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THE PALESTINIAN TERRITORIES

Project PAL/97/G31

Energy Efficiency Improvements & Greenhouse Gas Reductions (GHG)

Project Final Evaluation Report

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ANNEX

1. Acronyms

APR	Annual Project Review
ATSWG	Auditing and Technical Services Working Group
B&FWG	Business and Finance Working Group
CRES	Centre for Renewable Energy Sources
CFL	Compact Fluorescent Lamps
DWG	Distribution Working Group
E&RWG	Economics and Regulations Working Group
EE	Energy Efficiency
EIC	Energy Information Centre
EIGR	Energy Efficiency Improvement and Greenhouse Gas Reduction Project
ESCO	Energy Service Consultant
GEDCo	Gaza Electricity Distribution Company
GEF	Global Environment Facility
GHG	Greenhouse Gas
HEM	High Efficiency Motor
IEC	Israeli Electricity Corporation
IBRD	International Bank for Reconstruction and Development
JDECO	Jerusalem District Electricity Company
LSP	Letter of Sector Policy
MOU	Memorandum of Understanding
MTER	Mid Term Evaluation Report
NGO	Non-Governmental Organization
P&OWG	Promotion and Outreach Working Group
PEA	The Palestinian Energy Authority
PEC	Palestinian Energy Centre
PEnA	Palestinian Environment Authority
PERC	Palestinian Energy Regulatory Commission
PNA or PA	The Palestinian National Authority
ProDoc	Project Document PAL/97/G31
PTD	Project Technical Director
ToR	Terms of Reference

2. Executive summary

2.1. Brief description of project

The Energy Efficiency Improvements and Greenhouse Gas Reduction project (PAL/97/G31) was part of a regional initiative for energy efficiency joining Egypt and the Palestinian Authority (PA). The project aimed at assisting in the long-term growth in Greenhouse Gas (GHG) emissions from electric power generation and from the consumption of non-renewable fuel resources.

Funded by the Global Environment Facility (GEF) the project was executed by the United Nations Development Programme / Programme of Assistance to the Palestinian People (UNDP/PAPP) and implemented by the Palestinian Energy Authority (PEA), under the framework of a *Memorandum of Understanding*. The original project design was a three year period endeavor, but later extended by a few months duration. It entered in operation in April 1999, completing its activities in December 2003.

The total project budget was US$2,925,000, with a US$2,475,000 contribution from the Global Environment Facility (GEF), US$200,000 contributed by UNDP/PAPP, and US$250,000 contributed in- kind by the Palestinian Authority.

The project fell under the institutional framework provided by the *Letter of Power Sector Policy and Associated Action Plan* (LPSP), and was consistent with and instrumental to the energy sector strategy outlined by the PA in the *Letter of Power Sector Policy and Associated Action Plan*.

2.2. Context and purpose of the evaluation

A final evaluation is mandatory for all full size projects supported by the GEF. In this respect, the present evaluation is in accordance with UNDP/GEF policies and procedures. The project under examination concluded its operation in December 2003. Accordingly, the main stakeholders (GEF, UNDP/PAPP, PEA) have agreed to field a final evaluation.

The purpose of this final evaluation is to review the performance and implementation of the project, in the light of its declared global environment objectives and the improvements targets and to asses the efficiency and cost effectiveness of how the project moved towards its objectives and outcomes. Assess the relevance, the performance and the success of the project, providing a summarized overview of the conceptual design, implementation, results, achievements, impact, sustainability, co-

financing, and key lessons learned that may serve for future GEF and UNDP/PAPP funded activities.

2.3. Main conclusions, recommendations and lessons learned

Conclusions:

- The concept of the project under examination was consistent with GEF Operational Program No.5 "*Removal of Barriers to Energy Efficiency and Energy Conservation*". It was also consistent with the medium term strategy for the energy sector outlined by the Palestinian Authority in the *Letter of Sector Policy for the Power Sector* (LSP) and the *Associated Action Plan* (LPSP).
- The project was considered highly relevant to the Palestinian Energy Authority and in line with the priorities established by the Palestinian Authority for the improvement of energy efficiency in the sector.
- The implementation approach was sound, providing the necessary and appropriate institutional arrangements to maximize project impact and success. The project was inserted in the Palestinian Energy Authority and was considered by the Government a fundamental instrument in the development and success of the energy strategy.
- The project document was well formulated and well documented, providing background information to justify the support and assistance of GEF and UNDP/PAPP.
- The project had a sound management, showing great ability to adapt and apply flexibility to overcome obstacles, amidst the extremely difficult security situation and the changing priorities for PA during the *Intifada.* The project achieved success and measurable results in most activities.
- The commitment shown by the Palestinian Energy Authority was strong and genuine. So was the commitment and willingness of the project management and senior staff and of the different stakeholders involved in project activities.
- The project successfully created a series of conditions that should ensure and promote continuity of activities and sustainability beyond the project's end. Sustainability is currently happening, basically given by the ability and the willingness of the host institutions, both private and public, to continue to function effectively or continue to implement energy efficiency activities after the cessation of the UNDP/PAPP/GEF support.
- The final conclusion of the evaluation is that UNDP/PAPP and GEF did well in providing support and assistance to the PA to implement this project. The

results have been satisfactory and there is a good perspective that the results will be sustainable.

Recommendations:

- The recommendations included under number 6 of this report, deal basically with actions to follow up or to reinforce the initial benefits resulted from project implementation. Worthwhile mentioning are the need to provide continuing support to the PEA in its endeavor to maintain and operate the Energy Information Center and the institutional building support needed to establish the Palestinian Energy Regulation Commission. Both initiatives will contribute decisively to enhance the sustainability of some of the results achieved by the project.

Lessons learned:

- Probably the most significant lesson is that stakeholders participation in the formulation stage of a project is crucial. Formulating well a project is not enough, it needs to promote involvement of national stakeholders. In this fashion it will promote ownership and commitment, making possible that the project document takes into consideration different background aspects, such as opportunities, risks and experiences, therefore ensuring relevance.
- In terms of project performance, an important lesson drawn from project implementation is that monitoring and evaluation is essential. The Mid-Term evaluation was critical in putting forward a set of recommendations, that once implemented, had a positive impact in project performance and outputs, and were for the benefit of the project.
- In terms of project success, one important lesson is that opening of new business opportunities and demonstrating the economical benefits of energy efficiency to the private sector through the successful implementation of project activities, contributes significantly to enhance sustainability. Achieving market changes ensures sustainability.

3. Introduction

3.1. Purpose of the evaluation

The Monitoring and Evaluation (M&E) policy at the project level has in UNDP/GEF four objectives: a) to monitor and evaluate results and impacts of GEF activities; b) to provide a basis for decision-making on amendments and improvements of policies, strategies, programme management, procedures, and projects; c) to promote

accountability for resource use against objectives; and, d) to document, provide feedback on, and disseminate results and lessons learned.

In accordance with UNDP/GEF M&E policies and procedures, all regular and medium-sized projects supported by the GEF should undergo a final evaluation upon completion of implementation. This final evaluation is based on this directive.

The overall objective of this final evaluation is to review the performance and the implementation of the Energy Efficiency Improvements and Greenhouse Gas Reduction project PAL/97/G31, to asses the extent to which the global environment objectives and the improvements targets, as described in the project document, have been achieved and, to analyse the efficiency and cost effectiveness of how the project has moved towards its objectives and outcomes.

The final evaluation is expected to present, in a comprehensive manner, the main findings and key lessons learned, including example of good practices for future projects in the country, the region and world wide.

3.2. Key issues addressed

In accordance with the overall objective, the consultant has been asked to address the following key issues during the final evaluation:

- Assess the effectiveness with which the project addressed the root causes and barriers to energy efficiency identified in the project document;
- Assess the extent to which the planned objectives and outputs were achieved;
- Analyse whether the project's logical framework and indicators have been effectively used as a management and M&E tool;
- Describe the Project adaptive management processes- how did project activities change in response to new conditions encountered during implementation, and were the changes appropriate?
- Review the extent to which the findings and recommendations of annual reviews as well as the Mid-Term evaluation have been taken into consideration;
- Review the clarity of roles and responsibilities of the various institutional arrangements for the project implementation and the level of coordination between the relevant stakeholders;
- Assess the level of public involvement and whether public involvement was appropriate to the goals of the project;
- Review and evaluate the extent to which the project's impacts have reached the targeted beneficiaries;

- Asses the likelihood of continuation and sustainability of project's outcomes and benefits after GEF assistance/external assistance;
- Describe key factors that will require attention to improve prospects for sustainability and the potential for replication and make recommendations for improving the effective continuation and sustainability of the project;
- Describe the main lessons and experiences coming out of the project and differentiate between those lessons learned applicable only to this project, and lessons that may be replicated in the design and implementation of others projects;
- Assess the achievement of the global environmental and developmental objectives as well as the projects outputs in relation to the inputs, costs and implementing time;
- Examines the project's compliance with the application of the incremental cost concept;
- Review the implementation of monitoring and evaluations plans.

3.3. Methodology of the evaluation

The evaluation process was carried out through a period of thirty days, including a seven days mission to the Palestinian Territories where the Palestinian Energy Authority and UNDP/GEF was represented, in addition to the consultant. The consultant coordinated and worked with the PEA and UNDP/PAPP, and other stakeholders as required. The consultant was based in Jerusalem and carried out visits, as needed, to various locations in the Palestinian Territories .

The methodology applied to this evaluation included information acquisition and evaluation in order to formulate an opinion, conclusions an recommendations.

Project information. The information was mainly obtained from UNDP/PAPP and the Executing Entity, and from reports and documents produced during the Project. Progress Reports, Work Plans and Energy Audits reports were particularly important.

Interviews. Interviews to institutions and to other Project participating companies and organizations are another source of information. The purpose was finding aspects that would permit evaluating project performance regarding results, institutional strengthening, capacity building, and the lessons learned. During the visit to the Palestinian Territories, several interviews were done to stakeholders in Jerusalem and Ramallah. Unfortunately, due to security concerns it was not possible to perform visits or interviews to other places in the Palestinian Territories.

Information evaluation. The documentation was reviewed and evaluated in accordance with success indicators formulated in the Project. Quantitative/qualitative indicators and their evolution during the project execution term were taken into account.

Upon review of the project documentation, the consultant prepared an inception report, after which a seven day visit to the Palestinian Territories, with a meetings and interview agenda, intended to receive oral information and relevant documents for the evaluation. After the visit, the consultant analyzed the information obtained and prepared the draft report, for revision by the Palestinian Energy Authority and UNDP/PAPP.

The Inception Report outlined the work plan and the key issues to be addressed during the mission in the Palestinian Territories.

The Draft Final Evaluation Report includes a) findings, conclusions and recommendations; b) lessons learned and best practices for future projects in the country, region and GEF and c) differences or disagreements between the findings of the evaluation team, the PEA or UNDP/PAPP

4. The project and its development context

4.1. Project start and its duration

The project was part of a Regional energy efficiency initiative, providing assistance to the Palestinian Authority in reducing the long term growth in Greenhouse Gas emissions (GHG) from electric power generation and from consumption of non-renewable fuel fossil resources.

The total project budget was US$2,925,000, with a financing from GEF of US$2,475,000, from UNDP/PAPP of US$200,000 and US$250,000 contributed in-kind by the Palestinian Authority.

The project was scheduled to enter in operation in January 1999, designed to develop within a three year period. Due to delays in the initial stage, the project entered in operation in April 1999. Originally expected to end operation in April 2002, after recommendations put forward during the Mid Term Evaluation, the project was extended until December 2003, when the project activities were finally completed.

4.2. Problems that the project seek to address

Recognizing the growing dependency on imported power and fossil fuel and the low level of energy efficiency in PA, and acknowledging the need to address this issue in

order to ensure that PA can meet the growing demand of power and energy that economic development requires, the UNDP/PAPP and the Palestinian Authority agreed to implement a project aimed at assisting the PA in dealing with the problem of energy efficiency, while at the same time building awareness and institutional capacity to confront the issue effectively.

It was understood, that the low level of energy efficiency was a result of the relatively low priority given to energy efficiency and to several important barriers to greater efficiency. It was also understood, that there was ample scope and potential to improve energy efficiency in PA.

Project PAL/97/G31 was given the task of removing such barriers and introducing energy efficiency in PA, thereby contributing to reduce GHG emission and mitigating dependency from imported power and fossil fuel.

In a thorough and extensive manner, the ProDoc analyses the situation a the time of project formulation, clearly identifying barriers of different nature, that hamper the possibility of successfully introducing energy efficiency measures and that the project must attempt to remove. Without entering into details, the barriers are:

- *Low Priority of Energy End Use Efficiency;*
- *Limited Information;*
- *Awareness*;
- *Business Barriers;*
- *Consumer Cost Perspective Barriers;*
- *Equipment Availability Barriers;*
- *Financial Barriers;*
- *Power Factor Incentive Barriers;*
- *Distribution System Technical Project Evaluation Barriers;*
- *Demand-Side Power Resource Planning Barrier.*

Simultaneous to the barrier removal, the project was to address the institutional weakness and the need for capacity building.

Finally, through its activity the project would address market deficiencies by creating new business opportunities for energy consulting firms, contractors and suppliers of energy efficiency equipments.

4.3. Development and Immediate objectives of the project

The Project's development objective was to address energy efficiency within the energy sector in PA, thereby assisting in the long term reduction of Greenhouse Gas emissions from electricity generation and consumption of non-renewable fossil resources, by removing a set of identified barriers to implementing such energy efficiency practices in the PA.

The ProDoc provides sufficient information and data to understand the base line situation in PA, its context and baseline.

To achieve the overall objective, the Project was designed to pursue the following four immediate objectives:

Objective 1: Improve energy efficiency in the Industrial/Commercial/Government Sector;

Objective 2: Improve energy efficiency in the Residential Sector, by improving efficiency in refrigeration and lightning;

Objective 3: Reduction in distribution losses, by identifying a portfolio of projects in Electricity Distribution Efficiency;

Objective 4: Creation of an Energy Efficiency Center, to promote energy efficiency within the public and private sectors.

The ProDoc defined an overall strategy and selected the most promising specific strategy to address each of the immediate objectives and the corresponding barriers.

4.4. Main stakeholders

The main stakeholders envisaged to take part in project execution are the UNDP Programme of Assistance to the Palestinian People (UNDP/PAPP) and the Palestinian Energy Authority (PEA)[1].

a) The UNDP/PAPP was responsible for the execution of the project, on behalf of the United Nations and the GEF. Under this arrangement, UNDP/PAPP was 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

[1] Project Document, Section A, page 8

PTD regarding procurement of supplies and sub-contract services.

b) Palestinian Energy Authority (PEA) was the primary national implementing and counterpart agency, responsible for the successful performance of the project, having a lead role in most of the technical work groups, specifically recommended for the project.

The PEA was established in November 1994, as an independent institution with its own budget under the direct instruction of the President of the Palestinian National Authority. Under the *Letter of Sector Policy for the Power Sector (LSP),* signed July 6, 1997, the Palestinian National Authority assigned the PEA the responsibility for overall coordination of the power sector development and the associated policy formulation and administration. While originally the PEA was granted concessions for generation, transmission, distribution and development of the electric sector, following a sector reform, the PEA has focused its mandate primary along policy lines, relinquishing many of its responsibilities in generation, transmission, and distribution, which have been passed on to private and public sector entities. At the time of project implementation, PEA was the country's primary energy policy institution and as the signatory to major international contracts with private generators and multilateral donor agencies.

Furthermore, PEA has directed and produced several studies of the energy sector, including a study of the rehabilitation and development of the distribution network, generation planning and interconnection. PEA is also engaged in setting up a specification and standards system for the energy sector.

In addition to UNDP/PAPP and PEA, the following institutions play a key role in providing support and assistance in project implementation:

c) Palestinian Energy and Environmental Research Center (PEC)

The Palestinian Energy and Environmental Research Center 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, such as energy audits and surveys. PEC is linked with universities and other national partners, with the European Economic Community (its primary funding agent) and other international partners. Through its activities in energy efficiency and related fields, PEC has acquired a wealth of experience from which the project draws when in need of technical know-how, entrepreneurial capabilities, and experience in mobilizing public, seminars and community meetings.

d) Electricity Distribution Companies

This GEF project also relied upon contributions and cooperation from four

distribution companies that had worked with PEA and the World Bank to rehabilitate and improve the distribution network. The ProDoc mentions the following companies:

- Jerusalem District Electricity Company (JDECo), which supplies electricity to East Jerusalem and to the surrounding areas. World Bank assisted.
- Southern Electric Company (SELCo), which serves Hebron and the southern area of the West Bank. With assistance of the World Bank through JDECo
- Gaza Region Electricity Utility (GREU), which will serve the Gaza area.

f) Other Counterparts

Other counterparts that are mentioned in the ProDoc and that provided expertise and cooperation for project activities 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.
- Regulatory Staff of the Ministry of Trade
- Standards Staff of the Ministry of Industry.
- Ministry of Planning & International Cooperation
- Palestinian Environmental Authority (PEnA)
- World Bank/Palestinian Mission Energy Sector Advisor.

Stakeholders participation as envisaged in the ProDoc, seems appropriate, involving the main institutions acting in the energy sector in the Palestinian Territories.

4.5. Results expected

The project is expected to make a decisive contribution to reduce energy consumption by a total of 14%, by the year 2010, compared to the levels of consumption at the time of project formulation.

This main development objective would be achieved by attempting to remove a series of identified barriers to implementing energy efficiency practices in the PA, while simultaneously achieving energy efficiency improvements and greenhouse gas reductions through the development of energy efficiency activities.

a) Removing the Barriers

At the end of its lifespan, the project should have accomplished the removal of the following barriers through specific strategies:

- 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.

b) Achieving Energy Efficiency and GHG Reductions

In order to accomplish the removal of the above barriers and at the same time introduce capabilities for responsive action, the GEF project was designed to implement four main components or immediate objectives geared to obtain the following long term results:

- Objective 1: Improvement in the industrial, commercial, and government sector energy efficiency by 17% by the year 2010 and 10% by the year 2005, relative to 1996 energy consumption levels. This result will contribute to eliminating nearly 80,000 tons of CO_2 emissions per year.
- Objective 2: Improvement in the residential sector energy efficiency by 11%, by the year 2010, through the introduction of efficiency measures in the use of refrigeration and lighting equipment. This result will contribute to eliminating more than 140,000 tons of CO_2 emissions per year.
- Objective 3: Facilitate a 2% reduction in electricity distribution line losses by means of identifying and evaluating potential priority projects for multilateral development bank or other third party funding. This result will contribute to reduce nearly 45,000 tons of CO_2 emissions per year.
- Objective 4: Creation of a Energy Efficiency Center, aimed at promoting customer awareness and strategic actions by public and private sector energy market participants.

c) Creating Capacity

As a result of the implementation of the project activities, it was envisaged that the project would create new capacities including:

- 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 Commercial, Industrial and Government power users.
- planning capabilities within PEA to consider DSM and distribution investments in resource plans.

4.6. Project beneficiaries

The ProDoc indicates as project beneficiaries the following:

- 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 centre 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 that may result indirectly from 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
- Palestinian Energy Authority staff and organization that will receive training and capacity building under the GEF project.

5. Findings and Conclusions

5.1. Project formulation

Summary of main findings and conclusions:

- The implementation approach is sound and satisfactory. Locating the project in the Palestinian Energy Authority and providing it with the necessary institutional arrangements and access to policy making level.
- The project document is well formulated and in accordance with GEF requirements. The ProDoc clearly identifies the barriers and the instruments to remove them, as well as the success criteria to evaluate the results. Notwithstanding this fact, a preliminary study to accurately determine some aspects of the baseline situation would have helped to understand and focus better the activities to the Palestinian reality.
- Due consideration was given to the incorporation of other experiences in the field, particularly in view of the fact that the project is part of a regional effort.

- Country ownership and driveness was ensured during the preparatory stage through appropriate active consultations with different stakeholders, which helped to properly define project requirements and implementation modality.
- The project was designed to be part and complementary to other donor funded activities in the energy sector.
- UNDP/PAPP have proven experience of in supporting development project in the Palestinian Territories, with access to regional and international expertise, therefore, have a solid comparative advantage in this respect.

5.1.1. Implementation approach

The Project is consistent with GEF Operational Program No.5 "*Removal of Barriers to Energy Efficiency and Energy Conservation*". It is also consistent with the medium term strategy for the energy sector outlined in the *Letter of Sector Policy for the Power Sector* (LSP) that gave existence to the PEA and in the *Associated Action Plan* (LPSP). This arrangement would provide the policy and institutional framework for the project to operate.

Located in the Palestinian Energy Authority (PEA) office in Ramallah, it was envisaged that part of the project technical staff would probably be located at organizations and institutions in the West Bank, in view of the limited mobility of individuals between the two regions of the PA and the need to give support to some activities to be developed there.

The PEA is the main policy making body for the sector and is responsible for energy sector coordination, policy formulation and system development, particularly in the areas of rural electrification, regional interconnection, energy conservation, and research.

Furthermore, efficiency improvement is among the priorities established by the PA for the energy sector in the *Letter of Sector Policy for the Power Sector* (LSP). PEA coordinates energy efficiency and conservation responsibilities with, among other institutions, the Palestine Energy Centre (PEC), an independent agency focused on research and public education, and with other NGO institutions working in this field.

This was a sound institutional arrangement that provided the project direct access to a policy making level in its field of action, enabling the project to influence energy policy making in PA. It was therefore a *fundamental instrument* in the development and success of the energy strategy outlined by the PA.

Accordingly, the initiative to formulate and execute the project was highly relevant in view of the strong need for technical assistance and support to put in place effective energy efficiency measures as part of the general sector strategy outlined by PA.

The institutional framework under which the project was made operational was the *Memorandum of Understanding* between the PEA and the UNDP, signed on the 15th October 1998. This document specifies the modality of execution, type and amount of the assistance, institutional responsibilities and management and supervision arrangements.

The *Memorandum of Understanding* provides the legal support under which all sub-contracts for project staffing, consulting services, equipment and others, are signed. This is a normal UNDP procedure for this type of projects.

In view of the evaluator, the project implementation approach is, in principle, sound, appropriate and **satisfactory**. The institutional arrangements for project implementation and operation are well thought, with a view to maximize project impact and success.

5.1.2. Analysis of Logical Framework (Project logic/strategy; Indicators)

The overall project strategy was to undertake an initial set of activities that would target the greatest opportunities for improving electrical energy efficiency, reducing the growth of demand for electrical power and as a result, slow down the rate of greenhouse gas production from the power sector and certain direct use of fossil-based energy.

The strategy would entail removing *barriers* to achieving this efficiency, using channels that could sustain themselves beyond the project completion, and create an institutional framework to advocate continuing attention to efficiency opportunities through government policy, power sector planning, trade regulations, and exposing the financial self-interest of efficiency actions by electricity consumers, energy services and equipment businesses.

The *barriers*[2], were well identified in the ProDoc as well as the *immediate objectives*[3] to solve them. A specific *strategy* was outlined to address the removal of each of the *barriers* and the attainment of the *Immediate Objectives*. The ProDoc also indicated the *success criteria* to be applied to each of expected

[2] Project Document, Section B.
[3] Project Document, Section D.

outputs for each of the objectives. Finally, the ProDoc detailed the necessary *activities*[4] that should be carried out to achieve such outputs.

While the ProDoc apparently did not include a *Logical Framework (LF)*, there is a sound logical development of each of the project components, activities, outputs and corresponding success criteria. It is possible to grasp and understand the reasoning and the sequential logic behind each of the project components.

Notwithstanding the absence of a logical framework in the ProDoc, the *Mid-Term Evaluation* document provided a complete logical framework that was prepared by the mid-term evaluator. This LF included, in a organized manner, the *indicators* and their source of verification. It also included a set of *risks* that may affect the achievement of results.

While the ProDoc assigns the necessary inputs to carry out the activities, some problems arose during implementation when trying to employ engineers to fill the posts, mainly due to the level of salaries, that were perceived as too low by the candidates.

The ProDoc also included a special chapter to analyze the risk factors[5].

While the project under examination is well formulated, representing an ambitious and much needed undertaking for the PA, in view of the evaluator the deteriorating security situation that affected the Palestinian Territories during the time of project execution, made its implementation and operation complex and difficult.

The project design called for a fine tuned coordination among the different stakeholders, which became increasingly complicated as the political and social situation worsened and communications and internal displacement became more difficult.

This situation imposed an additional burden on the project management to minimize the substantial risks involved in operating in such an environment.

In spite of the above, the ProDoc fulfilled GEF requirements and denoted care and dedication from the part of the project formulators, to prepare a well framed document. Thus, giving the first step on the road to project success. However, in view of the evaluator, some risks factors and assumptions may have been underestimated, despite the fact that most of them were identified in the Section F of the ProDoc.

[4] Project Document, Section D.
[5] Project Document, Section F.

More attention could have been paid to economic and social risks. To illustrate this remark, it is worthwhile mentioning the market risks due to a depressed economic and social situation. This became apparent in the implementation of Objective 2, activity 2.5 "Develop a financing system for refrigerators" and its planned extension throughout the West Bank and Gaza.

Also de general security situation posed a substantial risk to project results. Unfortunately, from 2000 onwards the security situation deteriorated beyond expectations in the Palestinian territories.

Project management had to dedicate strenuous efforts to mitigate these risks.

It is important to note that apparently much of the project frame was derived from the Egypt project. Some of the difficulties that arose during project implementation, could have been avoided by better focusing the project.

In this respect, ESCO participation for example, while important and viable in Egypt, is not applicable to the Palestinian Territories, mainly due to the size of the companies, the relatively small energy consumption and the general economic and social situation. Following the recommendations of the international consultant hired for this particular purpose, this activity was abandoned due to the impossibility to apply it in the Palestinian Territories.

5.1.3. Lessons from other relevant projects (e.g., same focal area) incorporated into project implementation

The ProDoc specifically considers and gives great importance to prior and ongoing assistance being provided by various Donors in the same focal area of the project.[6] The ProDoc declares that the project is designed to take advantage and learn, not only from other activities implemented locally, but from experiences along the region. In fact, the project is part of a regional effort to curve GHG emissions through energy efficiency, involving Egypt and the Palestinian Territories.

Locally, special attention is given to the assistance being provided by the World Bank in rehabilitation of the electricity network and institutional strengthening.

The ProDoc is well documented in this respect, taking into consideration and promoting the incorporation of lessons learned in similar activities. The project structural design is such, that through the participation of the main stakeholders, the project should be able to absorb and make best use of experiences and

[6] Project Document, Section A, page 5

capacities already present elsewhere.

5.1.4. Country ownership/Driveness

This project emerged from a PA need and as a direct response to a PEA request for support. The project is coherent with the sector policy strategy and the development priorities outlined by the PA. In fact, the project is viewed by the PA and the PEA as a crucial instrument in their strive to achieve improved efficiency within the energy sector. The project activities are in line with the main focus of the sector action plan, geared to achieving energy efficiency and institutional preparedness to confront present and future development demands.

Direct active involvement of national stakeholders in Project implementation is included in the project document.

While the main role of UNDP/PAPP is to provide support and assistance to project execution, the Palestinian Authority, through the PEA and the different stakeholders, assume direct responsibility for the implementation and successful performance of the project.

5.1.5. Stakeholder participation

Stakeholders participation throughout the project cycle is essential, among others, to ensure a sense of ownership and commitment and to ensure that lessons and experiences are taken into consideration early on at the formulation stage of the project.

The main stakeholders were deeply involved during the formulation stage, through a joint PEA – UNDP team. The team helped set up the guidelines for the implementation process, in addition to the definition of project requirements. Other stakeholders were consulted in the preparatory stages (Ministry of Trade, Universities, and Chamber of Industry).

The ProDoc clearly identifies the main stakeholders taking part in project implementation, defining their specific fields of activity and their expected contributions to the project[7].

Stakeholders participation is engineered into the structural architecture of the project. In fact, many of the responsibilities to carry out specific project activities

[7] Project Document, Section A, page 8

are assigned to the main stakeholders. Moreover, the ProDoc envisages that in some cases, professional staff from participating counterparts and stakeholders, will have an active role to play through a part-time dedication to the project, while under contract with the specific local agency or institution.

A project of the size and complexity as the one under examination, is not viable without a firm commitment and active participation of the country host institutions and main stakeholders. The ProDoc gives due consideration to this fact.

The evaluator believes the stakeholders participation as envisaged in the ProDoc to be **satisfactory**. A sound partnership strategy is considered an important step on the road to project *ownership* and *sustainability*.

5.1.6. Replication approach

The project strategy relies heavily in the ability of the project to demonstrate the usefulness and good economic sense of improved energy efficiency, thus, triggering replication effects, assuming that the examples will be replicated. The project by itself cannot achieve the long term objective, it will initiate a series of changes designed to build local capacities, create new instruments and establish models for wider application within the energy sector in PA. An example of this is the implementation of demonstration projects.

Replication within the energy sector will be achieved, among others, by sharing information among the stakeholders and users in general, through the establishment of ad-hoc communication channels.

In general, the project has considered a sound replication approach.

5.1.7. Cost-effectiveness

From GEF point of view, in the long run project activity will accomplish a significant reduction in CO2 emissions through the introduction energy efficiency actions and barrier removal. The target figure was set at some 200MM tons by the year 2005. The project represents a cost effective way to accomplish these reductions and to ensure permanence.

The project developed market opportunities for energy efficiency by triggering market development. This is a cost-effective way to approach the problem of introducing energy efficiency.

Moreover, through the removal of barriers, the cost of introducing energy efficiency and achieving additional reductions in GHG, becomes less costly (cheaper). This is a more efficient way to reduce emissions than the situation business-as-usual.

The project was designed to implement a package of initiatives (project objectives) that together, will contribute to accomplish the results in CHG reductions. This design was intended to achieve maximum impact in view of the limited resources available to the project.

From the UNDP point of view, the Project design makes good use of the available resources within the country and region, to complement and strengthen the impact of project activities.

5.1.8. UNDP comparative advantage

The UNDP/PAPP has an extensive and proven capacity and experience supporting capacity building, institutional strengthening and infrastructure development activities aiming at sound environmental management and sustainable development in the Palestinian Territories. This long lasting partnership has build a fluent and reliable relationship with PA institutions and governing authorities.

Moreover, UNDP/PAPP and GEF have direct access to regional and international expertise, training seminars and coordination with other institutions and projects with similar focal areas in the region and world wide.

GEF has world wide authority and expertise in all matters related to environment and energy efficiency.

Consequently, UNDP/PAPP and GEF have a solid comparative advantage to provide assistance and support in implementing the project.

5.1.9. Linkages between projects and other interventions within the sector

The project was part of a general strategic effort by the PA, aimed at restructuring the energy sector, among others, by rehabilitating the existing power network and introducing efficiency in the system. Within this context, the project was **part of and complementary** to other activities and projects funded by other donors, providing assistance and financial support within the same sector.

The ProDoc[8] provides information on Donor assistance to PA in this fields. Particular attention was given to the technical assistance and capacity building that the project will provide PEA in the decision making process associated with the grants and loans for institutional strengthening and network rehabilitation.

Moreover, the project is part of a of a regional initiative in energy efficiency barrier removal and business development within the entire Arab region. In this larger context, the project benefited from experiences gained through the execution of similar projects in the neighboring Arab countries, especially the project being executed in Egypt. This arrangement provided access to seminar, workshops and discussion forums around the region.

In this respect, the ProDoc[9] indicates the provisions that were embedded in the project, in order to take advantage of energy efficiency activities taking place in other countries. The project was specifically designed to open channels of communication and coordination with project initiatives being developed in other countries of the region.

This linkage between projects and similar endeavors, within the country and the region, was a potent arrangement and was appropriate to include in the project formulation stage. This contributed significantly to ensure success. It is also cost-effective, as the project was able to draw on the expertise created by other projects, saving resources and efforts. Sharing experiences among same focal point projects is something that should always be strongly promoted by UNDP/PAPP/GEF, and should be a permanent endeavour of the UN technical assistance agencies.

This is particularly true in the case of the Palestinian Territories, due to its isolation as a result of the long lasting difficult political and territorial situation. This arrangement tends to mitigate the risks this situation implies.

5.1.10. Management arrangements

Great care was given in the ProDoc to clearly define the organizational and management structure of the project. The large number of different activities and outputs requires an equally large number of expertise and professional manpower to be developed. This can pose a heavy burden on project resources. Aware of this fact, the project formulators decided to approach the issue of management and staffing in a decentralized manner, drawing on the managerial and professional

[8] Project Document, Section A, page 5, number 3, exhibit 3.
[9] Project Document, Section B, page 42.

capacities already present among the stakeholders. Consequently, the staff of the project would include, apart from the full time management staff, a number of experts and professionals employed on a part-time or temporary basis. This part-time staff would assume specific project responsibilities, while retaining their responsibilities within the employing agencies[10].

This staffing approach was reflected in the project budget, using UNDP and PNA salary scales for the portion of time these individuals will be assigned to project activities.

In view of the many different tasks assigned to the project, this approach appears reasonable and appropriate. It makes cost-effective use of the available financial resources and takes advantage of existing capacity, although it may imply some hidden risks, unless appropriate and effective arrangements are made at the host institutions of the part-time staff.

The ProDoc assigned the primary responsibility for management and of project success to a ***Project Technical Director*** *(PTD),* bearing the overall task of managing all project activities and ensuring that all work remains consistent with project objectives and the project document, preparing work plans, budgets and reprots.

The PTD had the support of an ***Executive Assistant***, dealing with administrative, financial, and contractual issues.

A ***Project Steering Committee***[11] was established to provide guidance to the project management. Among the duties assigned to this committee were, to review the annual work plans and budgets, to review the progress reports, to offer assistance to the PTD in identifying and solving problems and to provide strategic guidance. The composition and responsibilities of the *Project Coordinating Committee were* clearly established.

Finally, the ProDoc indicated the need to establish ***Working Groups***[12], to deal with different project activities and outputs.

The specific membership and responsibilities of each of the *Work Groups* were extensively described in Section B of the ProDoc. It is important to note that the composition of the different working groups include the participation of international consultants, providing expert assistance in specific fields for each of the working groups.

[10] Specific Terms of Reference for Project Staff is presented in Annex 2 of the ProDoc.
[11] Project Document, Section B, page 32, and in Annex 2, page 7.
[12] Project Document, Section B, page 33

In general, this was a sound and appropriate management arrangement, intended to have a positive impact on coordination, sustainability and technology transfer.

5.2. Implementation

5.2.1. Implementation approach

Implementation arrangements were followed as outlined in the ProDoc and in the *Memorandum of Understanding (MOU)*. As is usual in UNDP assisted project, the *MOU* was the legal framework under which several sub-contracts were signed between UNDP and PEA, to put in place project implementation. Sub-contracts also include project service providers, such as consultants and equipment providers, among others.

The project formally was assigned to enter in operation in January 1999, but later revised to begin operating in April 1999, when staffing became effective.

The Final Project Report does not elaborate much on how the implementation process took place and how it developed, nor does it mention any difficulties, delays or problems encountered.

Nevertheless, some information is present in the Mid-Term Evaluation Report, indicating that there were several problems affecting inception and first stages of implementation and operation. It is reported that one of the main causes for implementation delays, was a result of difficulties in the process of recruitment of project local personnel and international consultants[13]. The preparation and approval of the Terms of Reference and the corresponding contracts for consultants took more time than expected. In the case of the international consultants, reluctance to undertake assignment in the Palestinian Territories involving field visits, delayed the development of some activities.

The Mid Term Evaluation raised the issue of staffing, pointing out that if not solved, it would seriously compromise sustainability.[14] The report indicated that there had been long delays in the recruitment of local staff, in particular, that the recruitment of senior staff members (working group directors) had not gone as expected and did not fulfil project needs[15].

[13] Mid Term Evaluation Report, page 2, N°2.2, page 15, N°3.7
[14] Mid Term Evaluation, page 15, N°3.7 and N°4 and N°4.2
[15] Mid Term Evaluation Report, page 15, N°3.7

These staffing problems that plagued the project in its initial stage resulted in a slow pace in the beginning of project activities, with substantial work only being made possible during the year 2000, onwards.

Based on the recommendations of the Mid Term Evaluation, the PEA and the project management seems to have had the ability to successfully implement the recommendations and to overcome these problems, mitigating any negative effects. In the case of the unwillingness of the international consultants to undertake services in the Palestinian Territories due to security concerns, project management successfully chose alternative local resources, enhancing the role of the national/regional consultants within the project, to pursue the same objectives at lower costs. Thus, opening new opportunities to develop capacities within the PA and saving resources for new activities.

UNDP/PAPP and PEA agreed upon the composition of the project *Steering Committee*, and membership was appointed. While in the initial stage of project implementation the Committee fulfilled its commitment as envisaged, with the ever more deteriorating general situation in the Palestinian Territories from 2000 onwards, it grew increasingly difficult for the committee to meet amidst deteriorated security and changing priorities.

In fact, the Committee met once during 1999, and three times during 2000. These meetings were fundamental and helped the project in a series of implementation issues, such as TdR, contracts, work-plans and general coordination matters. The Steering Committee was a very good arrangement, unfortunately the situation deteriorated substantially during the second half of 2000, making it difficult for the Committee to meet.

The Mid-Term report recommended that efforts should be made to retake the periodic meetings. However, the security situation and periodic curfews made it practically impossible. The project, in a good example of adaptive capability, begun using telephones and internet services to consult and coordinate with the Steering Committee members, mitigating the effects of this adverse situation.

The project was physically located in the PEA offices in Ramallah. Most of the project activities were conducted with related departments of the PEA. In many cases the project obtained its information and data from PEA. All training activities involved PEA personnel and most pilot and demonstration project were implemented in close cooperation between the project and the concerned PEA staff members. Through this close collaboration the project was able to improved the planning capabilities of the PEA by introducing modern integrated resource planning and sophisticated planning software such as WASP, NET PASS, and Power World Simulator.

In mid 2002, on the occasion of Israeli Security Forces intervention, the premises where the project was located were blocked by the intervening forces, thereby obstructing normal project activity. Nevertheless, the project was immediately relocated and managed to retake activities.

In order to minimize the impact of the difficulties and constraints affecting internal displacements in the Palestinian Territories, from September 2000 onwards the project took a decentralized approach to work, locating staff in organizations and institutions in the West Bank and Gaza, communicating and coordinating activities via telephone or internet.

Project management gave proof of good management flexibility by confronting these problems and taking timely and appropriate measures to minimize any possible negative impact.

5.2.2. The logical framework used during implementation as a management and Monitoring and Evaluation tool

While the ProDoc did not include a Logical Framework, the Mid-Term Evaluation did prepare one for the project.

Work planning and priority setting was mainly done taking into consideration the activities outlined in the ProDoc and the success criteria and outputs. Basically this approach complies with the Logical Framework, - from objectives to activities, to success criteria and results.

The Project Technical Director prepared work-plans on a annual basis, with quarterly revisions and updates. The work-plans were prepared in detail for each Working Group, specifying activities, time schedule and outputs, in a fairly detailed manner. A Gantt chart was included in order to facilitate monitoring and control.

The evaluator had the opportunity to examine the yearly planning of the project and discuss with the Project Technical Director these issues, concluding that a fair amount of time and work was dedicated to planning activities, that it was made in a appropriate and acceptable manner and used for activity monitoring and control.

The Logical Frame and the set of recommendations put forward by the Mid Term Evaluation were used by the project management to focus activity and to monitor and assess progress.

5.2.3. Effective partnerships arrangements established for implementation of the project with relevant stakeholders involved in the country/region

Due to the amount and complexity of the tasks assigned to PAL/97/G31, the need to establish a sound partnership strategy was recognized early on. For this purpose the ProDoc identifies partners and stakeholders, providing the means to synchronize and coordinate them in their pursue of results. The Steering Committee and the Working Groups helped to materialize the partnership approach. Both arrangements seem quite appropriate. Unfortunately, the ever degrading security situation and the internal displacement difficulties did not permit a smooth operation.

More successful was the good and fruitful partnership established with the Electricity Distribution Companies and the Universities. Proof of this effective partnership are the positive results obtained by the project, particularly under Objectives 1 and 3.

5.2.4. Feedback from Monitoring and Evaluation activities used for adaptive management

Feedback from monitoring and evaluation activities is crucial to project management. It is mainly based on the information provided by Project Implementation Reports (PIR), Annual Progress Reports (APR), Tripartite Reviews (TR), Mid-Term Evaluation Reports (MTER), and other ad-hoc project reviews.

The project underwent a Mid Term Evaluation on August 2001. The evaluator made a thorough and detailed assessment of project progress, the internal consistency of the project components and implementation difficulties and problems, resulting in a variety of recommendations. These ranged from recommendations regarding staffing, to more specific recommendation concerning the use of available funds and suggestions regarding activities and outputs. The report was analytical, very complete and clear in its findings and recommendations. It raised several problems and suggested a series of possible solutions.

The project gave due attention to the recommendations and implemented changes accordingly. The following table gives a summarized account of the main

technical recommendations made by the MTER and the corresponding action taken by the project management:

Table 1: MTER recommendations and actions taken

Objective/Outputs	Mid-Term Recommendations (with number of paragraph MTER)	Actions Taken
Immediate Objective 1		
Output 1.1 - 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	¶4.42: 1. Adopt methodology approach and systematic data compilation and analysis of energy use	1. The project has adopted a clear systematic analysis of energy use by designing a data base defining the energy consumption by region, sub region, sectors and sub-sectors, utilities, and energy consumption equipment.
	2. International consultants to spend 2 weeks with the ATSWG, to develop a detailed work plan and methodology.	2. The project contacted the International consultants to resume their missions, but due to the political situation they refused the request. Nevertheless, the project arranged to use the auditing methodology and guidelines used in UK by reviewing the best practice program prepared by energy efficiency office of UK.
Output 1.2 - Performed approximately 200 audits of industrial, commercial, and government sector facilities to provide recommendations for low/no cost energy savings	¶4.43: 1. Provide a distinct executive summary for each site.	1. The project provided a distinct executive summary for the audited sites and provided the same summary to the previously audited sites before the mid term evaluation.
	2. Follow up with the audited customers to sustain the audit activities at the end of the project.	2. The ATSWG adopted a follow up method with the audited sites, which contributed to implement the audits recommendations. Also, provided technical assistance to the audited sites to carry out the audit recommendations (designing, tendering, and equipment procurement).
Output 1.4 - Performed demonstration projects and provided business seminars to provide instruction on the development of successful energy businesses	¶ 4.4.5 The evaluator suggested designing a demonstration program of high efficiency motors.	1. In correspondence with the evaluator suggestion the project conducted a study to find out the willingness of the audited sites to participate in such program. The study outcome was not encouraging as 3 sites responded positively and more that 17 sites refused the idea. Instead, the project proposed to conduct a demonstration program of PF correction capacitor banks.
Immediate Objective 2		
Output 2.3 - Established consumer awareness of the availability and favorable economics of buying and using energy efficient appliances and equipment, and demand for these products	¶ 4.5.4 1. Evaluate the awareness campaign	1. The project performed and completed the evaluation of awareness campaign.
	2. Extend the campaign to refrigerators.	2. The project designed the final stage of the awareness campaign to be concentrated on

		refrigerators. Also, issued a pamphlet on how to reduce refrigerator's energy consumptions.
Output 2.4 - 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	¶ 4.5.5 1. Develop a list of efficient refrigerators based on external data from manufacturing companies. 2. Cooperate with the French funded project to promote the efficient refrigerators.	1. The project developed a list of efficient refrigerators available in the local market. Also, contacted the international consultants to provide the project with the list of energy efficient refrigerators available in the EU. 2. The project met with the management of the French funded project to cooperate on the promotion of the efficient refrigerators. The project provided them with all information required.
Output 2.6 - Implemented a program to promote the purchase and/or purchase-to-hire arrangements for energy efficient refrigerators and fluorescent lighting in homes	¶ 4.5.7 1. CFL leasing program should be extended to Gaza in a smaller form.	1. The project approached the distribution utility in Gaza to perform CFL leasing program in Gaza. The project developed the implementation mechanism for the program. But, due to the economical difficulties in Gaza Strip the management of the utility declined as they were facing a problem to collect the electricity bills. But, the project proposed to transfer the remaining units of CFL from WB program to be distributed in Gaza with low prices.
Immediate Objective 3		
Output 3.1 - 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	¶ 4.6.2 1. The consultants in distribution should be required to recommend an affordable procedure to extend the capability in loss reduction studies and network planning to the utilities through affordable software.	1. The project designed a training program to be conducted at the premises of the international consultants on the planning capabilities of the utilities. 2. The project consulted with the International consultants to specify an affordable software to be distributed to the local utilities and the subsequent purchase from the software developer from USA was made (Power World Simulator, WASP, NETPASS). 3. The project designed a training program through regional consultant for the local distribution engineers on modern techniques for the operation of medium sized urban rural distribution systems.
Output 3.2 - 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	¶ 4.6.3 2. The review of the existing draft code of practice by consultants should be undertaken immediately. Promotion and negotiation with the EDC should be carried out by the project.	1. The project hired a regional consultant to assist the project to develop the final draft of code of practice and a first draft was completed.

Output 3.2 - 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	Same recommendation as in ¶ 4.6.2.	1. The project provided an intensive training program to the senior management and engineers of the working utilities in the Palestinian Territories on the advance technique of reducing technical losses. The project delivered a training program on the use of the modern system design software (PWS, WASP, NETPASS) and made PWS available for the targeted utilities and research centers.
Immediate Objective 4 - 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	MTER recommended to extend the project schedule for this output.	1. The project made a proposal to extend the duration of this activity, which was approved. During the extension periods the project managed to establish the Energy Information Center.

5.2.5. Financial planning

Financial planning is fundamental to management, it reflects the degree to which project management has control over the available assets and reveals the managerial and tactical decisions taken on the road to reach the objectives. The way assets are allocated and scheduled to perform the different tasks assigned to the project, uncovers the priorities established by management to the different project components.

Work plans were regularly prepared on a yearly basis by the project management (PTD), determining the activities, allocating inputs, assigning responsibilities, and indicating timing. This work-plans were updated every three months, were revised and specific responsibilities assigned, with time schedules and results, to each of the different work groups. These work-plans were effectively used to plan and monitor progress and outputs.

The project presented Liquidation Reports, in accordance with the agreed procedures established in the Memorandum of Understanding and Sub-Contracts. The evaluator had the opportunity to go through the financial statement reports, concluding that they were comprehensive and detailed, well prepared, with all

supporting documentation and vouchers and following standard accounting procedures requested by UNDP.

5.2.6. Monitoring and evaluation

Monitoring and evaluation are important management tools to ensure project adherence to ProDoc and general directives and procedures from the implementing agencies.

The project underwent a Mid-Term evaluation in August 2001. A thorough, analytical and well structured report was prepared, that included several relevant recommendations and suggestions for a better project implementation.

The project prepared Annual Progress Reports (APR) which were discussed between UNDP and PEA, monitoring progress and a necessary input for annual planning.

The Steering Committee was a useful instrument to monitor progress and implement whatever coordination was necessary to secure that activities were implemented, validating management decisions among the main stakeholders. When actual meetings of the SC were not feasible due to security, coordination and consultations among members were made through other available means (internet or telephone).

5.2.7. Execution and implementation modalities

The contractual modalities under which the project would be implemented are given by the *Memorandum of Understanding* signed on 15th October 1998, between UNDP and PA.

Under the umbrella of the MOU, specific sub-contracts were signed between UNDP and PEA for the development of activities and transfer of funds. This is a normal procedure for UNDP operated projects.

5.2.8. Management by UNDP country office

Management and support from UNDP/PAPP local office is essential for project implementation.

Financial management and support documentation is handled by the UNDP/PAPP. Based on the procedures established in the MOU, a series of sub-contracts were established with PEA, to implement specific activities. Among these activities was the transfer of funds for the establishment of the Energy Efficiency Information Center.

The project prepared Liquidation Reports on transfers and use of funds, submitted to UNDP/PAPP, in an appropriate manner according to the procedures set forth in the agreements signed between PEA and UNDP/PAPP.

Support and assistance from the local UNDP office was deemed appropriate.

5.2.9. Coordination and operational issues

The ProDoc gives great importance to coordination activities. In fact, the ProDoc clearly states that in order to achieve certain targets, good coordination is of the essence. Special attention is given to coordination with Electricity Distribution Companies and with other institutions involved in the energy sector, such as PEC, Chambers of Commerce and Industry.

The main coordinating body for this project, was the Steering Committee, with the participation of representatives from the Ministry of Environment, Ministry of Planning and International Cooperation, Palestinian Agricultural Relief Committees, Palestinian Energy Authority, UNDP/PAPP, World Bank, Ministry of Industry and project personnel. This arrangement provided the necessary coordination for the project to develop its activities. Unfortunately, the deterioration of the general security situation in the Palestinian Territories from 2000 onwards, hampered committee meetings. Nevertheless, the project looked for ways and means to maintain, as much as possible, coordination activities, amidst a very difficult political situation.

6. Results

6.1. Attainment of objectives

In spite of the unstable and difficult environment in which the project had to develop, the Project Final Report presents positive overview of the results achieved. A preliminary review of the documents at hand, rendered a rather satisfactory account of project development and results. Any evaluation of this particular project and its results, is bound to give due consideration to the environment in which the project

developed and to carefully consider the ability of management and stakeholders to overcome difficulties, adapt and make the best possible use of the available resources on the road to success.

During the visit to the Palestinian Territories, the evaluator had the opportunity to interview the project personnel, some Palestinian officers that had taken part or collaborated in project execution, some important beneficiaries of the project, and to review some of the many reports, documentation and studies produced by the project.

The general impression of the evaluator is that the project achieved the best results it could achieve under the circumstances. The Palestinian Energy Authority and other PA institutions, demonstrated once and again a genuine commitment and involvement with the project, amidst changing priorities. It is worthwhile mentioning, the dedication and involvement that the project manager and the staff had to pursue results. No doubt that the project execution was complex and with some problems. But efforts were made to overcome them and risks were mitigated, particularly the security and displacement difficulties.

This commitment and sense of ownership was fundamental in achieving good results.

6.1.1. The Objectives

Following is a summary account of main project results and achievements by immediate objective. The general ratings are based on the specific output achievements of the project, as analyzed and shown in *Table 3: Summary of project results by outputs,* page 42 of this report.

The immediate objectives are analyzed from the point of view of the most significant and measurable results achieved in each of the objectives. A general view of the likelihood of attaining the long term targets is also provided, taking into consideration the combined impact of the activities and the risks involved.

A) Immediate Objective 1: Improve energy efficiency in the Industrial/Commercial/Government Sector;

Level of Success: Satisfactory

In general, the outputs for this objective were achieved in a satisfactory manner, as analyzed in *Table 3: Summary of project results by outputs* . In this objective, the single most important impact was achieved through the energy audits component and through the implementation of the recommendations thereof. The project performed 200 energy efficiency audits, identifying opportunities to improve efficiency. It is estimated that upon implementation of the recommendations put forward by the audits, a 10 – 20% energy reduction will be

achieved by 2010. Up to date, the majority of the recommendation put forward in the audits have already been implemented in the 200 sites audited. [16]

The project implemented five demonstration projects, that resulted in substantial reductions in energy consumption. It is worthwhile mentioning the Jericho Steel Factory, where among other measures, a capacitor bank was installed, eliminating a US$30,000 per month penalty. The implemented improvements reduced the electricity consumption by 5%. Another example was the Nablus National Aluminum Factory, where the phase distribution was redesigned, a capacitor bank installed and use of energy efficient equipment introduced. Previous to this improvements, the factory had a diesel generator operating 24 hours per day, that was eliminated after improvements. The reductions were not only in electricity consumption, but also in fuel oil and LPG consumption.

The evaluator had the opportunity to visit three factories where energy audits were performed and recommendations implemented. The results were there to see. In all three cases, after implementing the recommendations, the monthly electricity bills were substantially lower and the managers were extremely satisfied with the audits and the assistance provided by the project.

Long Term target: Improvement in the industrial, commercial, and government sector energy efficiency by 17% by the year 2010 and 10% by the year 2005, relative to 1996 energy consumption levels. This result will contribute to eliminating nearly 80,000 tons of CO_2 emissions per year.

The combined impact of all the elements of Objective 1, namely, the audits, energy efficiency advice, pilot projects, preventive engine maintenance and market information, have made a durable impact, already having improved efficiency and achieved reductions in CO2 emissions. The project has made a solid impact and most probably will contribute decisively to attain the long term target. But there is a substantial risks involved in the deteriorating political and economic situation of the Palestinian Territories. This risk is true for all long term targets.

B) Immediate Objective 2: Improve energy efficiency in the Residential Sector, by improving efficiency in refrigeration and lightning;

Level of Success: Satisfactory

The awareness campaign, coupled with the CFL leasing program, are the two elements that made the most significant impact. On the one hand, the awareness campaign was successful in initiating a change in the attitude and behavior of the

[16] Annex 8 of this report

general public with regards to energy efficiency at household level. In fact, the evaluation made ex-post of the campaign indicated that 80% of the households were reached by the message and found it useful, and had implemented some kind of energy efficient change in their homes, mainly through the use of CFL. The evaluator had the opportunity to interview the management of the Jerusalem District Electricity C. Ltd, both in Jerusalem and Ramallah, establishing that the companies have continued to promote awareness on energy efficiency among their clients. In fact, promoting energy efficiency is now a permanent activity of the company, allocating resources and manpower to develop the activities. This is very important and significant, and has bearing on the sustainability of the results achieved.

The impact in the internal market of electrical appliances has also been significant and successful. CFL are now available in the market, and prices have dropped dramatically: the cost of the 23 W German made CFL unit before the implementation of the CFL leasing program was around 55 NIS or about 12 USD, today the cost of the same unit is 20 NIS or about 4.4 USD.

The project prepared a labeling system for energy efficient refrigerators and determined the corresponding testing procedures. This proposal was submitted to the Palestinian Legislative Council for approval and enforcement.

Long Term Target: Improvement in the residential sector energy efficiency by 11%, by the year 2010, through the introduction of efficiency measures in the use of refrigeration and lighting equipment. This result will contribute to eliminating more than 140,000 tons of CO_2 emissions per year.

The project successfully introduced energy efficiency at household level and in the market initiating a process that has its own dynamics. As with immediate objective 1, the project has made a solid contribution on the road to achieving the long term target. Nevertheless, the same risks described for the long term target 1, can affect this target too. In particular, the lack of regular meeting of the Palestinian Legislative Council has hindered the approval and implementation of the labeling system. This is totally outside the range of influence of the project.

Immediate Objective 3: Reduction in distribution losses, by identifying a portfolio of projects in Electricity Distribution Efficiency;

Level of Success: Highly Satisfactory

Through the work of the Distribution Group, the project successfully introduced, analytical and planning tools in electricity distribution companies. This upgrade in the managing and technical capabilities is most appreciated by the companies.

This improvement is now self-sustained. The technical and financial studies prepared by the project for the reduction of power losses in distribution, provided the opportunity to identify and implement a series of loss reduction projects throughout the Palestinian Territories (West Bank and Gaza).

The projects were executed resulting in an actual loss reduction of more than 2%, improving the target figures included in the ProDoc. The technical and financial studies were prepared by the Distribution Work Group, and are listed in Annex 7 of this report.

The project prepared a set of Codes of Good Practice in distribution, that have been introduced to all interested parties. The major utilities have adopted and are already implementing the codes. The enforcement of the codes and standards prepared by the project depends on the approval and adoption by the Palestinian Energy Regulation Commission, which is being established by the PEA.

Long Terms target: Facilitate a 2% reduction in electricity distribution line losses by means of identifying and evaluating potential priority projects for multilateral development bank or other third party funding. This result will contribute to reduce nearly 45,000 tons of CO_2 emissions per year.

The long term target has been already achieved. A preliminary evaluation of the contribution made by the project in terms of emissions reduction may be over the target figure of 45,000 tons of CO_2 per year. The adoption of the system codes and standards will ensure sustainability in time.

Immediate Objective 4: Creation of an Energy Efficiency Center, to promote energy efficiency within the public and private sectors.

Level of Success: Satisfactory

The results achieved in this objective are in all accounts satisfactory and the impact is many folded. The project generated an important amount of data and information, previously not available, while simultaneously creating the channels to disseminate it. The establishment of the Energy Efficiency Center, physically established within the PEA and integrated in its regular activity, is a cornerstone that will ensure that the data collected and the significant amount of information generated by the project will serve to upgraded the planning capacities of PEA and other interested parties and stakeholders and to maintain a permanent role of awareness.

Long Terms Target: Creation of a Energy Efficiency Center, aimed at promoting customer awareness and strategic actions by public and private sector energy market participants.

The attainment of the long term objective will depend on the ability and commitment of the PEA to sustain in time the operation and further improvement of the Energy Efficiency Center. In particular, the future of the center will depend much on the availability of the necessary resources to operate it.

As with the other achievement of the project, the unstable economic and political situation in the Palestinian Territories poses a severe risk difficult to assess at this stage.

The following table 2 "*Project Achievement of results by Immediate Objective*", summarizes the general rating of the results achieved by the project, vis-à-vis the project main objectives. This rating is based on what transpired from the analysis of the large amount of documents and information produced by the project, the outputs and the impressions of the evaluator during the field visit to the Palestinian Territories Territories. In general terms, the project performance and results are deemed satisfactory, in some cases, as with Objective 3, the results can be deemed as highly satisfactory.

Table 2 : Project Achievement of results by Immediate Objective

Objective	Implementation Strategy	Results Achieved
No.1 Improve energy efficiency in the Industrial/Commercial/Government Sector;	Adequate	Satisfactory
No.2: Improve energy efficiency in the Residential Sector, by improving efficiency in refrigeration and lightning;	Adequate	Satisfactory
No.3: Reduction in distribution losses, by identifying a portfolio of projects in Electricity Distribution Efficiency;	Adequate	Highly Satisfactory
No.4: Creation of an Energy Efficiency Center, to promote energy efficiency within the public and private sectors.	Adequate	Satisfactory

6.1.2. The Outputs

The outputs are analyzed from the stand point of the success criteria as outlined in the ProDoc. The following table 3, *"Summary of Project Results by Output*", presents the project results by output, using the indicators provided by the ProDoc, in the form of a Logical Framework Matrix.

In general terms the project succeeded in delivering the results expected. As indicated before, the project managed to achieve the results that were possible to achieve under the circumstances. Moreover, in view of the difficult constraints and the changing priorities for the Palestinian Authority, the results may be deemed satisfactory.

Table 3: Summary of project results by outputs

Objective 1	Indicators	Results Achieved	Degree of Success	Problems Affecting Results
1.1 EE market information (PEA)	• Information resources developed, made public, promoted and used	• Information data base developed and disseminated	• Satisfactory	
1.2 Audits and energy saving advice to 250 consumers (UNDP/PAPP; ATWG)	• 200 audits performed and recommendations made	• 200 Audits performed and reported	• Satisfactory	
1.3 EE awareness forums on 5 topics (PEA/ATWG)	• Five seminars held, contents disseminated	• 3 Seminars and 2 workshops held and promoting material prepared and disseminated	• Satisfactory	
1.4 Energy Service business advice seminars and demonstration projects: competitive tender (PEA)	• Seminars held • Tender completed • Demonstration projects implemented	• 30 + case studies • 5 demonstration projects completed • 3 Energy Audits to companies in Nablus and Jerico • 1 Energy Service Contracts Workshop	• Satisfactory	
1.5 Prepare and promote energy efficient procurement policies in government.	• Policies prepared and adopted	• Investigated the applicable trade regulations and its impact on energy efficiency. • Prepared technical standards of the energy efficiency equipment • Proposed new trade regulations, promoting energy efficient equipment	• Satisfactory	• The priorities of the PLC and PA changed due to the political situation in the Palestinian Territories
1.6 EE equipment maintenance assistance and training (PEA/REWG)	• Status assessment made • Market assessment made • Pilot program implemented	• Assessment made at auditing sites • Report on HEM • Market consumer assessment • Training provided to auditing staff • Motor maintenance guide • Pilot training program	• Satisfactory	• Bank financing difficult due to high collateral
1.7 EE financing – identification of projects and funding sources (PEA/BFWG)	• List of fundable projects • Promotion made to funding agencies • Projects funded	• Most of the audits and 8 distribution loss Projects implemented • Promotion made to funding agencies (Banks) • Training provided to B&F and through Workshop on Energy Service Contracts	• Satisfactory	
1.8 Recommendations for power factor rates, codes and standards (PEA/REWG)	• Recommendations drafted • Implemented by distribution companies	• Assessment of Power Factor situation in The Palestinian Territories • Five technical reports • Power factor regulations, standards and penalty rates for PA approval	• Satisfactory	

Objective 2	Indicators	Results Achieved	Degree of Success	Problems Affecting Results
2.1 Equipment trading barriers identified and reduced	• Published assessment of market for lighting and refrigerators and barriers to change	• Report prepared and circulated • Training provided to two PEA staff in Egypt(standards and labeling)	• Satisfactory	
2.2 Commitments by vendors to stock EE equipment	• Secured cooperation of vendors	• After DFL leasing program , vendors have started to stock more EEE • Conducted market survey • Promotion and information to vendors	• Satisfactory	• High prices of new efficient appliances • Availability of low cost second hand appliances
2.3 Consumer awareness campaign (PEA plus others)	• Established consumer awareness • Materials designed and prepared • Campaign launched and evaluated	• Market research • Campaign launched and evaluated • 60% of consumers believe that their monthly electricity bill was lower as a result of the acquired energy efficiency practice • Established consumer awareness	• Satisfactory	
2.4 Refrigerator labelling system (PEA, MITE)	• Implementing legislation developed and passed • Labeling system agreed • Testing procedures formulated and validated • System implemented • Enforcement agencies identified, trained and enforcement practiced	• Proposed a refrigerator labeling system • Determined refrigerator testing procedures • Submitted the proposed labeling system to PLC for approval and enforcement	• Partially Satisfactory	• Lack of regular meetings of the Palestinian Legislative Council (PLC) due to current political situation, has not permitted approval or adoption of the system.
2.5 Develop financing systems for EE refrigerators (PEA/contracted research company)	• Lenders enrolled • Roles and costs allocated • projects implemented • Increased sales of efficient appliances	• Survey on financial institutions • Palestinian Energy Research Centre prepared a Refrigerator Leasing Program through Banks	• Partially Satisfactory	• Difficulties due to general economic situation
2.6 Self-supporting program to lease CFLs to consumers (PEA)	• Formulation of program • Agreement reached with 2 discos • Program implemented and marketed • Adoption by consumers • Increased sales of CFLs	• Program formulated, marketed and operative through JEDCO • Reported increase in sales • Increased CFL availability • Decrease in CFL prices	• Satisfactory	
2.7 Plan for extension of above throughout West Bank and Gaza Strip (PEA/local market research firm)	• Assessment of activities • Proposals for extension	• Awareness Campaign impacts evaluated positively • Extension of program to GAZA	• Satisfactory	• Due to the depressed economic situation in GAZA, the program was put on hold.

Objective 3	Indicators	Results Achieved	Degree of Success	Problems Affecting Results
3.1 Development of 50 – 100 fundable projects for improving distribution (PEA)	• Specification of metering equipment • Training program delivered • Design software installed • Projects identified and evaluated • Fundable project list prepared • List promoted to funding agencies	• 8 Distribution Line Loss Projects prepared and executed • Actual loss reduction more that 2%	• Highly Satisfactory	
3.2 Development of code of practice to be used by distribution companies with aim to reduce losses (PEA)	• Assessment of benefits of better practice • Verification for pilot schemes • Codification of practice • Adoption by discos	• Several studies were carried out • Prepared distribution code of practice • Prepared economic evaluation of transformer losses • Prepared procedures to determine the loss reduction due to voltage improvements and load balancing • Prepared and optimization of transformer sizing • Code of Practice in use by utility companies • Training provided by DWG to utilities professional staff	• Highly Satisfactory	

Objective 4	Indicators	Results Achieved	Degree of Success	Problems Affecting Results
4.1 Establish information dissemination strategies and capabilities to energy service industries (PEA/IPWG)	• Information system defined • Data assembled • Dissemination channels identified • System launched and used	• Market survey in conjunction with Objectives 1 & 2 • Dissemination channels identified	• Satisfactory	
4.2 Establishment of information dissemination capabilities to energy users (PEA/IPWG)	• Dissemination channels identified • Strategy developed in association with Objective 2 • Implement further actions	• Information system generated, data and information compiled • Information system ready available and operative	• Satisfactory	
4.3 Evaluation of activities conducted under Objectives 1 – 3	• Evaluations prepared of impacts of tasks within Objectives 1-3 on consumer and commercial behavior • Recommendations to enhance impacts • Analytical capacity of PEA staff strengthened	• Conducted evaluation of effectiveness of awareness promoting activities • Conducted assessment survey on sales of EE appliances • Training in data base management to PEA staff	• Satisfactory	
4.4 Establishment of a country-wide EE information network (PEA/IPWG)	• Studies on need completed • National center established in PEA • Center has appropriate staff, budget, working practices and Terms of Reference • Center is used by industry and consumers	• Energy Efficiency Information Center established at PEA	• Satisfactory	
4.5 Establishment of power sector strategic planning capability (PEA/ERWG)	• PEA has self-sustaining capability in DSM and IRP planning methods • Data exists to support strategic planning	• Training provided to PEA staff • Data and information generated in use by PEA in loss assessments and planning	• Satisfactory	
4.6 Plan for extension of EE in national energy policy (PEA/ERWG)	• Action Plan prepared to sustain impacts beyond project lifetime • Plan adopted • Institutional mandates and policy instruments promulgated	• Conducted training program on Integrated Resource Planning (IRP) • Energy Efficiency has been sorted in the Palestinian Energy Master Plan • Establishment of Energy Efficiency Information Center	• Satisfactory	

6.2. Relevance and efficiency

The project under consideration is with out any doubt relevant. It was relevant at the time of project formulation, and remains a very relevant endeavor for the PA. The results achieved represent a significant advancement in the introduction of energy efficiency in PA.

The project was efficient in achieving whatever results were feasible to achieve in the current situation in the Palestinian Territories. In this respect, the deteriorating situation in PT meant that the Palestinian National Authority had to give priority to ensure security in the territory, allocating as much resources and efforts to this end. Communications and internal displacement became more difficult and complicated. The general economic situation begun to deteriorate and the social situation became unstable. As a direct result of this, the Steering Committee was unable to meet regularly and alternative communication means had to be implemented. Difficulties arose to field international consultants and some activities were hampered (Objective 2, activities 2.5 and 2.7). Nevertheless, in the opinion of the evaluator and taking into consideration the extremely difficult security situation and the changing priorities for PA, the project did very well, achieving success efficiently in most activities.

In conclusion, the project was relevant and efficient. The Global Environment Facility (GEF) did well in funding project PAL/97/G31 and the UNDP/PAPP took an appropriate decision to provide assistance and support to the Palestinian Authority to implement this project.

6.3. Sustainability

Sustainability is basically given by the ability and the willingness of the host institutions to continue to function effectively after the cessation of the UNDP/GEF support. Moreover, from the UNDP/GEF standpoint, projects must also be environmentally sustainable.

In countries with unstable political situation and rather depressed economy, such as is the particular case of the Palestinian Territories, there are many external factors increasing the risks affecting, among others, sustainability. Project contribution tends to be volatile in these cases. Giving due consideration to this issues becomes critical during project formulation. These factors were in fact considered in the risk assessment for project PAL//97/G31. Political and security uncertainty is always a clear and present risk, that is beyond the project's sphere of influence and is an external factor.

Notwithstanding this adverse environment, the project has successfully created a series of conditions that should ensure and promote continuity in activities and sustainability beyond project end. In fact, this is already happening, as can be appreciated below.

The main achievements of the project that will contribute to ensure sustainability are:

a) The project prepared a significant amount of good quality reports, that are continuously being used to identify new opportunities for energy efficiency and have become a reference for relevant parties. Worth mentioning is the comprehensive market research report ¨Market Research for Products Consuming Electricity in The Palestinian Territories Households, Commercial and Industrial Sectors¨, performed by the Birzeit University.

b) The project successfully managed to demonstrate the gains that can be obtained through energy saving to private companies. This was achieved through the energy audits and the recommendations thereof. The audited companies implemented, in many cases low cost changes, that resulted in substantial and measurable reductions in electricity costs. In other cases, such as power factor correction, investment payback period is less than three years, representing a cost effective way to reduce electricity costs and penalties. In fact, some companies that are currently expanding their commercial activities, are implementing energy efficiency from scratch in their new facilities. The ability of the project to connect energy savings with costs reductions in production, was an important step to ensure sustainability.

c) The comprehensive awareness campaign displayed by the project, coupled with the CFL leasing program implemented with the collaboration of JDECO, resulted in, among others, changes in consumption patterns and market availability of energy efficient appliances (CFL). In fact, JDECO has established a specific Energy Efficiency Department and has continued with customer awareness and promotion activities financed through their own resources. This is a process that was triggered by the project and JDECO is maintaining its momentum.

d) The collaborative partnership established with Beirzeit University has resulted in the inclusion of energy efficiency in the normal study curriculum of the Engineering Faculty. The software provided by the project (Power World Simulator) is widely used by students. This will ensure that engineers have skills and technical knowledge on energy efficiency.

e) The introduction of analytical and planning tools and the technical and financial studies prepared by the Distribution Group to reduce power losses in distribution, provided the opportunity to identify and implement a series of projects. This is an ongoing activity within the electricity distribution companies.

f) The project provided assistance in the establishment of the Regulatory Commission and prepared a set of standards and tariff system, that once approved and adopted, will ensure permanence and enforcement.

g) The establishment and operation of the Energy Information Center and the commitment shown by PEA, will ensure that data and information continues to be produced and disseminated among interested parties, and the skills and preparation of engineers in energy efficiency is improved.

6.4. Contribution to upgrading skills of the national staff

From the Beneficiaries perspective, the project made a solid contribution in the following aspects:

a) Distribution Utilities

- **Improved planning capacities**: the project provided distribution planning tools Power World and Netpass, currently in use by the companies. Developed and implemented codes of practice and standards on distribution system operation and maintenance, for use in future plans and operations for distribution line loss reduction by the companies.
- **Trained engineers**: intensive training in the use of planning software, system design and in the use of sophisticated metering equipment were provided. These professionals are currently part of the technical staff of the companies.
- **Measurement instruments and computer tools for analysis and planning**: were provided to significantly enhance the technical capacity of the utilities.
- **Reduced losses in distribution network**: the project directly contributed to achieve more than 2% loss reduction in distribution network. The most successful project was Bani Zeid feeder in Ramallah area, which reduced the energy losses in the feeder from 14.5% down to 4.1% and power losses from 25.4% down to 4.1%.
- **Improved awareness in energy efficiency**: training, workshops, seminars and the large amount of documentation generated by the project successfully introduced energy efficiency in the utilities. Issues such as quality standards, power factor correction and loss reduction are now part of the day to day management and planning activities of the utility companies.
- **Improved contact with clients:** the active participation of the distribution companies in the energy efficiency awareness campaign, gave them a chance

to enter in direct contact with consumer clients. This was so successful, that it is now a permanent activity of the companies.

b) Universities

- **Instruments and software tools**: the project provided measuring instruments and software to be used in the engineering faculty for educational purposes. The evaluator had the chance to verify in situ the use of this equipment and software by the students at the university in Ramallah.
- **Training in software use and application**: together with the software, the project provided the corresponding training.
- **Graduate students able to operate computer models:** the project opened this new opportunity to students that was not present before.

c) Industrial / Commercial Sector

- **Manuals for maintenance of motors**: the project prepared a motor maintenance guide and implemented a pilot training program.
- **Energy audits for energy efficiency:** energy auditing was a very successful activity developed by the project. The results are measurable, with a significant improvement in energy efficiency in the companies.
- **Training**: extensive training was provided to auditing personnel and seminar and promoting material prepared and disseminated among companies.
- **Optimized systems**: the direct result of the pilot projects and the implementation of the auditing recommendations, were optimized energy consumption. This was reflected directly in the electricity costs.
- **Lowered energy costs**: industrial companies that successfully introduced efficiency measures in the use of energy in their production processes, have benefited from lowered energy costs.
- **Reduced electricity bills**: same as above.
- **New business opportunities**: the project demonstrated that there is business opportunities in energy efficiency.

d) Palestinian Energy Authority PEA

- **Creation of the Energy Information Center**: the creation of the EIC was one of the main objectives of the project. Information generation, data collection and management, dissemination, energy efficiency market information on customer electricity use, energy savings potential, feasibility studies, market size and potential, energy efficient technologies, monitoring,

measurement and verification, are some of the important activities that the EIC performs. This is a new situation and a direct result of project activity.

- **Codes and standards**: Developed and implemented codes of practice and standards on distribution system operation and maintenance. This is a most needed and significant improvement that has brought important changes in the sector. The implementation of the codes have resulted in, among others, improvement in line loss reductions and power factor correction to increase distribution system efficiency.
- **Tools to promote energy efficiency**: the role of the Energy Information Center is to collect data, generate and disseminate information and to promote energy efficiency. The project successfully implemented a series of awareness and promotion activities to overcome information and customer awareness barriers. Among the tools used for this purpose we can mention the public awareness campaign, seminars and awareness forums, the energy newsletter, the project webpage, leaflets, radio and TV promotion of energy efficient refrigerators and appliances and CFL leasing program.
- **Improved data and Information availability**: developed a data information system and provided training in the subject. The large amount of data and information generated through project activity is now available for public use through the EIC.
- **Improved planning capacities to develop strategies, action plans and policy making**: data and information now available in PEA have significantly enhanced the possibilities of strategic planning. Training provided to PEA staff has also contributed to this improvement.
- **Improved internal coordination within the energy sector**: the coordination requirements of the project implementation, created opportunities to develop and improve collaboration between the different stakeholders. While currently there is no formal body for coordination, the different parties that were involved during project implementation are continuing the coordination in this field. The Energy Information Center also continues its activities to bring together all parties involved in energy efficiency in the Palestinian Territories.
- **Identifying new issues and activities**: this is a result of the different surveys and studies prepared by the project.

e) Residential clients

- **Reduced electricity bills**: an obvious improvement and most appreciated by consumers. 60% of the surveyed consumers believed that the monthly electricity bill was lower as a result of energy efficiency.

- **Improved electricity quality service**: the introduction of quality standards in maintenance and operation of distribution systems by the utilities, has resulted in a better service to costumers, in terms of reliability and quality of electricity supply.
- **Availability of environment friendly energy efficient appliances in the market in the Palestinian Territories**: the project managed to successfully introduced energy efficient appliances, such as CFL, in the market. It also managed to change consumer behavior through promotion and awareness campaign.

7. Recommendations

7.1. Actions to follow up or reinforce initial benefits from the project

Under the circumstances, the achievements of the project have been impressive. While sustainability has been ensured by the willingness of the institutions to continue in the path of energy efficiency and by the level of awareness achieved by the project, it is advisable that follow-up activities be encouraged and subsequently implemented in order to reinforce the initial benefits of the project.

a) **High Efficiency Motors**: The issue of introducing High Efficiency Motors was raised during the Mid-Term evaluation, but was left aside due to unwillingness of industry (audited sites) to take part in such a program. In perspective, probably the moment was not ripe to introduce such a program. However, the positive impact that the energy efficiency activities implemented by the project have had in industry, in particular the audits, have paved the road for further improvements. While in the beginning industry was reluctant to embark in new investment such as high efficiency motors, after the good and measurable results obtained by the audits, their attitude has changed and are willing and have expressed interest in further efficiency improvements, such as energy efficient motors. The implementation of a **High Efficiency Motors Leasing Program**, with a similar structure as the CFL leasing program is recommended. It would build upon the results already achieved by the project, improving efficiency and, in the long run, contribute to further reduce CO2 emissions.

b) **Rehabilitation projects on Medium and High Voltage power lines and distribution system codes**: The Palestinian Distribution Utilities were the main beneficiaries of the loss reduction program implemented by the project. A comprehensive loss reduction analysis that covered most of the Palestinian Territories was prepared, highlighting the importance of the improvements of the

distribution systems codes and the implementation of the rehabilitation project on MV an HV power lines. These two areas need further development and assistance from bilateral and multilateral donors is required.

c) **Prepaid Meters**: In the discussions had with the management of the Jerusalem District Electricity Company (JDECO), both in Ramallah and Jerusalem, the issue of the introduction of Prepaid Electricity Meters was brought up, as a way to target the low rate of collection, which amounts in some cases to 30-40%. This is a burden difficult to bare by the companies. This situation is mainly due to the difficult economic situation in the territories. Prepaid meters may help to reduce this problem. In order to implement such a project, the electricity distribution companies would need assistance. A Prepaid Meters Project, coupled with further promotion of energy efficiency among consumers is recommended.

d) **Palestinian Energy Regulation Commission**: PEA is in the process to establish the Palestinian Energy Regulation Commission. Its mandate is to regulate and enforce the codes and standards of the energy sector. Assistance and support is needed to accomplish this institution building. It is advisable that the PA, in conjunction with UNDP/PAPP, discuss way and means to materialize such an assistance. The establishment and operation of the Palestinian Energy Regulation Commission would contribute to enhance the sustainability of some of the results achieved by the project.

e) **Energy Information Center**: The project made a solid contribution to the establishment of the EIC. The center is now an integral part of the operation of PEA. Nevertheless, ways and means should be explored in order to provide further assistance and support to the PEA to maintain the EIC in operation and, among others, to implement follow-up or reinforcing awareness campaigns covering all the Palestinian Territories.

f) **Labeling system**: The labeling system, energy ratings and testing should be extended (and enforced) to include a wider range of household electrical appliances, such as washing machines, dryers, water heaters, etc.

g) **Power factor Correction on MV and LV power lines**: To further enhance the results of the project, a comprehensive power factor correction project on Medium and Low Voltage levels should be implemented.

8. Lessons learned

8.1. Best and worst practices in addressing issues relating to relevance, performance and success

8.1.1. Project Relevance

1. Stakeholders involvement in project preparation promotes relevance, ownership and commitment, and will ensure that the project responds to actual needs and is complimentary and consistent with Government strategy. This is something that is applicable to any UNDP funded project.

8.1.2. Project Performance

1. Monitoring and evaluation is essential. The Mid-Term evaluation of project PAL/97/G31 is a good example of how critical and useful is good monitoring. The MTER made a set of recommendations, that once implemented, had a positive impact in project performance.
2. The project performed an example of good practice by building upon existing resources, by coordinating and integrating them into project activities, in the presence of a difficult environment. The establishment of the working groups was a good mechanism to build upon, manage and integrate valuable expertise to accomplish project objectives.
3. Project management made a good example of flexibility and adaptation by making use of locally available resources in the absence of international consultants.
4. Assistance and support from UNDP local office proved fundamental to ensure smooth development of project activities. Particularly in matters such as drafting contracts made under the umbrella of the project, international biddings, international consultants.

8.1.3. Project Success

1. Training is fundamental for project success and sustainability. The project provided a significant amount of training in different areas of expertise, to different stakeholders. Most significant were the enhancement of the strategic planning capability, energy auditing and data base management in the PEA and the training provided to the professional staff of the electricity companies in loss reduction and code of practice.

2. The opening of new business opportunities and demonstrating the economical benefits of energy efficiency to the private sector through the successful implementation of project activities, contributes significantly to enhance sustainability. Market changes ensure sustainability. The project was successful in achieving such changes, thus in ensuring permanence.
3. Dissemination of data and information is key to project success. The creation of the Palestinian Energy Information Center opened an important and permanent communication channel to be used by different interested parties.
4. Under certain circumstances, the use of locally available consultants (regional and national) may be more appropriate.
5. Demonstration activities and pilot projects play a significant role in achieving replication effects that go beyond the projects lifespan. Energy audits, energy service business advice and demonstration projects implemented under Objective 1, successfully revealed the benefits of energy efficiency to private companies.
6. Well prepared and directed awareness and promotion activities play an important role in achieving changes in public and private sector behaviors.

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