eventual regional information centers) to facilitate providing energy information to the energy service industry and to end-use consumers.

Output 4.5 Strategic resource planning and analysis capabilities at PEA that can incorporate the results of efficiency projects (as well as possible load management initiatives funded under other donor activities) into planning activities that weigh demand side resources and distribution system improvement opportunities against supply side resource options on equivalent terms.

Output 4.6 A plan for expanded initiatives by the PEA to transfer project activities more broadly throughout the Palestinian Territory, increase energy efficiency of other electric appliances and equipment, reduce the growth in electrical demand, and share implementation responsibilities among the government, energy service providers, and electric consumers.

Output 4.1: Information Management and Dissemination Capabilities to Serve Potential Energy Services Providers (Energy Services Industry)

SECTION D

Establishment of information management capabilities and dissemination strategies to provide information on market opportunities and energy efficiency infrastructure to the energy services industry. This service will help the energy services industry to overcome information barriers that are currently inhibiting the industry from comprehensive and methodical exploitation of market opportunities. Essential information will include energy efficiency industry market opportunities; equipment cost, characteristics, reliability and availability; energy efficiency financing; and other issues relevant to the energy services industry,

The Information and Promotion Work Group shall be primarily responsible for achieving this output. The Technical Services, and Business and Finance Work Groups shall assist the Information and Promotion Work Group by providing results from the work under Objectives 1 through 3.

Activities for Output 4.1

4.1.1 Assess information gaps that currently inhibit PEA and power distribution company resource planners from considering demand side measures and distribution system improvements along-side supply side investments. Based upon this assessment, identity critical information needs to be used in Output 4.5.

4.1.2 Using the findings from 2.2.1 and 4.1.1, and drawing upon international experience, define a framework of common terms, definitions, units of measurement for use in data collection, progress reporting, and evaluation activities of Objectives 1-4. Disseminate these common rules to all project staff and consultants.

4.1.3 Compile, assess, and organize information and data on the energy efficiency market, equipment, technology, and the infrastructure of energy service providers (e.g. manufacturers, equipment and product vendors, consulting engineers, facility maintenance contractors, etc.) available from Objectives 1 and 2 to understand:

- customer electricity use by sector and end-use technologies (including studies conducted by PEC, Birzeit University, the General Department of Statistics, and relevant consumption and load shape data available from electric distribution companies)
- energy savings potential (in part based on information developed in Outputs 1.2, 1.3, and 2.1)
- functions, performance, and local availability of end-use energy efficiency and load management technologies (from information that may be developed during the course of the project from Outputs 1 and 2)

- estimates of the energy and monetary savings of efficient thermal and electric technologies compared to the current types of equipment in use in the PA.

- local implementation experience and performance data for energy efficient end-use equipment, to the extent developed in Outputs 1.1, 1.2, 1.4, 1.6, and 4.3)

- existing financing mechanisms (from Outputs 1.7 and 2.5)

- other information needed by energy service providers (as identified in Outputs 1.4, 2.2, and 4.1)

4.1.4 Develop databases and information management systems that facilitate retrieval and use of this information. Staff should receive training in database design, data assessment, access and management topics from international consultants. This training and work activity will be coordinated with activities 4.4.1 and 4.4.2 regarding the development of a national and regional information centers.

This task will include a two-week training program from an international expert in data management for energy efficiency and power sector planning, along with a computer for data management.

4.1.5 Identify optimal communication channels and information distribution mechanisms to provide access to information collected and synthesized in Activities 4.1.3 and 4.1.4. Assess possible channels for distributing information to public officials and energy professionals that include:

- decentralized information agents and forums throughout the West Bank and Gaza Strip, the new distribution utilities (e.g. SELCo, JEDCo, NELCo and GREU) and technical societies (e.g. the Engineers Associations of the West Bank and Gaza Strip)

- on-line computer data bases with Internet access

- news media (e.g. radio, newspapers, professional publications, periodic newsletters, television)

- seminars and public forums in the energy services industry

Prepare a short memorandum report describing the advantages and disadvantages of each information source. Present findings, conclusions, and defended recommendations for an optimal information distribution strategy.

This task will include assistance from a local promotion and communications consultant.

4.1.6 Develop an energy efficiency information distribution strategy that considers the above information sources as well as the needs and requirements for energy efficiency information in various sectors of the energy services industry. Prepare a schedule for information distribution. The strategy should include information developed in Outputs 1.5, 1.7, 1.8, and 2.2 through 2.6.

4.1.7 Distribute information collected, assessed, and compiled in the above activities through the optimal channels and distribution strategies identified above.

Output 4.2: Information Management and Dissemination Capabilities to Serve Energy End Users

Establishment of information management and dissemination capabilities to provide information to consumers on the benefits of energy efficiency. This program will help overcome barriers of customer awareness that are currently inhibiting consumers from adopting economic energy efficiency measures.

The Information and Promotion Work Group shall be primarily responsible for achieving this Output. The Technical Services, and Business and Finance Work Groups shall assist by providing results from the work under Objectives 1 through 3.

Activities for Output 4.2

4.2.1 Identify optimal communication channels and information distribution mechanisms for information collected and synthesized in Activities 4.1.3. Drawing upon the information from 4.1.3 develop a strategy for accessing the most promising channels for distributing information to energy consumers, including:

- decentralized information agents and forums (e.g. municipal governments, chambers of commerce, community information centers) throughout the West Bankand Gaza Strip, the new distribution utilities (e.g. SELCo, JEDCo, NELCo and GREU), and relevant technical societies (e.g. the Engineering Associations of the West Bank and Gaza Strip)
- on-line computer data bases with Internet access
- news media (e.g. radio, newspapers, professional publications, periodic newsletters, television)

- seminars and public forums in the energy services industry

Prepare a short report (memorandum) describing the advantages and disadvantages of each information source, findings and conclusions, and defended recommendations for an optimal information distribution strategy. Provide these findings and recommendations to the project personnel performing the residential consumer campaign (Activity 2.3.4), Refrigerator labeling plans (Activity 2.4.1 and 2.4.3) and fluorescent lighting leasing plans (Activities 2.6.2 and 2.6.4).

4.2.2 Develop an energy efficiency information distribution strategy that includes the findings from Output 2. Determine if additional consumer information activities are advisable beyond those identified in Activities 2.3.4-2.3.6.

4.2.3 If additional consumer information activities are warranted, undertake the most advisable activities, which may be directed to other residential technologies, or to non-residential sectors. This would be performed through in-service training and capability-building tasks that will increase PEA's ability to develop and mobilize consumer information initiatives. Implementation of any such activities beyond the project's completion would require PEA to arrange for funding resources.

Output 4.3 Evaluations of the performance and efficiency gains of the activities conducted in Objectives 1-3

This output will develop objective information on the energy savings, cost-effectiveness, and overall effectiveness of Outputs 1, 2, and 4 activities. The results will be used to guide continuing energy efficiency activities, information dissemination methods, and the administration of national power sector policy and power resource planning.

This task should be performed by a local market research firm through a sub-contract. The technical work and methodology should be guided by an international program evaluation consultant, preferably with expertise in assessing market transformation. The work will be performed under the general direction of PEA's PTD, and with assistance with project records, data compilation, and other related duties from the staff of the Information and Promotion Work Group. The international consultant and the PTD will select an appropriate organization to perform statistical analyses. This could be PEA, the market research contractor, the Information and Promotion Work Group, or a university research group.

4.3.1 Assess the effectiveness of the information management program for Outputs 1 and 2 for the individual activities for the consumer awareness campaign, efforts to increase vendors' efficiency inventories, the energy efficiency labeling method, and financial assistance mechanisms.

Electricity Authority to review their Energy Efficiency Center activities, and their experience with establishing national and regional information centers that support both energy service businesses and energy end users. Drawing upon the work in Outputs 4.1 - 4.3, assess the current availability of information in the PA at national and regional levels and identify any information gaps. Evaluate consumers' willingness and likelihood of using information provided through an energy information center, compared to other outlets, on a national and regional level. Distinguish the information needs of residential consumers, CIG facility staff, and energy service providers.

Prepare a brief report addressing the need for information centers, and if needed, recommending an overall strategy and direction for the establishment of central and regional information sources. Develop a preliminary budget for facilities, operating costs, and staff; identify potential funding sources, both in-kind and cash. The budget has provided for a one-week trip to Egypt by the PTD and the senior Information and Promotion staff member.

4.4.2 Establish a national energy information center at PEA. Identify key information sources that must be accessed from the center, using information and data developed in Outputs 4.1 and 4.2. Identify and additional information infrastructure needed for a national center, including information management software, computers, Internet access and/or web site design, copiers, printers, and material storage facilities.

The budget has provided for publications, modem and Internet communications lines, and supplies. Staff should participate in the training in database design, data assessment, access and management topics provided in Activity 4.1.6. Technical assistance in the development of information dissemination mechanisms appropriate to the Palestinian situation, both with regard to how people access information, and to the physical separation between Gaza Strip and the West Bank will be provided by a local or regional promotion and outreach consultant, possibly from one of the universities. An international data consultant will advise on the organization and administration of the information center.

Output 4.5: Power Sector Strategic Resource Planning Capabilities at PEA

Establish strategic planning capabilities at PEA for power sector planning that can readily incorporate lessons learned from the energy efficiency and distribution system improvement activities funded under this GEF initiative, as well as load management and transmission and distribution loss reduction initiatives funded under other donor programs, and any other data or information gathered that pertains to the power sector. Emphasis will but put on the need to demand side resources and distribution system improvement measures on equal terms with supply side resource options. These capabilities can be applied to long-term strategic actions to curtail greenhouse gas emissions while simultaneously helping PEA, the regional utility

companies and other energy providers to solve their energy planning problems.

The Economic and Regulatory Work Group shall be responsible for achieving this output. They shall be assisted by an international consultant specializing in integrated resource planning (IRP), and will receive training in both IRP and DSM theory, as well as application of this theory in a computer model.

Activities for Output 4.5

4.5.1 Receive training in the theory and concepts of IRP and DSM. This will be supplied by two one-week training courses on each subject, organized and taught by international consultants. If possible, each course should be given once in the West Bank and once in Gaza Strip. Participants should include approximately 10 staff from PEA's Gaza and West Bank offices, especially the project staff engineer, regulatory economist, business and finance director, information and promotion staff, and other non-project engineering staff involved in power sector planning.

4.5.2 Review the methodology currently used by PEA and that will be used by the new regional distribution utility companies to analyze resource investment options with regard to meeting consumer demands, reliability, capital investment and operating costs. Focus on such specific activities as the load forecast (inclusion of efficiency, load management, or other DSM measures; use of an end-use methodology; reflection of the impact of energy efficiency standards for buildings or equipment); explicit strategies to reduce demand or manage load growth (whether part of the resource plan or conducted separately); resource planning optimization models (ability to include end use efficiency and distribution loss improvement measures); and forms of risk analysis.

Determine if these planning methods can include energy efficiency, load management, cogeneration, and/or distribution improvements in power project planning and analysis. If so, identify the required data formats for analyzing these projects, and/or any modifications that can be made to existing planning tools. If not, identify a DSM model that will be acquired and used in Activity 4.1.3 to perform this analysis.

4.5.3 Develop data sets and an information base (as necessary) that can be used to evaluate end use efficiency and distribution loss reduction options on equal terms to supply side options. Draw on the data amassed in Activity 4.1.2 to analyze the impacts of the refrigerator labeling and financing program, the lighting leasing program, the energy audit and maintenance program for CIG users, and selected distribution system improvement projects.

4.5.4 Apply the data sets to either PEA's existing power sector resource expansion models, or,

if the resource expansion model cannot analyze these other options, to a separate demand-side management model. Identify the economics and load shape impacts of energy efficiency and distribution improvement options to PEA and regional utilities. Determine to what extent these programs economically help the regional utility companies solve their peak demand problems and benefit the global environment by reducing greenhouse gas emissions. Provide the results to the staff performing the work in Output 4.6.

The budget includes funds for two-weeks of on-site training in incorporating DSM and distribution data sets into a resource planning model. IN the event PEA's existing power planning methods cannot perform the analysis, the budget contains an allowance for purchasing a computer with sufficient speed and memory to run the model, and a specialized DSM software model. These funds (approximately $29,000) should be reallocated to other project activities if not required to perform this output.

Output 4.6 Plan for Extension of Energy Efficiency in National Energy and Power Sector Policy and Strategies

A policy framework and action plan is essential to martial the extensive learning that will be gained from this UNDP/GEF project and incorporate this into an ongoing institutional mandate for PEA and the other government and private sector organizations which participate in this project. Since the GEF project mandate to remove barriers to energy efficiency and greenhouse gas reduction must be performed with in a finite budget, follow-on actions will be required to ensure larger scale implementation and reaping the most promising benefits.

This output will be the responsibility of the Economics and Regulation Work Group, assisted in its analysis by the Technical Services and Information and Promotion Work Groups. This work will be closely guided by the PTD, its progress reviewed and its results scrutinized by the PEA General Director, and the recommendations presented to the Steering Committee, PEA Chairman, and International Donors Committee. The results should also be discussed with the Egyptian and Syrian UNDP/GEF Project Technical Directors and their respective high level or steering committees, as well as the UNDP/GEF Regional Bureau for Arab States to determine if there is a basis for unified regional action on certain initiatives.

Activities for Output 4.6

4.6.1 Drawing upon the analysis performed in Output 4.5, prepare up to five brief memo reports that provide justified arguments for a stronger role of energy efficiency within the Palestinian National Authority's national energy strategy. Examples of issues that could be addressed are cogeneration policy, tariff design, investment guidelines for choosing among competing resources, cost sharing programs where the PEA might provide incentives to the regional utility companies to implement energy efficiency programs, energy efficiency standards for new equipment and building construction, efficiency

program mandates on distribution utilities, energy consumption surcharges to pay for public-purpose efficiency programs, and government-supported technical training for CIG facility operators and maintenance personnel.

4.6.2 Apply the experience from the above activities to assess whether similar promotional and market transformation activities may be warranted for other major electrical appliances or equipment (such as water heaters, air conditioners, space heating equipment). If so, identify the type of equipment and action needed (labeling, promotion, vendor technical assistance, and/or financing mechanisms). Perform cost-benefit analysis of possible additional program activities, and recommend a course of action to the PA government, appliance vendors, and/or power companies that identifies future programs (as needed), their features, participants, and possible funding sources.

4.6.3 Attend one or two selected Egyptian and Syrian UNDP/GEF quarterly project meetings to discuss each project's findings and likely future directions, and to determine if there is a basis for unified regional action on certain initiatives. Participate in a regional forum under the auspices of the UNDP/GEF Regional Bureau for Arab States to formulate plans for regional action.

4.6.4 Prepare and adopt a more explicit Palestinian Authority action plan for energy efficiency and greenhouse gas reduction, consistent with decisions from Outputs 4.5 and 4.6. Identify which activities are limited to the PA and which should be undertaken on a regional basis.

Section E: INPUTS

1. Government of Palestine Inputs

The Palestinian Authority will assign or transfer to the project the staff listed below. Such staff will be suitably qualified and experienced. The PA will be responsible for financing the payment of salaries of in-kind administrative (given in the table below in U.S. Dollars) and allowances commensurate with current policies and future policies which may from time to time be decided by the PA. The PA is also responsible for providing the office space, including utilities, for all staff. The PA shall also be responsible for providing drivers and miscellaneous transportation expenses, as shown below. The total in-kind contributions of the PA are valued at $250,000.

Summary of In-Kind Contributions

Personnel		
Position Title	**Work Months**	**Total Personnel Costs**
Executive Assistant	36	63,000
Other Administrative Support	72	90,000
Subtotal Total	108	153,000
Facilities		70,000
Operation & Maintenance		5,000
Transportation		10,000
Reporting Costs		5,000
Misc. Expenses		7,000
Total In-Kind Contribution		**250,000**

3. UNDP/GEF Inputs

GEF will provide a total of $2,490,000 to this project. This input will be used to pay for all but $200,000 of the total $2,690,000 required for the non-in-kind support required for this project. This remaining amount of $200,000 will be provided by the local UNDP/PAPP office. The details of the use of these funds are shown below.

Note that national personnel, and national, regional, and international consultants are assigned to the following work groups:

I. E&R: Economics & Regulation
II. ATS: Auditing and Technical Services
III. B&F: Business and Finance
IV. P&O: Information and Promotion

v. DWG: Distribution Work Group

National Personnel (full time positions assigned to project)

Position Title	Work Months	Total Personnel Costs ($US)
Project Technical Director	36.0	92,500
Director, Business & Finance (B&F)	24.3	45,100
Director, Audit & Technical Services (ATS)	24.0	48,000
Audit Specialist (ATS)	48.0	84,000
Audit Assistant (ATS)	48.0	43,200
Director, Promotion & Outreach (P&O)	36.0	63,500
PEC Technical Data Specialist (P&O)	36.5	56,875
Director, Distribution (DWG)	28.0	42,000
Senior Distribution Engineer (DWG)	28.0	42,000
TOTAL NATIONAL STAFF	308.8	517,175

Consultants

Position Title	Work Months	Total Consultant Costs
International Consultants		
Project Document Preparation	2.0	41,000
International ESCO Specialist (B&F)	9.0	188,000
International Finance Specialist (B&F)	6.0	132,000
Energy Effic. Promotion Specialist-International (I&P)	3.5	71,500
International Energy Efficiency Economist (E&R)	2.0	38,000
International Resource Planner/Specialist (E&R)	3.5	78,000
International Eng. Eff. Data Specialist (P&O)	2.5	62,000
International EE Evaluation Specialist (P&O)	2.0	62,000
International Program Design (E&R)	7.5	189,000
International Distribution Consultants	2.0	55,000
Subtotal International Consultants	40.0	982,000

International - Regional Consultants		
Audit/Trainer - Regional (ATS)	8.5	54,750
Regional Outreach (I&P)	5.0	33,000
Regional Technology Specialist (ATS)	3.25	36,375
Regional Distribution Consultants (DWG)	4.0	35,000
Subtotal International - Regional Consultants	20.75	159,125
TOTAL INTERNATIONAL (INT'L + REGIONAL)	60.75	1,141,125
National Consultants		
Director Economics and Regulation (E&R)	16.0	27,600
Economist/Rate Specialist (E&R)	12.0	21,000
Regulatory Specialist (E&R)	14.0	21,000
Resource Planning Specialist (E&R)	7.0	11,950
Ministry Trade Regulatory Staff (E&R)	5.0	8,750
Ministry Industry Standards Staff (E&R)	18.5	32,375
Engineer (ATS)	13.0	19,500
Promotion & Outreach Specialist (P&O)	6.5	11,375
Domestic ESCO Specialist (B&F)	11.5	25,000
Domestic ESCO Specialist, (B&F)	9.0	20,000
Equipment Maintenance Trainer (ATS)	12.0	18,000
Engineer/Technical Analyst (ATS)	6.0	10,500
Promotion & Outreach (P&O)	13.5	22,750
Financial Specialist (B&F)	6.0	13,500
Market Analyst (B&F)	3.0	4,500
TOTAL NATIONAL CONSULTANTS	153.0	267,800
Total All Consultants	**213.75**	**1,408,925**

Travel Costs

This GEF Project will require a total of $413,300 in travel and per diem cost. Of this, a total of $301,500 is associated with the travel and per diem expenses of international consultants, as shown below. An additional $85,500 in costs will be needed for travel of regional consultants. A total of $8,500 of travel costs will be associated with national personnel. These $395,500 in direct travel and per diem expenses are included within the costs of international and regional consultants shown above and should not be added to

these figures to compute total costs for this GEF Project. Travel within the PA will require another $17,800 in expenses.

SECTION E

Position Title	Travel & Per Diem Costs
International Consultants	
Project Document Preparation	10,000
International ESCO Specialist	35,000
International Finance Specialist	30,000
Energy Effic. Promotion Specialist	16,000
International Energy Effic. Economist	8,000
International Resource Planner/Specialist	42,000
International Eng. Eff. Data Specialist	35,250
International Distribution Consultant	20,000
International EE Evaluation Specialist	28,000
International Program Design	77,250
Total International Consultants	301,500
Regional Consultants	
Audit/Trainer - Regional	25,000
Regional Promotion & Outreach	15,500
Regional Technology Specialist	25,000
Regional Distribution Consultants	20,000
Total Regional Consultants	85,500
TOTAL CONSULTANTS	387,000
Staff - Direct	
Project Technical Director	2,500
Outreach Specialist	2,000
ESCO Specialist	2,000
ESCO Specialist	2,000
TOTAL STAFF	8,500
Other Travel and Per Diem within Training and Study tours	
Local Travel Expenses	17,800
Total Travel	**413,300**

Subcontracts

The following subcontracted components will be paid for by UNDP/GEF funds:

Item	Cost
Market research-residential sector	$10,000
Development of Billing software by EDCs for CFL leasing program	$ 8,000
Promotional material creative design/develop. (Outputs 2.2, 2.5-6)	$10,000
Market research for overall program evaluation	$15,000
Statistical analysis for overall program evaluation	$ 5,000
Publicity	65,000
Publications	23,000
Total Sub-contracts	***136,000***

Training and Visits

See details in Annex 4.

Item	Type of Training		
	Group	**In Service**	**Total**
Objective 1: Energy Auditing*	0	7,334	7,334
Objective 2: Training, Study Tours, Seminars	16,000	0	16,000
Objective 3: Distribution Evaluation	0	6,000	6,000
Objective 3: Computer Simulation	0	5,000	5,000
Objective 4: IRP Training	5,000	7,500	12,000
Total	21,000	25,834	46,834

* See details below for Objective 2.

Training and Visits, Objective 2	Cost
2.1 Appliance standards & labeling/PEA & local counterparts (Egypt)	$3,000
2.3 Promotion/marketing training/PEA (Egypt)	$1,500
2.4 Promotion/marketing training/PEA local counterparts (Egypt)	$1,500
2.5 Regional conference attendance, financing EE equipment purchases	$500
Travel Expenses	$9,500

Equipment and Supplies

Annex 3 provides additional detail on the equipment expenses shown below.

Item	Cost
National Procurement	
Computers/Printers (Objectives 2 and 4)	$16,500
Vehicles	$41,800
Supplies	$8,533
Subtotal	$65,833
International Procurement	
Database, planning software (Objective 4)	$5,000
Instrumentation & Monitoring (Objective 3)	50,000
CFL Lighting Equipment (Objective 3)	0
CIG Sector EE Retrofit Material (Objective 1)[1]	25,000
Auditing Equipment[2]	40,000
Computer Distribution Simul. & Design equip. (Obj. 3)	60,000
Software (Objective 4)	25,000
Subtotal International Procurement	*205,000*
Total	270,833

As shown above, the program will incur no expenses for compact fluorescent (CFL) equipment over the course of the entire three year period. Lease payments under the program have been structured to exactly equal total program expenses, including the cost of lamps and program administration, and allowing for a 10% payment default. However, the program will bear expenses for CFL lighting in the first two years of the program during which time program costs exceed revenues. It will be the responsibility of the PTD (together with one of the International experts) to design an appropriate mechanism to channel the collected lease payments back into the project. For example, a phase III (could be a continuation of Phase II or a newly designed approach depending on results and outcomes of phases I and II) follow-up auditing program can be designed for implementation in year 3 of the project using the collected lease payments. The PTD will, in this case design the auditing program with the help of the International ESCO specialist,

[1]Equipment to be specified based on assessment of potential energy efficiency projects.

[2]Cost net of vehicle lease expenses.

the International Finance Specialist and the energy efficiency economist.

CFL Lease Program Costs by Quarter				
Year/Quarter		Quarterly Costs	Total Annual Cost	Cumulative Cost
1997	1	0		0
	2	9,600		9,600
	3	115,200		124,800
	4	148,640	273,440	273,440
1998	1	153,392		426,832
	2	125,342		552,174
	3	37,232		589,406
	4	-43,618	272,348	545,788
1999	1	-262,408		283,380
	2	-153,750		129,630
	3	-92,040		37,590
	4	-37,590	-545,788	0
Total		0	0	----

Project Review, Initiation, and Execution

Item	Cost
Project Initiation	13,333
GEF/RBAS Tripartite Review	15,000
Mid-term Evaluation	25,000
Steering Committee Meetings	1,500
UNDP/PAPP Oversight/Execution Costs	183,312
Total Project Review & Initiation	**238,145**

Furthermore, US $ 10,000 will be provided annually ($30,000 in total) for the duration of the project to cover part of the office rent needed for the project. Moreover, US $2,800 have also been budgeted for office furniture.

4. UNDP Country Programme Inputs

UNDP is contributing to the proposed GEF project. UNDP/PAPP shall also provide local support for the execution and monitoring of this project through its Jerusalem and Gaza offices. UNDP/PAPP shall contribute to this project by serving as the responsible procurement agent for all domestic, regional, and international procurement of consultants, study tours, and training. UNDP/PAPP shall also be ultimately responsible for all hiring and other employment decisions for national staff.

UNDP/PAPP is providing direct funding of $200,000 to assist in the funding of the $2,690,000 of non-in-kind contributions.

5. Other Donor and Financial Institution Inputs

One activity in the proposed GEF project will attempt to leverage the financial resources of donors, financial institutions, and other entities. The proposed GEF project will maintain a list of energy end-use efficiency and distribution upgrade projects in need of finance and will use this list as a basis for seeking finance form multilateral development banks, bilateral agencies, and private foundations. This project will also provide assistance on how to obtain loans and other assistance from these agencies.

some obstacles emerging. Equipment providers may be reluctant to offer new lines of energy efficiency products, in spite of the work under Output 2.2.

Fourth, the political tensions between Israel and the PA will make complicate the resolution of trade issues that impede energy efficient equipment purchases, as envisioned under Output 2.1. In today's difficult environment, even sensible reform proposals that benefit both the PA and Israel will have difficulties being implemented because of complications that exist on both sides.

It would be unrealistic to assume that this or any other GEF project could completely eradicate these risks. This GEF project will, however, mitigate these political risks by relying upon the following four measures.

First, the GEF project envisions the participation of organizations that have presence throughout the PA. PEA has staff and offices in both the West Bank and Gaza, as does PEC. Other potential counterparts such as Birzet University that are located in the West Bank have relations with counterparts in Gaza. The GEF project envisions contacts with municipalities and distribution companies in both the West Bank and Gaza. The regional breadth of these organizations will reduce the interference of breaks in travel within the PA.

Second, the GEF project contains two measures to reduce the impacts of organizational changes that may result from political uncertainty. First, the GEF project's primary implementing authority is the Palestinian Energy Authority (PEA), the leading energy policy organization in the country that has been and should be the government leader in the PA's energy sector. Very profound organizational changes would need to take place before the position of the PEA would be altered substantially. Second, the GEF project will rely upon the UNDP's PA office for execution of the overall GEF program. The UNDP's local office will provide organizational continuity in a politically uncertain environment. Even major change in the PEA or the PA as a whole would not affect the continued viability of the UNDP's office in the PA.

Third, the GEF project mitigates the effect of political uncertainty on the business environment by anticipating a continued slow-down in business investment. None of the outputs in the GEF project rely upon a large expansion in business investment. The business advice provided under Output 1.4 will be provided to small scale companies that exist today and that could survive without large improvements in the political risk environment. The new lines of energy efficiency products envisioned under Output 2.2 furthermore represent relatively low risk endeavors.

Fourth. Output 2.1 will endeavor to mitigate the chance that continued political tensions among the PA and Israel would interfere with trade reforms by providing for an outside, objective assessment of the issues by a third and neutral party that is not affiliated directly with the PA.

SECTION F

Other Project Risks

- programs (Output 1.3) increase the likelihood that customers will undertake energy efficiency measures by increasing customers' awareness of potential energy efficiency savings. However, there is no guarantee that awareness and audit programs alone will lead to implementation of proposed energy efficiency measures. Customers may be more interested in other types of investment that increase production or enhance quality of life rather than saving energy. Poor availability of finance may limit energy end users' ability to afford the initial costs of energy efficiency. Energy audit recommendations may be convincing to technical staff but may not make a sufficient impression on decision makers to convince them to implement energy efficiency measures. This program attempts to mitigate these risks by:

  - focusing attention in Outputs 1.1 through 1.3 on low/no cost energy efficiency measures that require little or no capital investment and that typically have very short payback periods.

  - emphasizing the need to provide audit reports and information in Output 1.3 that target decision makers with persuasive information on expected impacts of energy efficiency measures on firms' profits and/or product quality control;

  - initiating simultaneous activities to remove other barriers that may inhibit some customers from making energy efficiency investments, including financing barriers (under Outputs 1.6, 2.5, and 2.6) and equipment availability barriers (Outputs 1.7 and 2.1)

- The business advisory services, market information, and finance information provided under this GEF project (through Outputs 1.1, 1.4, 2.3., and 2.4, and through Objective 4) will only effective, if:

  - The services are properly focused and presented in a way that is meaningful to real world energy market participants. Overly academic reports and information will be ineffective.

  - There is sufficient information on the part of consumers to demand energy efficiency services. Currently energy prices are sufficiently high to motivate consumer behavior. However, in making new equipment purchases, energy consumers typically lack the life cycle perspective necessary to motivate them to buy low cost equipment. Until adoption of equipment standards, there may be a suppressed demand for energy services.

To mitigate these risks, this program will:

- provide specific funding to enlist the support and participation of private industries and consultants that will give reports and information the necessary, real world perspective.
- includes promotional and educational activities to present a persuasive case for energy efficiency investments to energy users for whom there are clear economic benefits.
- provided financial and other incentives (Outputs 2.3 and 2.4 to further motivate consumer behavior.

There is no guarantee that efforts under the proposed GEF project to encourage certain policy reforms (e.g. government procurement rules in Output 1.5, trade reform under Output 2.1, government labeling system in Output 2.4,) will be successful. As the leading energy policy organization in the PA, PEA is very well positioned to influence the adoption of these reforms. However, the decision to adopt these reforms rests with officials in the PA and Israel.

The proposed GEF project will attempt to mitigate these risks by promoting the adoption of sensible and easy to implement procurement rules that can benefit all levels of government as well as the PA economy as a whole. There should furthermore be strong motivation to adopt the labeling system and trade reforms encouraged by the proposed GEF, because these policies should make economic sense to all parties..

The costs for this GEF project are very "front-loaded". The program incurs ALL BUT $19,737 of its $2.69 million of UNDP and GEF funded expenses during the first two years. In part, the front-loaded nature of costs results from the large amount of training and equipment that is purchased during the first two years of this GEF project.

In part, this project incurs all of its costs during the third year of the project because of the cost requirements of the residential CFL lighting program (Output 2.6). While the equipment and administration cost for this output will be zero, the CFL lighting program will incur a projected liability of about $545,788 by the end of the second year of this program (See Section E). This liability should be paid completely during the third year of the program. The risk to the GEF project is that payment defaults or other problems with the lease programs could cause the GEF project to overspend budgeted funds, at least in the short term until lease payments are made in full.

The proposed GEF project has attempted to mitigate these costs by gradually phasing in the costs of the CFL leasing program and by designing a CFL leasing program that is entirely self-sufficient. This GEF project further instigates payment risks from the lease program through three risk management features:

SECTION F

- The lease program represents a win-win situation for the customers. The net total of lease payments and electricity bills is less than electricity bills would have been in nearly all periods of the year. Overall, benefits to customers exceed costs by a ratio of more than three to one.

- A 10% default rate has been factored in the lease program costs. As long as the default rate is 10% or less, the program cannot possibly incur a liability during the life of the GEF project.

- The distribution company will cover any defaults over 10% as a pre-condition to its participation in the program.

Section G: PRIOR OBLIGATIONS AND PREREQUISITES

The prior obligations of the Palestinian National Authority to the project are as follows:

- Agreement between PEA and UNDP/PAPP for project management responsibilities (execution, implementation, financial oversight)

  Agreement to jointly with UNDP/PAPP interview and select a qualified full-time Project Technical Director, most likely to be based at PEA offices in Ramallah

- Agreement to identify appropriate staff from PEA Gaza and West Bank offices to be assigned to the project, including designation of up to five currently trained staff in energy efficiency and distribution efficiency analysis to be assigned in whole or in part on an in-kind basis

- Agreement to commit the facility, staff, and transportation resources designated in the PA in-kind budget of $250,000

The project document will be signed by UNDP, and UNDP assistance to the project will be provided, only if the prior obligations stipulated above have been met to UNDP's satisfaction.

Prerequisites of the project are listed as follows:

Keeping in mind the official status of PEC (what ever that may be during project implementation) within the Palestinian Authority, arrangements have to be made to include the cadre/know-how/experience that already exists at PEC in Objectives 1 and 2 of the project as appears in Section D of the current project document.

- Selection of the one or two regional electric distribution companies to receive technical assistance with the distribution system improvement analysis, as outlined in Objective 3

- PNA policy commitment to implement the plan for efficiency produced from Output 4.6, to the extent financial resources can be found

The project document will be signed by UNDP, and UNDP assistance to the project will be provided, subject to UNDP receiving satisfaction that the prerequisite listed above have been fulfilled or are likely to be fulfilled. When anticipated fulfillment of one or more prerequisite fails to materialize, UNDP may, at its discretion, either suspend or terminate its assistance.

Section H: PROJECT REVIEW, REPORTING, AND EVALUATION

PROJECT MONITORING

Ongoing project monitoring will be provided in accordance with UNDP established procedures and will be provided on an ongoing basis by the UNDP/PAPP with support from UNDP/RBAS/GEF.

Tripartite Reviews

The project will be subject to review by representatives of the Government, the UNDP Country Office and UNDP/GEF HQs at least once every year. The first tripartite (TPR) meeting will take place within twelve months following project start-up. During these review meetings, the project performance will be measured against established work plans, expenditures will be reviewed and the overall technical performance will be discussed.

Mid-term Review

One detailed mid-term review will be held during the second year of project implementation depending on outcome and recommendation of the first tripartite meeting. The review process will be undertaken through a two week mission to Syria where the UNDP/GEF will be represented in addition to international experts in the demand and supply side field of energy (preferably the parties that were involved in project design and formulation).

During this mid-term review a thorough evaluation of the performance and the implementation of the project in accordance with identified targets of emissions reduction and project outputs. Moreover, an analysis of the degree to which the project objectives are achieved using the success criteria identified in the project document will be undertaken.

REPORTING

The Project Technical Director will prepare and submit to the UNDP/PAPP for examination three months prior to each TPR meeting, a Project Performance Evaluation Report (PPER). Additional PPERs may requested if necessary during the project. All reports will produced in the English language and will be translated to Arabic upon the request of the Palestinian National Authority.

Section J: Budget

The budgets showing Palestinian Authority Government in-kind Contribution, UNDP Co-financing inputs, UNDP/GEF inputs are shown on the following two tables.

Summary of In-Kind Contributions

Personnel:		
Executive Assistant	36 m/m	63,000
Other Admin. Support	72 m/m	90,000
Facilities:		70,000
Operation and Maintenance		5,000
Transportation		10,000
Reporting Costs		5,000
Misc. Expenses		7,000
Total In Kind		**250,000**

GEF PROJECT BUDGET

PROJECT NUMBER : PAL/97/G31/B/1G/31
PROJECT TITLE : Palestinian Authority - Energy Efficiency Improvements and Greenhouse Gas Reductions
SOURCE OF FUNDS: UNDP/GEF
EXECUTING AGENT: PEA

BUDGET LINE	LINE DESCRIPTION	PROJECT TOTAL (1998-2000) Wk Mos.	$ COST	YEAR 1 1998 Wk Mos.	$ COST	YEAR 2 1999 Wk Mos.	$ COST	YEAR 3 2000 Wk Mos.	$ COST
10	PROJECT PERSONNEL								
11	International personnel								
11.51	Project Preparation Consultants	2.0	41,000	2.0	41,000	-	0	-	0
11.52	International ESCO	9.0	188,000	0.9	18,800	6.3	131,600	1.8	37,600
11.53	International Finance Specialist	6.0	132,000	-	0	3.0	66,000	3.0	66,000
11.54	Int'l 'Prog. Design	7.5	204,750	3.0	81,900	2.5	68,513	2.0	54,338
11.55	Other International Consultants	15.5	416,250	6.1	166,350	5.9	151,688	3.6	98,213
	Subtotal Interationational Consultants	40.0	982,000	12.0	308,050	17.7	417,800	10.4	256,150
11.56	Audit Trainer/Regional	8.5	54,750	5.1	32,850	3.0	19,163	0.4	2,738
11.57	Regional Outreach	5.0	33,000	1.4	8,800	2.2	14,050	1.5	10,150
11.58	Other:Technnol. & Distrib. Consultants	7.3	71,375	3.9	39,463	3.0	28,413	0.4	3,500
	Subtotal Regional Consultants	20.8	159,125	10.4	81,113	8.1	61,625	2.3	16,388
11.99	*Total International, Regional Consultants*	*60.8*	*1,141,125*	*22.3*	*389,163*	*25.8*	*479,425*	*12.7*	*272,538*
13	Administrative Support								
13.01	Executive Assistant	<A>							
13.02	Adminstrative Support	<A>							
13.99	*Subtotal*	-	*0*	-	*0*	-	*0*		*0*
15.00	Travel								
15.01	Local Travel & Per Diem		17,800		4,617		6,092		7,092
15.99	*Subtotal*		*17,800*		*4,617*		*6,092*		*7,092*
16	Mission costs								
16.01	GEF/RBAS Tripartite Review Cost		15,000		5,000		5,000		5,000
16.02	Mid-term Evaluation		25,000		0		25,000		0
16.99	*Subtotal*		*40,000*		*5,000*		*30,000*		*5,000*
17	National Professional Staff								
17.01	Project Technical Director	36.0	92,500	12.5	32,000	10.7	27,625	12.8	32,875
17.02	Director, Promotion & Outreach	36.0	63,500	12.0	21,167	12.0	21,167	12.0	21,167
17.03	Director, Business & Finance	24.3	45,100	8.5	15,290	11.1	20,765	4.7	9,045
17.04	Audit Director	24.0	48,000	8.0	16,000	8.0	16,000	8.0	16,000
17.05	PEC Audit Specialists	48.0	84,000	16.0	28,000	16.0	28,000	16.0	28,000
17.06	Audit Assistants	48.0	43,200	16.0	14,400	16.0	14,400	16.0	14,400

GEF PROJECT BUDGET

PROJECT NUMBER : PAL/97/G31/B/1G/31
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SOURCE OF FUNDS: UNDP/GEF
EXECUTING AGENT: PEA

BUDGET LINE	LINE DESCRIPTION	PROJECT TOTAL (1998-2000)		YEAR 1 1998		YEAR 2 1999		YEAR 3 2000	
		Wk Mos.	$ COST	Wk Mos.	$ COST	Wk Mos.	$ COST	Wk Mos.	$ COST
10	**PROJECT PERSONNEL**								
17.07	PEC Technical Data Specialist	36.50	56,875	14.30	21,625	9.30	15,375	12.90	19,875
17.08	Director, Distribution Work Group	28.0	42,000	9.3	14,000	9.3	14,000	9.3	14,000
17.09	Senior Distribution Engineers	28.0	42,000	9.3	14,000	9.3	14,000	9.3	14,000
17.51	Director, Economics & Regulation	16.0	27,600	4.0	7,000	4.0	7,000	8.0	13,600
17.52	Part-time E&R Staff-Econ, Reg Spec, Res Plan	33.0	53,950	8.4	13,750	10.4	16,800	14.2	23,400
17.53	Part-time Staff: P&O: P&O Assistant	13.5	22,750	4.6	8,571	6.1	10,783	2.8	3,396
17.54	Part-time Staff, ATS - Engineer	13.00	19,500	5.70	8,550	3.70	5,550	3.60	5,400
17.55	Minis. of Industry & Trade Staff (Econ & Reg)	23.5	41,125	5.6	9,844	7.2	12,600	10.7	18,681
17.56	Other National Consultants	54.0	102,875	18.9	35,917	24.2	46,217	11.0	20,742
17.99	*Subtotal*	*461.7*	*784,975*	*153.1*	*260,113*	*157.3*	*270,282*	*151.3*	*254,580*
20.00	**SUBCONTRACTS**								
21.00	market research		25,000		6,000		4,000		15,000
22.00	EDC billing software		8,000		8,000		0		0
23.00	promotional material		7,000		5,000		2,000		0
24.00	statistical research		5,000		0		0		5,000
25.00	Publicity		65,000		43,000		20,000		2,000
26.00	Publications		23,000		12,800		9,950		250
29	**Component total**		133,000		74,800		35,950		22,250
30.00	**TRAINING**								
31.00	Fellowships		0		0		0		0
32.00	Group Training, Energy Audits, Obj 1		0		0		0		0
32.01	Training/Study Tour, Objective 2		16,000		8,000		4,800		3,200
32.02	Group Training, Distribution Object. 3		0		0		0		0
32.03	Seminars, Objective 4		5,000		5,000		0		0
32.99	*Subtotal, Group Training*		*21,000*		*13,000*		*4,800*		*3,200*
33.01	In Service Training, Audits, Object. 1		7,334		7,334		0		0
33.02	In Serv. Train,Obj 3: Distribtution Losses		6,000		5,100		900		0
33.03	In Serv. Train, Obj 3: Computer Simulation		5,000		4,250		750		0
33.03	In-service training, Objective 4		7,500		3,000		1,125		3,375
33.99	*Subtotal, In Sevices Training*		*25,834*		*19,684*		*2,775*		*3,375*
34.01	Project Initiation		13,333		13,333		0		0
34.02	Steering Committee Meetings		1,500		500		500		500
39	**TRAINING SUBTOTAL**		61,667		46,517		8,075		7,075

GEF PROJECT BUDGET

PROJECT NUMBER : PAL/97/G31/B/1G/31
PROJECT TITLE : Palestinian Authority - Energy Efficiency Improvements and Greenhouse Gas Reductions
SOURCE OF FUNDS: UNDP/GEF
EXECUTING AGENT: PEA

BUDGET LINE	LINE DESCRIPTION	PROJECT TOTAL (1998-2000) Wk Mos.	$ COST	YEAR 1 1998 Wk Mos.	$ COST	YEAR 2 1999 Wk Mos.	$ COST	YEAR 3 2000 Wk Mos.	$ COST
10	**PROJECT PERSONNEL**								
40.00	**EQUIPMENT & SUPPLIES (Details in Section E or Annex 3)**								
45	Local Procur: Supplies, Computers, Vehicles								
45.99	*Subtotal*		*68,633*		*47,800*		*20,833*		
46	International procurement								
46.99	*Subtotal*		*205,000*		*411,940*		*338,848*		*-545,788*
49	**EQUIPMENT & SUPPLIES SUBTOTAL**		273,633		459,740		359,681		-545,788
50	**MISCELLANEOUS**								
51.01	Office Rental		30,000		10,000		10,000		10,000
51.02	Operation and Maint.		<A>						
52.01	Reporting Costs		<A>						
52.02	Communications		9,200		3,705		2,815		2,680
52.99	*Subtotal*		*9,200*		*3,705*		*2,815*		*2,680*
53	Sundry		<A>						
53.99	*Sundry Subtotal*		*0*				*0*		*0*
54.01	UNDP/PAPP Project Support Service		183,312		92,241		88464		2607
59	**MISCELLANEOUS SUBTOTAL**		222,512		105,946		101,279		15,287
90.00	**PROJECT SUBTOTAL**		2,674,711		1,345,895		1,290,783		38,034
99	**Total w/ UNDP/GEF Expenses**		2,674,711		1,345,895		1,290,783		38,034
109	**UNDP Cost Contribution**		200,000						
999	**GEF Input**		2,475,000		1,245,401		1,194,405		35,194
	Net Surplus/(Shortage)		289						

<A> To be made up by in-kind contributions of the PA.

Energy Efficiency Improvements and Greenhouse Gas Reduction in the Palestinian Authority

ANNEXES

PALESTINIAN AUTHORITY
ENERGY EFFICIENCY IMPROVEMENTS AND GREENHOUSE GAS REDUCTION

TABLE OF CONTENTS

ANNEX *J*:

Greenhouse Gas Calculation

Exhibit 1:
Summary of CO2 Savings from Objective 1

Output	Impacts (000 TOE) Consumer Energy Savings	Energy Line Loss Impact	Total Energy Savings,	% Savings Relative to 1996 Consumption	CO2 Savings (000 Tons)
1	485	48	533	0.28%	1,661
2	5,333	533	5,867	3.11%	18,284
3	1000	100	1100	0.58%	3428.3333
4	8750.0812	875.00812	9625.0894	5.10%	27271.087
5	2250	225	2475	1.31%	7713.75
6	3000	300	3300	1.75%	10285
7	1111.1111	111.11111	1222.2222	0.65%	3809.2593
8	#N/A	8904.3694	8904.3694	4.72%	8904.3694
Total	21929.124	11097.282	33026.406	17.51%	81357.608

Exhibit 2:
CO2 Savings from Output 1:
Energy Market Information

Assumption: Facilitate ten new energy efficiency opportuntiy of 5 TOE per year. Savings accumulate over time.

Average Energy Use of Facility	25	TOE/year
Energy Savings/Opportunity	30%	
Annual Energy Savings/Facility	8	
Number of facilities	10	
Total Energy Savings	75	
Deterioration Factor	10%	

Year	Simple Annual Savings	Deteriorated Savings	Cumulative Annual Savings
1998	75	38	38
1999	75	42	81
2000	75	47	127
2001	75	51	179
2002	63	47	226
2003	52	43	269
2004	43	39	308
2005	36	36	344
2006	30	33	377
2007	25	30	408
2008	21	28	436
2009	17	26	461
2010	15	23	485

Total Annual Savings by 2005 =	485	
plus Energy Loss Impact	48	
Total Annual Savings by 2005 =	533	TOE
CO2 Equivalent	1,661	

Exhibit 3:
CO2 Savings from Output 2:
Energy Audits

Energy Use per Facility (TOE)	100.00
Potential Energy Savings/Facility (%)	20%
Potential Energy Savings/Facility (TOE)	20
Likelihood of Audit Generating Savings (%)	67%
Probability Weighted Savings (TOE)	13.33
Number of Audits	400
Total Energy Savings (TOE)	5,333
plus Energy Loss Impact	533
Total Energy Savings (TOE)	5,867
CO2 Equivalent	18,284

Exhibit 4:
CO2 Savings from Output 3:
Energy Efficiency Awareness Seminars

Energy Use per Facility (TOE)		60.00
Potential Recommended Energy Savings/Facility (%)		10%
Potential Energy Savings/Facility (TOE)		6
Likelihood of Adopting Measures (%)		33%
Probability Weighted Savings (TOE)		2.00
Number of Attendees:		
	Number of Seminars	25
Times:	Attendees/Seminar	20
		500
Total Energy Savings (TOE)		1,000
plus Energy Loss Impact		100
Total Energy Savings (TOE)		1,100
CO2 Equivalent		3,428

Exhibit 5:
CO2 Savings from Output 4:
Energy Efficiency Business Seminars

Assumption: Create energy savings directly, through pilots, and, indirectly by contributing towards the creation of two new energy efficiency-related businesses by the year 2005. The two firms would each have ESCO-related businesses with $1 million in annual revenue.

Pilot Energy Savings	
Energy Use/Facility (TOE)	150
Energy Savings at Facility (%)	30%
Energy Savings/Facility (TOE)	45
Number of Pilot Facilities	3
Total Pilot Energy Savings	135
CO2 Equivalent	421

Business Creation	
Annual Business Volume ($MM)	2.00
Equivlent in Energy Savings ($MM) <1>	0.67
GWH Savings	6.7
TOE Equivalent	1,667
Number of ESCOs	2
Total TOE	3,333
Contribution of Program to Creation	40%
Net Annual TOE Contribtuion	1,333
Net Annualized TOE Contribtuion	8,615
CO2 Equivalent	26,850

Total for Output

Total TOE	8,750
plus Energy Loss Impact	971
Total TOE	9,721
Total CO2 Saviings	27,271

Exhibit 6:
CO2 Savings from Output 5:
Energy Efficiency Government Procurement Policies

Government Procurement Due to New Equipment	
New Government Facilities	18,000
Increase by Existing Government Facilities	9,000
less Increase due to Increased Activity	4,500
Net Increase by Existing Facilities Subject to Procurement	4,500
Total Electricity Increase Subject to Procurement	22,500
Probability that Procurement Guidelines will Influence Energy Efficiency (%)	50%
Anticipated Energy Savings (%)	20%
Probability Weighted Anticipated Energy Efficiency Savings	2,250
plus Energy Loss Impact	225
Total Energy Efficiency Savings	2,475
CO2 Equivalent	7,714

Exhibit 7:
CO2 Savings from Output 6:
Energy Efficient Equipment Maintenance Program

Number of People Receiving Training	100
Average Number of Facilities Receiving Energy Efficiency Equipment Maintenance Services per Person Trained	10
Total Facilites Served	1,000
Energy Use per Facility Served (TOE)	30
Total Energy Use of Facilities Served (TOE)	30,000
Proportion of Energy Use Affected by Maintenance Program	50%
Net Energy Use Affected by Program	15,000
Increase in Energy Efficiency at Facilities Served	20%
Net Energy Efficiency Reduction due to Program	3,000
plus Energy Loss Impact	300
Total Energy Efficiency Savings	3,300
CO2 Equivalent	10,285

Exhibit 8:
CO2 Savings from Output 7:
Energy Efficiency Finance Development

Number of Projects Identified	100
Energy Use per Facility	100
Total Energy Use per Project	10,000
Energy Savings Identified (%)	33%
Total Potentiial Energy Savings	3,333
Probability of Receiving Financing	33%
Total Potential Energy Savings	1,111
plus Energy Loss Impact	111
Total Energy Efficiency Savings	1,222
CO2 Equivalent	3,809

Exhibit 9:
CO2 Savings from Output 8:
Power Factor Rates and Standards

Total Technical Losses (%)	25%
Total Potential Technical Losses (%)	10%
Proportion of Losses Due to Consumer Side	30%
Net Losses Due to Consumer Side	3%
% of Electricity, Indust, Comm'l, Indust.	40%
Total Electricity Demand, 2005 (GWH)	2,344
Total Electricity Losses Due to Conumer Side (GWH)	28
Total Electricity Losses Due to Consumer Side (MTOE)	7,032
Electricity Losses Affected by Outputs 1-7	2,280
Remaining Losses to be Affected	4,752
% of Remianing Losses Affected by Program	50%
Total Energy Efficiency Impact	2,376
CO2 Equivalent	7,404

ANNEX 8:

Incremental Cost Analysis

ANNEX 8

Incremental Cost Analysis

Broad Development Goals

After the signing of the Peace Accord with Israel in 1993, a major wave of reconstruction has been set into motion throughout the Palestinian territories. A part of its broad development goals, the PA is investing heavily into infrastructure and institutional establishment. Moreover, meeting power and energy demands through efficient and rational consumption and utilization of alternative energy source is also part of these goals. However, at this time, many of the actions which can be taken to improve the situation have not been undertaken due of the existence of a number of barriers of a technological, human-resource, or legal nature. It is nevertheless crucial for the sustainable development in the PA and the region to capitalize on the existing atmosphere of restructuring to implement and plan activities that promote energy conservation and energy efficiency. It is therefore an ideal time for intervention in order to influence the development of policies at an early stage. Through the relatively high level of energy pricing currently established in the West Bank and Gaza, many of the financial incentives for energy conservation have been put in place. However, experience has shown that this is a necessary, but insufficient condition needed to achieve energy efficiency improvements of the type discussed in this proposal. This is due to the absence of institutions and lack of efficiency standards, information and knowledge about energy efficiency and conservation in all sectors of Palestinian society.

Global Environmental Objective

The global environmental objective being pursued through this project is the reduction of GHG emissions through increased efficiency of power and fuel utilization in the Palestinian territories. As such, this project has been designed to correspond to GEF Operational Programme # 5: Removing Barriers to Energy Efficiency and Energy Conservation. As described in the project document, the main thrust of the activities in this project will focus on removing different barriers to the achievement of greater energy conservation (electricity and fuel) in the demand sides of the public and private sectors.

Baseline

With the political developments presently taking shape in the region, economic prospects are expected to considerably improve during the next few years. With the assistance from donors, the PA is presently building its infrastructure (including energy projects) and improving the conditions of living for over 2.5 million people in the West Bank and Gaza. As a result, the presently suppressed demand for energy and electricity consumption is expected to soar. Fuel consumption is expected to increase at a rate of 6% and electricity at over 10% annually. Such an increase, unless rationalized, will impose a heavy burden on the population and on the economy in general.

With electricity production per capita bound to rise drastically over the coming years (to meet the growing demand prompted by the current wave of reconstruction). it is vital to initiate activities that would guide and steer this growth in a direction that would secure energy conservation as a means to meeting the demand. In this way, the project will also influence this growth in a manner that would take into account global environmental issues.

Without intervention on the part of this project, uncontrollable growth in demand is likely to result, leading to a scenario where capacity expansion is the only accepted method of meeting demand. Furthermore, basic energy services would not exist, inefficiencies would dominate both public and private enterprises and the per capita consumption of fuel and power would be unacceptably high. The present high losses of the electricity system will continue and the utilization of the West Bank and Gaza as dumping grounds for inefficient machinery and apparatus will proliferate.

GEF Alternative

The activities of this project will focus upon strengthening the national institutions (PEA - primarily and PEC) who will play the important role of focusing on energy efficiency and energy conservation. Moreover, since, at present, no energy efficiency standards or codes exist, this project will initiate formulation starting with labeling of refrigerators. The project will undertake extensive training programmes and raise public awareness to energy efficiency opportunities linked to this, and other ongoing projects and the major wave of investments and restructuring that has been initiated. With national institutions now focusing on energy efficiency, many of the public information, training, and regulatory obstacles to improved energy efficiency will be met. Furthermore, the project will seek to address the shortage of skilled personnel and private-sector entities dealing offering energy services and investments in energy services. It will also establish an energy efficiency center which will serve to support the provision of energy services and at the same time encourage the establishment of private sector energy service companies (ESCOs). With the national infrastructure in support of energy services established, the emerging private sector of the PA will be in a better position to establish ESCOs taking advantage of the many profitable energy efficiency investments which exist.

Domestic and Global Benefits

The projected potential savings in heavy fuel oil are estimated to be 0.265 MTOE/year in 2010. The global benefits are measured as the reduction in emissions of greenhouse gases. The above figure is based on additional investments beyond the technical assistance outlined in this. All of the components of this project are meant to lay the foundation for this potential significant investment through barrier removal activities.

In order to respect the principal of incremental cost, that project is ensuring that all GEF funds are targeted barrier removal activities and that these funds only focus on technical assistance elements and training. Any funds to be used in follow-on investments will have to be obtained independently from non-GEF sources.

INCREMENTAL COST MATRIX

Scenario	Total costs US $	Domestic Benefits	Global Benefits
Baseline: ➢ Extensive public and private investments in power supply sector. ➢ Rehabilitating the distribution system (valued at $ 115 million). ➢ Unguided surge in consumption. ➢ Capacity expansion is only method to meet demand. ➢ Development of capacity to identify priority projects in Transmission and Distribution sector.	0.25 million (Gov. in kind) 0.2 million (UNDP/PAPP) 0.45 million	➢ Unjustified high level of capacity expansion. ➢ Electricity production per capita rises drastically ➢Large inefficiencies in all sectors of the Palestinian energy demand side ➢ Increased capacity to identify priority projects within T&D sector.	➢ A drastic and accelerating increase in the level of emissions of GHG from the PA. ➢ A reduction of GHG emissions as a result of a decrease in T&D losses.
GEF Alternative: ➢ Creation of an operational national institution which will focus on support of energy conservation and energy efficiency. ➢ Provision support to private sector entrepreneurs who wish to provide energy services or establish ESCOs. ➢ Identification of priority distribution network projects. ➢ Develop on codes and standards	2.94 million	➢ Help to meet demand efficiently ➢ Help limit capacity expansion ➢ Creation of a strong national institution that will promote energy services and other energy savings activities ➢ Increased capacity to identify priority projects within T&D sector.	➢ The potential reduction of CO2 emissions by 0.265 MT/year by the year 2010. ➢ Help limit capacity expansion.
Incremental Cost: GEF Alternative - Baseline	2.49 million	➢ Creation of a strong national institution that will promote energy services and other energy savings activities	The potential reduction of CO2 emissions by 0.265 MT/year by the year 2010 ➢ Help limit capacity expansion

ANNEX 2

Incremental Cost Analysis

Broad Development Goals

After the signing of the Peace Accord with Israel in 1993, a major wave of reconstruction has been set into motion throughout the Palestinian territories. A part of its broad development goals, the PA is investing heavily into infrastructure and institutional establishment. Moreover, meeting power and energy demands through efficient and rational consumption and utilization of alternative energy source is also part of these goals. However, at this time, many of the actions which can be taken to improve the situation have not been undertaken due of the existence of a number of barriers of a technological, human-resource, or legal nature. It is nevertheless crucial for the sustainable development in the PA and the region to capitalize on the existing atmosphere of restructuring to implement and plan activities that promote energy conservation and energy efficiency. It is therefore an ideal time for intervention in order to influence the development of policies at an early stage. Through the relatively high level of energy pricing currently established in the West Bank and Gaza, many of the financial incentives for energy conservation have been put in place. However, experience has shown that this is a necessary, but insufficient condition needed to achieve energy efficiency improvements of the type discussed in this proposal. This is due to the absence of institutions and lack of efficiency standards, information and knowledge about energy efficiency and conservation in all sectors of Palestinian society.

Global Environmental Objective

The global environmental objective being pursued through this project is the reduction of GHG emissions through increased efficiency of power and fuel utilization in the Palestinian territories. As such, this project has been designed to correspond to GEF Operational Programme # 5: Removing Barriers to Energy Efficiency and Energy Conservation. As described in the project document, the main thrust of the activities in this project will focus on removing different barriers to the achievement of greater energy conservation (electricity and fuel) in the demand sides of the public and private sectors.

Baseline

With the political developments presently taking shape in the region, economic prospects are expected to considerably improve during the next few years. With the assistance from donors, the PA is presently building its infrastructure (including energy projects) and improving the conditions of living for over 2.5 million people in the West Bank and Gaza. As a result, the presently suppressed demand for energy and electricity consumption is expected to soar. Fuel consumption is expected to increase at a rate of 6% and electricity at over 10% annually. Such an increase, unless rationalized, will impose a heavy burden on the population and on the economy in general.

With electricity production per capita bound to rise drastically over the coming years (to meet the growing demand prompted by the current wave of reconstruction), it is vital to initiate activities that would guide and steer this growth in a direction that would secure energy conservation as a means to meeting the demand. In this way, the project will also influence this growth in a manner that would take into account global environmental issues.

Without intervention on the part of this project, uncontrollable growth in demand is likely to result, leading to a scenario where capacity expansion is the only accepted method of meeting demand. Furthermore, basic energy services would not exist, inefficiencies would dominate both public and private enterprises and the per capita consumption of fuel and power would be unacceptably high. The present high losses of the electricity system will continue and the utilization of the West Bank and Gaza as dumping grounds for inefficient machinery and apparatus will proliferate.

GEF Alternative

The activities of this project will focus upon strengthening the national institutions (PEA - primarily and PEC) who will play the important role of focusing on energy efficiency and energy conservation. Moreover, since, at present, no energy efficiency standards or codes exist, this project will initiate formulation starting with labeling of refrigerators. The project will undertake extensive training programmes and raise public awareness to energy efficiency opportunities linked to this, and other ongoing projects and the major wave of investments and restructuring that has been initiated. With national institutions now focusing on energy efficiency, many of the public information, training, and regulatory obstacles to improved energy efficiency will be met. Furthermore, the project will seek to address the shortage of skilled personnel and private-sector entities dealing offering energy services and investments in energy services. It will also establish an energy efficiency center which will serve to support the provision of energy services and at the same time encourage the establishment of private sector energy service companies (ESCOs). With the national infrastructure in support of energy services established, the emerging private sector of the PA will be in a better position to establish ESCOs taking advantage of the many profitable energy efficiency investments which exist.

Domestic and Global Benefits

The projected potential savings in heavy fuel oil are estimated to be 0.265 MTOE/year in 2010. The global benefits are measured as the reduction in emissions of greenhouse gases. The above figure is based on additional investments beyond the technical assistance outlined in this. All of the components of this project are meant to lay the foundation for this potential significant investment through barrier removal activities.

In order to respect the principal of incremental cost, that project is ensuring that all GEF funds are targeted barrier removal activities and that these funds only focus on technical assistance elements and training. Any funds to be used in follow-on investments will have to be obtained independently from non-GEF sources.

This project is not intended to finance investments in energy efficiency equipment, but to remove barriers that will, among others, enable follow-up investments to take place. Cost recovery on barrier removal is, however, impossible and therefore GEF involvement is needed. Once the barriers are removed, potential and anticipated follow on investments in "win-win" projects could trigger the curtailing of as much as 0.265 $MTCO_2$/year. Domestic benefits associated with the project will be the creation of a strong national institution that will act as an incubator for energy services companies and other investments in energy efficiency.

Total Project Costs

The costs of this project are estimated to be $2.94 million, of which $2.49 million is being requested from GEF. As part of the baseline, $0.20 million will be obtained as co-financing by the UNDP, while the remaining $0.25 million represents the contribution (in kind) of the Palestinian Authority.

INCREMENTAL COST MATRIX

Scenario	Total costs US $	Domestic Benefits	Global Benefits
Baseline: ➢ Extensive public and private investments in power supply sector. ➢ Rehabilitating the distribution system (valued at $ 115 million). ➢ Unguided surge in consumption. ➢ Capacity expansion is only method to meet demand. ➢ Development of capacity to identify priority projects in Transmission and Distribution sector.	0.25 million (Gov. in kind) 0.2 million (UNDP/PAPP) 0.45 million	➢ Unjustified high level of capacity expansion. ➢ Electricity production per capita rises drastically ➢Large inefficiencies in all sectors of the Palestinian energy demand side ➢ Increased capacity to identify priority projects within T&D sector.	➢ A drastic and accelerating increase in the level of emissions of GHG from the PA. ➢ A reduction of GHG emissions as a result of a decrease in T&D losses.
GEF Alternative: ➢ Creation of an operational national institution which will focus on support of energy conservation and energy efficiency. ➢ Provision support to private sector entrepreneurs who wish to provide energy services or establish ESCOs. ➢ Identification of priority distribution network projects. ➢ Develop on codes and standards	2.94 million	➢ Help to meet demand efficiently ➢ Help limit capacity expansion ➢ Creation of a strong national institution that will promote energy services and other energy savings activities ➢ Increased capacity to identify priority projects within T&D sector.	➢ The potential reduction of CO2 emissions by 0.265 MT/year by the year 2010. ➢ Help limit capacity expansion.
Incremental Cost: GEF Alternative - Baseline	2.49 million	➢ Creation of a strong national institution that will promote energy services and other energy savings activities	➢ The potential reduction of CO2 emissions by 0.265 MT/year by the year 2010 ➢ Help limit capacity expansion