



Final Evaluation

**Supply-Side Efficiency and
Energy Conservation &
Planning project
Syria**



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Colophon

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Meerssen, December 2006

1. Summary

1.1 Overview of the project

The project was developed to strengthen the capacity of the Syrian Arab Republic to implement and sustain long-term energy efficiency efforts that will have positive impacts on both global and local environments. The preparation of the project started in 1994 with some preliminary audits on sample industrial sites followed by a feasibility study and finally in 1996 a GEF project brief. In 1998, the UNDP project document was developed and approved, containing five main components targeting demand side energy efficiency (objectives 1 and 2) and supply side energy efficiency (objectives 3 – 5). The project was expected to contribute to the development objective through the creation of a multi-purpose Syrian Energy Services Centre (SECS) and a National Energy Efficiency Program (NEEP) and by improving supply-side efficiency through the demonstration of Efficiency Management Systems and Maintenance Management Systems (EMS/MMS) at the Baniyas Power Plant. The initial project design proposed 29 project outputs under the five project objectives, which were slightly redesigned after the mid term evaluation following the evaluators recommendations.

The project document estimated as start date of the project November 1998 and as project duration 4 years. After the project document was signed there was a subsequent delay in the start of the project and the official start of the project activities was in October 1999. The initially planned end date has been postponed twice and finally the project activities were terminated by the end of 2005.

The project has resulted in a sustainable increase in the attention for and activities targeting energy efficiency with the Ministry of Electricity, and in three main, ongoing impacts in the country, related to condition monitoring and efficiency monitoring systems which will be implemented at new power stations in the country; power factor corrections that have been applied during the project and will be applied further, with teams for this set-up in all regional utilities; and the

establishment of the National Energy Research Centre. It was an important 'wake-up call' for the country about the importance to improve the efficiency of energy supply and demand, and this has had its impact. The three sustainable results signify the importance of the project to the country, and can be considered a success.

The project, however, also shows significant downsides. It was observed that in scope, it was more a program than a project, and in reality it was probably an impossible task to manage and implement all planned activities within the scope of the given project. Good results were achieved in some areas, but there are many gaps in the overall implementation of activities. Given the project's size and duration, the overall impact has been relatively small and performance has been lower than might have been expected.

1.2 Purpose of the evaluation

The final evaluation is intended to assess the relevance, performance and success of the project. It will look at early signs of potential impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The final evaluation is also supposed to identify and document lessons learnt and to make recommendations that might improve the design and implementation of other UNDP/GEF projects. Furthermore, the final evaluation is to make forward vision recommendations related to the sustainability of project outputs.

Key issues in this evaluation include the quality of the national situation and capacity assessment during the project design stage; the project strategy and design, in relation to the objectives, size and implementation arrangements of the project; the relevance and quality of the technical achievements; the stakeholder involvement in the development and implementation of demand and supply side management activities; steps taken during the project and distinctive characteristics of the project implementation; the results achieved with the project and the

sustainability of the project outcomes, and further actions recommended to improve the impact and sustainability of these outcomes. For this, evaluation indicators have been developed, based on the evaluation issues relevant for UNDP/GEF final project evaluations (annex 3, evaluation indicators). An indicator targets an important, measurable aspect of an evaluation issue, with the aim to make a complex, principally qualitative issue measurable and (semi-) quantifiable.

1.3 Main findings, conclusions, recommendations and lessons learned

1.3.1. Main findings and conclusions

Overall, the *project design* as used for this project (UNDP project document version) is rather poor: it was a reflection of the needs for energy efficiency of the country, but had little attention for the implementation capacities and arrangements needed to deliver improvements, nor of the scope of activities that could be combined into one project. The result was a project document with close to 30 largely independent activities, all to be implemented by one unit within one Ministry, and with a budget insufficient for that scope. National ownership and stakeholder involvement during project design appear to have been (too) limited, and have not evolved much outside of the parties directly involved in project implementation since.

Overall, *project implementation* was mediocre. Good use was made of experiences in another country, however, the implementation approach lacked focus and the use of good management tools. Even though it was clear that the project was burdened with too many objectives and activities, no action was taken to alleviate this work overload, until it was too late and work on many activities just stopped. A large part of the difficulties in implementing this project have their origin in the deeply flawed project design. Part of this, however, could have been counteracted by a better supervision of the project, and a better response to interim reports and the observed state of the project. The management style for this project seems to have been 'laissez faire', which is not recommended for this kind of projects.

The project had intended, originally, to target a variety of sectors in the Syrian society, but in the end has mainly focused on the Ministry of Electricity (the executing agency) itself and related units. Some actions were taken towards other parties, but these lacked a coherent, integrated approach. Monitoring of the project was conducted, but follow-up to this was limited, even though quite serious issues emerged in the various stages of the project.

The overall appreciation of the *project results* is marginally satisfactory. The objectives of the project have been achieved only for smaller parts of the project, and there is not a single objective that has delivered as planned. To a large part, this must be attributed to the poor design of the project, however, a lack of focus and prioritization in the implementation of the project, as well as substantial delays in the provision of inputs and the execution of the project, have also had a substantial impact on the low realized outcome of the project.

The sustainable impact of the project is likely to be limited to three topics: (1) Condition monitoring and efficiency monitoring systems will be implemented at new power stations in the country; (2) Power factor corrections have been applied widely during the project, and teams have been set-up in all regional utilities to continue this work; and (3) the National Energy Research Centre was created. In addition, attention for energy efficiency is increased at the Ministry of Electricity. The impact of the project outside of the Ministry of Electricity and its associated organizations is quite limited. Many planned outputs of the project have never been realized, and thus cannot have a lasting impact in the country. Many other activities, especially on the demand-side, have been fragmented or small-scale, or have not been carried through till the end and it is expected that there will be a limited sustainable impact at best for the other activities of the project.

1.3.2. Recommendations

Various corrective actions are needed for this project, to improve the administration of the project in various aspects, and to secure that non-yet-completed activities

are followed-through to a (more) sustainable state.

On the administrative side:

- Project documentation, including a final report, should be made easily available;
- Sustainability plans should be created for the power factor correction activities.

On the content side:

- Put in place a mechanism to monitor the progress of the rehabilitation of the Baniyas power plant and the installation of the condition and efficiency monitoring systems;
- Integrate various supply and demand-side activities and further develop this into a National energy efficiency program, including a strategy for introducing realistic energy prices;
- Involve stakeholder groups in the selection and implementation of priorities and actions for the National energy efficiency program with a strong focus on energy conservation activities;
- Develop a (revised) strategy need for the National Energy Research Centre, including a role in the implementation of the National energy efficiency program;
- Continuation and expansion of activities within industrial sector on energy auditing;
- Development and vigorous implementation of a Demand Side Management program, focusing on simple low-cost or no-cost measures;
- Continue work started on energy standards and labels for refrigerators and air conditioners;
- Regular provision of high-level consultancy, for feedback on the country's supply-side strategy and help with a bird's eye view on the evolution of the (efficiency of the) electricity network;

- Increase peak power production capacity, by installing a pumping system at the hydropower plant, speeding up commissioning on new capacity, and tracking power plant performance

Future projects should build on the activities initiated with this project, however, taking into account the needs of the country. As the country is facing power shortages in the coming years, activities that improve the efficiency and capacity of power supply, and activities leading to quick energy savings should be considered especially.

1.3.3. Lessons learned

The project has resulted in various valuable lessons, for the county and the wider community implementing energy efficiency projects. These lessons are related to:

- The benefits of a national centre being established as a follow-up to the project;
- The need for an in-depth assessment of the country, on the project objectives and the environment for its implementation, prior to the design of the project;
- The need to take account of the energy price situation;
- The national capacities present and the time needed to develop capacities to implement activities;

- The need to monitor project performance, and re-prioritize activities if needed;
- The need to involve all stakeholder groups and to develop co-ownership of activities;
- The need to arrange continuation of project activities before commencement of the project.

1.3.4. Rating of project components

Rated elements in the project formulation, implementation and results are listed here:

- The overall appreciation of the project formulation is unacceptable. Rated elements are:
 - Conceptualization / Design: unsatisfactory
 - Stakeholder participation: unsatisfactory
- The overall appreciation of the project implementation is mediocre. Rated elements are:
 - Implementation Approach: marginally satisfactory
 - Monitoring and Evaluation: marginally satisfactory
 - Stakeholder participation: marginally satisfactory

The overall appreciation of the project results is marginally satisfactory. Rated elements are:

- Projected emission reductions based on realized project results (improvement target): marginally satisfactory.
- Syrian Energy Services Centre operational as an independent unit and funded from non-project sources (Immediate Objective 1): satisfactory
- National Energy Efficiency Program adopted by Government of Syria and put into operation with government funding (Immediate Objective 2): unsatisfactory
- Baniyas Efficiency Management System installed and resulting in demonstrate efficiency improvements at plant operation (Immediate Objective 3): marginally satisfactory
- Baniyas Maintenance Management System installed and resulting in demonstrate efficiency improvements at plant operation (Immediate Objective 4): marginally satisfactory
- Power plant efficiency and maintenance management programs transferred to at least one other power plant (Immediate Objective 5): unsatisfactory
- Documented evidence of increased power system reliability (Immediate Objective 5): unsatisfactory

2. Introduction

2.1 Purpose of the evaluation

The final evaluation is intended to assess the relevance, performance and success of the project. It will look at early signs of potential impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The final evaluation is also supposed to identify and document lessons learned and to make recommendations that might improve the design and implementation of other UNDP/GEF projects. Furthermore, the final evaluation is to make forward vision recommendations related to the sustainability of project outputs.

The deliverables of the evaluation process are:

- List of evaluation indicators
- Questionnaires to be used during interviews
- Interviews reports (summary versions)
- Draft final report
- Final report

2.2 Key issues addressed

Key issues in this evaluation include:

- The quality of the national situation and capacity assessment during the project design stage;
- The project strategy and design, in relation to the objectives, size and implementation arrangements of the project;
- The relevance and quality of the technical achievements (demand side management activities; national energy efficiency program; supply side efficiency and maintenance management systems; PEEGT support team);
- The stakeholder involvement in the development and introduction of demand and supply side management

activities, and the national implementation process;

- Process characteristics of the project, steps taken during the project and distinctive characteristics of the project implementation;
- The results achieved with the project, in relation to the project documents and versus a reasonable expectation of possible achievements;
- The sustainability of the project outcomes, and further action recommended to improve the impact and sustainability of these outcomes.

2.3 Methodology of the evaluation

This evaluation aims at assessing the projects relevance, performance and success, early signs of impact and sustainability of results, identifying lessons learned, and making recommendations for the sustainability of project outputs and for future projects. For this, evaluation indicators have been developed, based on the evaluation issues relevant for UNDP/GEF Final project evaluation (annex 3, evaluation indicators).

An indicator targets an important, measurable aspect of an evaluation issue, with the aim to make a complex, principally qualitative issue measurable and (semi-) quantifiable. During the evaluation, fact-finding focuses on collecting data regarding these indicators (next to general qualitative and contextual information about the project), and during the analysis the projects results are valued against indicators (ranging from below to above what has been / might have been expected or was implied in the project design). Given that the project has had an unusually large scope and a rather long and dynamic implementation period, the evaluation could only cover the main issues for the various evaluation topics requested by the GEF.

Evaluation issues have been rated according to the assessment of the project on the indicators, complemented with the

contextual information and information of a strictly qualitative nature. The rating is reported and justified in the *Findings and Conclusions* section. The Evaluation outline (annex 2, Evaluation itinerary) provides a full overview of the project methodology.

The results achieved with the project have been assessed against the project documents (GEF project brief and UNDP project document), and – as it was concluded that the design was unrealistic – also against what could be expected from a project with the given size and duration in the contexts of an Arab country in transition. This latter assessment is not founded on a formal baseline, and as such is to be considered as indicative only. In the evaluators' opinion, however, it is the only realistic assessment possible of the project's outcome, under the circumstances.

2.4 Structure of the evaluation

The evaluation included the following steps:

- The desk review of (all kinds of) project documentation, including the project document, implementation and progress reports, and technical outputs. This review has served to (a) generate an overview of the project, its context, proceedings, outputs and outcome; (b) develop a list of evaluation indicators for the assessment of the project; and (c) to collect data regarding the evaluation issues and indicators. A review of the UNDP project archive has been conducted to track implementation issues and management decisions during project execution, and to track financial aspects of the project. The desk review has taken place in the initial stage of the evaluation, and during a mission to Damascus. A list of reviewed documents is included in annex 4 (List of documents reviewed).
- Interviews with project officers and (representatives of) major stakeholders involved in the project. The interview schedule is included in annex 5 (List of persons interviewed). These interviews have served to (a) complete the overview of the project, in its context, and the relevance and (future) impact of the projects outcomes according to

the involved organizations and stakeholders; (b) complete the fact finding regarding the evaluation issues and indicators; and (c) assist in the assessment of the project by asking the involved organizations about their impression of the projects results on specific issues (indicators), where relevant. A questionnaire, developed during the desk review phase, was used for these interviews (semi-structured interviews) (see annex 6).

- Additional desk review of (interim and final) project outputs and documents has taken place at a later stage to create a better overview of the relevance and sustainability of the results achieved and of the technical issues that emerged during the review of the project. Detailed technical comments regarding the sustainability of the project's impacts have been included in annex 7 (Detailed technical comments regarding project impacts).
- The analysis of the collected information, and assessment of the projects relevance, performance, success and potential impact. Collected data have been analyzed and structured according to the evaluation indicators. Where target values for evaluation indicators exist (in the project proposal or in the progress reports¹), the observed results of the project have been compared to these target values. Where these target values did not exist, a status quo description has been given and an assessment of the projects results based on a review of the project documentation (and the implied assumptions in it), reference information from similar developments in other situations, stakeholders opinions and the evaluators judgment. Ratings have been assigned based on this information. Together with the overview and contextual information, this formed the basis for this final evaluation report.

The evaluation took place from 6 August to 28 December 2006, including a mission to Damascus from 23 to 29 September 2006.

At this time, the project was concluded almost a year ago and the project team largely dismantled. Due to some administrative issues and a security situation, the final evaluation had to be postponed to the time indicated. Since key project staff has moved on to work in a similar field and with the executing agency, it was possible to interview most of the key people nevertheless.

A draft final evaluation report has, via the UNDP Syria country office, been circulated with the project team and the main stakeholders of the project. Comments and additions have been included in this final version of the report.

¹ Major changes in the project design have been initiated via progress meetings. The reports of these meetings complement the project document in these aspects.

3. The Project and its Development Context

3.1 Introduction

The project is characterized by an unconventional planning of activities, and various project documents that show little interrelation. Especially the UNDP project document (detailing project activities), which follows on to the GEF project brief (detailing project strategy and approach), makes little use of the lessons and strategic (STAP) review remarks included in the project brief. It should be noted that the GEF project brief was unknown with all involved parties in Syria (including the project management and UNDP), and that it was re-introduced only with the final evaluation². The UNDP project document was based on a new assessment of the national situation, in the evaluator's impression largely ignoring the GEF project brief.

During project implementation, several changes have been made in the project strategy, via yearly project implementation reports and tri-partite reviews, as well as a rather substantial delay in the project implementation. The mid-term evaluation of the project touched upon this and suggested further changes in the project's implementation, which were adopted during a yearly review meeting. Although formally correct, this approach does not do justice to the magnitude of the changes and delays. A revision of the project strategy and project document would certainly have been preferable, to integrate the various ad-hoc changes into a manageable package of activities.

An issue not raised during project design, implementation, review or mid-term evaluation is the scope of the project: the project covers both supply and demand-side management activities, and within these a range of objectives and sub-objectives (listed as outputs). Overall, nearly forty largely independent outputs were identified in the project design, a number far too large for any project. In the evaluators' opinion, a program (consisting of various projects) would have been required to implement all objectives, rather than a single project.

After three years of implementation (for a project with a planned duration of three years), work had started only on approx one quarter of these outputs, and none was at or close to completion. It is remarkable that this observation has not led to a reconsideration of the project strategy, and only to an extension of the project's duration. Such omission should be considered a serious error in the supervision of the project.

Noteworthy is further that many concerns raised in the GEF project brief and/or STAP review, not followed-up in the eventual project design, later led to significant disturbances in the implementation of the project. It is unfortunate that this final evaluation must (in following sections) point out issues that had been addressed already ten years ago, but were forgotten in the years in between.

3.2 GEF Project Brief

Project Objectives

The project was developed to strengthen the capacity of the Syrian Arab Republic to implement and sustain long-term energy efficiency efforts that will have positive impact on both global and local environment. The preparation of the project was preceded by preliminary audits on sample industrial sites performed by Ekono Energy in 1994. A Feasibility Study was funded using GEF PRIF (Pilot Phase) resources. The preparatory work was carried out during a six months period in the first half of 1994. During the PRIF phase, five energy audits were completed as well as a capacity assessment program. As part of the Feasibility Study for the present project, an energy audit was performed on Baniyas power plant, which recommended rehabilitation of the four Baniyas units and further investments in efficiency and maintenance management systems. In 1996 a GEF project brief has been developed and submitted for approval. The project contained two components – the first addressing the supply side of the Syrian power sector and the barriers to the efficient generation of power and the second focusing on the demand side and the issues that render energy conservation unknown and

² Using the version available in the GEF projects database, www.gefweb.org, accessed on 21 September 2006.

unfeasible in all Syrian sectors and society. The expected start date in the proposal was January 1997 with three years of project duration.

The GEF project brief outlines two strategic goals: 1) to improve the efficiency of electric power generation in Syria's power plants and to provide an alternative to the approach focused only on increasing supply to meet demand, and 2) to increase the independent capability of Syrian entities to evaluate and implement energy conservation activities focusing on improving the efficiency of industrial end-use and promotion of the use of Integrated Resource Planning into Syrian power sector planning.

The overall objective of this project was to assist the Syrian Arab Republic in its efforts to reduce the growth of GHG emissions that result from electric power generation and the inefficient consumption of carbon based fuels. In the long term, the project objective was to promote the self-sustaining capability of energy sector authorities and utilities to implement strategies of integrated energy utilization to improve power supplies with minimum environmental and economic cost.

The project has the following objectives:

- to support efficiency improvements and loss reduction in power generation through advanced efficiency control measures and maintenance management systems. Baniyas power plant was selected as pilot plant for these activities and the government of Syria has committed itself to replicate these systems in all other Syrian power plants, using Baniyas as a training laboratory;
- to support energy conservation and efficiency through adoption a National Energy Efficiency Program;
- to facilitate the adoption and implementation of energy conservation measures in the industrial, commercial, and public sectors through the establishment of an Energy Services Center, (Syrian Energy Services Center - SESC);

- to stimulate and guide the industrial sector in the field of energy auditing, optimal operation and better house-keeping;
- to promote Integrated Resource Planning in the electricity sector through introduction of advanced planning tools and training;
- to assist in the international and regional transfer of experience and technology; and
- to promote public and private sector investments in energy projects beneficial to the global environment.

Barriers and strategy

The project contained two components. The first addresses the supply side of the Syrian power sector and the barriers to the efficient generation of power. The second addresses the demand side and the barriers that render energy conservation unknown and unfeasible in all Syrian sectors and society.

Barriers to the Implementation of supply side efficiency and maintenance

The following three main category of barriers have been identified for the supply side efficiency: 1) *Information and awareness* - neither decision makers nor the staff of the MoE have adequate awareness of and information about preventive maintenance, efficiency control and the operation of market oriented utilities; 2) *Human resources*- technicians and engineers are accustomed to relying upon corrective action and have never been trained in preventive maintenance or efficiency control measures, there is insufficient capacity among MoE engineers & technicians to undertake the task of implementing and enforcing Energy Efficiency measures at the supply side of the Syrian power sector and 3) *Access to technology* - No Efficiency Management Systems (EMS) or Maintenance Management Systems (MMS) exist in Syria at present.

The project strategy to overcome these barriers included the following main activities:

Information and awareness - Increase the awareness and knowledge of MoE officials (managers and policy/decision makers) on the components of a market oriented/self sustaining utilities company including modern utilities management concepts, economic and financial methodologies/strategies and outcomes, MMS, EMS and their implications on economic return/profit and sustainability.

Development of a training program (both on and off site) for selected officials through subcontracting a modern and efficient utility.

Establishment of twinning arrangements for middle level managers from the MoE (two from PEEGT and two from PEDEEE) with an established and comparable power plant in Europe or the US.

Human resources - training programs designed and implemented after initial assessment of existing education and experience of the personnel, power plant personnel to be trained through participation in EMS and MMS engineering projects under the supervision of equipment and software suppliers.

Access to technology - organize training for MoE technicians in modern power plants where efficiency control systems are in use, acquaint MoE officials with already commissioned high-efficiency advanced power plant concepts, and the associated benefits, implement an EMS and MMS at the Baniyas power plant, follow up and monitor the EMS and MMS activities and the results achieved in fuel savings and emissions reductions, pursue the replication of efficiency monitoring and maintenance management concepts in other condensing power plants and provide the conceptual framework and specifications for an efficiency monitoring system and preventive and predictive maintenance system to be replicable in capacity expansion projects already at the design stage.

Barriers to Energy Conservation and Planning in Syria

The specific barriers to energy efficiency conservation are: 1) *Information and awareness* - lack of knowledge of decision makers and other staff at the MoE and the

Ministry of Planning on the concepts of integrated energy planning and its potential impact on development and sustainability of power services, energy conservation, and power supply security and availability; lack of knowledge on energy conservation and its economic and environmental potential among decision makers, managers and operators in the commercial and industrial sectors; insufficient in-depth knowledge in MoE of consumption habits and consumer behavior coupled with insufficient data and information on the specific areas where energy conservation measures will have the greatest impact; 2) *Institutional and human capacity* - insufficient capabilities among the MoE technicians to undertake tasks of implementing and marketing energy conservation measures in the industrial and commercial sectors and energy planning in the power sectors; inadequate institutional capacity to undertake promotion of energy conservation in the commercial and industrial sectors and 3) *Access to technology* - lack of familiarity with and the demonstration of technological options for the promotion of energy conservation in commercial and industrial sectors.

The project strategy to overcome these barriers included the following main activities:

Information and awareness - organize seminars in energy economics, energy efficiency measures and energy usage, monitoring and control for managers and operators from 20 large industrial companies; create data base in MoE on electricity consumption of different consumer groups, load patterns, and saturation and ownership of electric appliances; organize seminars for senior MoE officials and senior officials from the Ministry of Finance on energy planning strategies in general and Integrated Resource Planning in particular; collect information and feedback from consumer groups, with respect to energy conservation attitudes, involve Syrian university departments in outreach work to promote conservation and energy awareness in commercial, private and public sectors.

Institutional and human capacity - establish a Syrian Energy Services Center (SESC) associated with the MoE, which will provide private and public sector assistance such as energy auditing and identification of investment opportunities in energy efficient technologies and service areas, training of the SESC professional staff ; undertake policy research and provide policy advice plus model legislation to energy policy makers in general and MoE policy makers in specific to create incentives for energy conservation; Create and implement information programs on energy efficiency to help consumers and enterprises to develop energy-efficient practices, and to promote overall awareness of the benefits of energy conservation; carry out a comprehensive Integrated Resources Planning study combining least-cost studies of both supply and demand side options; establish energy savings targets and evaluate energy savings potential and energy savings results; establish systematic procedures for computerized DSM planning, data collection and creation of necessary data banks.

Access to technology - ensure that the SESC is fully equipped for industrial and commercial energy audit services; establish a testing laboratory within the Industrial Training and Research Center; introduce low-investment energy-saving improvements and housekeeping improvements in 20 industrial companies.

Potential Risks

Two main potential risks have been identified in the GEF project brief:

- 1) No immediate interest in the services of the SESC from public sectors other than Electricity and the private and commercial sectors. To overcome this initially SESC will be working under contracts for the two electricity establishments to become sustainable and Syrian Government should start to introduce changes in the existing electricity tariff structure
- 2) Trained staff do not remain in their posts. To overcome the risk a proper combination of salary package as well as some contract stipulation for the trained staff should be introduced in order to retain the project staff.

STAP review comments

The STAP review comments are given as an annex to the GEF project brief. The overall impression of the reviewer is that the project could have substantial energy, economic, and environmental benefits for Syria and there are some specific comments and proposal for modification in the planned activities. The main comments concern the scope and activities for the proposed SESC. To improve the effectiveness of the project and increase the long term benefits it is proposed to narrow the initially planned very broad responsibilities of the center to only performing energy audits and implementing energy efficiency projects. The other activities proposed for SESC (policy development, training, education, promotion, working on IRP, legislation, etc.) should be part of the national energy efficiency program to be implemented by the Ministry of Electricity or PEDEEE. In addition to the activities listed in the project proposal the national energy efficiency program should establish energy savings targets, evaluate energy savings potential and energy savings results, and work on obtaining financing for energy efficiency projects. Further the National program should encourage the entry of number of SESCOs into the Syrian market both national and international ones. Other major comment concerns the proposed sequence of the activities. In the earlier stage of the project priority should be given to making energy efficient end use technologies widely available in the marketplace, collecting data on energy use and analyzing energy savings opportunities, and carrying out demonstration projects; and that less priority be given to training and adopting integrated resource planning (IRP) methods. IRP activities should be postponed until sufficient data and experience in the country are obtained. Wide involvement of different stakeholders in the project implementation is proposed by set up of business and consumer advisory council which could review the project activities, make recommendations and facilitate interaction between the national energy efficiency program and major energy users. Other comments concern the SECS personnel and specialists (adding motor system and commercial building design specialists to the staff) and

the proposed two year time frame of the project which should be prolonged with at least one year.

3.3 UNDP project document

Project start and duration

In 1998 two consulting companies were hired to develop the UNDP project document - Haigler Bailly prepared the Demand side part (Components 1 and 2) and Hydro Quebec International prepared the Supply side (Components 3 – 5). The project document estimated a start date of the project November 1998 and defined the duration of the project activities to 4 years. After the project document was signed there was a subsequent delay in the start of the project activities due to a disagreement between the Government of Syria (GoS) and the UNDP on the recruitment of the National Project Director.

In May 1999 a procedure was started for selection of National Project Director who was hired in August the same year. The Steering Committee was installed in October 1999 and according to the project Inception Report the project start date was set for October 1999 with an expected duration of 4 years. The end of the project was foreseen for September 2003.

Issues that the project seeks to address

Syria has made remarkable progress since 1990 towards improving both its economy and energy situation. It has been estimated that energy management can not be improved without significant new actions. Oil is critical for Syrian economy, with oil exports accounting for 70% of Syria's total income from export while the production of oil is expected to steadily decline over the years. The focus of the project was to embark an aggressive program for energy efficiency improvement in sectors with significant potential of both supply and demand side.

In the residential and commercial sector, the preliminary studies have shown a large potential for improvements in building efficiency as well as electric appliances. There were various barriers identified to the improvement of the demand side energy efficiency due to the disaggregated nature of energy end use, the years of subsidized energy prices and the dynamics

of a centrally planned economy. The major ones were:

- Need for further energy price rationalization - low energy prices are significant barrier to investments in energy efficiency;
- Absence of institutional focus – no specific government institution is responsible to design and implement policies and programs to improve efficiency;
- No national policy promoting the more efficient use of energy;
- Unavailability of attractive financing;
- Lack of data for assessment of the energy efficiency potential;
- Low level of awareness and motivation of both end energy users from industrial and commercial sectors to save energy;
- Lack of energy efficient technologies on market;
- Insufficient human resources trained and skilled to solve energy efficiency issues.

On the supply side the focus was put on the Baniyas Power Plant, which in 1995 has generated about 20% of all electricity in the country. The energy audit in 1994 found out that units 1 and 2 were operating at 8.4% and 10.1 % below the designed efficiency and units 3 and 4 at 3.7% and 3.4% below original efficiency. The Syrian government has committed itself to the rehabilitation of the Baniyas Power Plant and UNDP GEF project was expected to provide the incremental funds needed to demonstrate a modern, computerized energy efficiency and maintenance management systems. The main barriers preventing the improvements in the power plant from being implemented were:

- Utility staff and decision makers lack of information regarding the importance of preventive maintenance, maintenance management and energy management;

- Technicians and engineers were not sufficiently trained in preventive maintenance and how to manage an utility in an efficient and financially sound manner;
- There were no Efficiency Management Systems or Maintenance Management Systems in Syria.

Development and immediate objectives of the project

Development Objective

The development objectives of the project were:

- to remove perceived risks associated with the installation and operation of efficiency and maintenance management systems in power generation facilities by demonstrating the effectiveness of technology and training plant staff in its operation and use;
- to remove barriers to energy efficiency in industrial and commercial facilities providing highly skilled energy audit and engineering services, project financing, and training and information to plant managers and operators.

Immediate Objectives

The project was expected to contribute to the Development Objective through the creation of a multi-purpose Syrian Energy Services Centre (SECS) and National Energy Efficiency Program (NEEP) and by improving supply-side efficiency through the demonstration of Efficiency Management Systems and Maintenance Management Systems (EMS/MMS) in the Baniyas Power Plant.

The outputs under each Immediate Objective are given below.

Immediate Objective 1: Establish the Syrian Energy Services Centre

- Output 1. Operational Quick Savings Program (QSP)
- Output 2. Operational Industrial Efficiency Program

- Output 3. Operational Boiler/Furnace Efficiency Program
- Output 4. Operational Steam System Efficiency Program
- Output 5. Operational Electric Motor Efficiency Program
- Output 6. Operational Power Factor Correction Program
- Output 7. Technical Training Programs
- Output 8. Long-term Business Plan for SECS developed and initiated

Immediate Objective 2: Develop the National Energy Efficiency Program

- Output 1. Information Dissemination and Promotion Program
- Output 2. Energy Efficiency and Conservation Hotline
- Output 3. Launch of NEEP: Awards for Energy Efficiency Program
- Output 4. Full DSM assessment of energy/electricity use
- Output 5. DSM Pilot program designed and implemented for residential sector
- Output 6. Energy efficiency labels and standards
- Output 7. Energy policy initiatives analyzed and designed

Immediate Objective 3: Demonstrate Baniyas Efficiency Management System

- Output 1. Scope of work for Implementation of EMS
- Output 2. Establish Appropriate Targets for Energy Efficiency
- Output 3. Detailed List of Monitoring Parameters
- Output 4. Complete Monitoring System Established

- Output 5. Baniyas Power Plant Staff Capable of Operating and Maintaining EMS

Immediate Objective 4: Baniyas Maintenance Management System

- Output 1. Scope of work for Implementation of MMS
- Output 2. Establish Appropriate Targets for Reliability
- Output 3. Fully functional Maintenance Management System Installed
- Output 4. Baniyas Power Plant Staff Capable of using MMS

Immediate Objective 5: Establish PEEGT Efficiency and Maintenance Management Support Team

- Output 1. Institutional and Organizational Structure and Resources Identified
- Output 2. Adequate and Fully Operational Equipment Available
- Output 3. Operational System of Reliability Indices
- Output 4. Capable Trainers and Training Modules
- Output 5. Thorough Review of EPS Section Undertaken

Main stakeholders

The main potential stakeholders identified in the beginning of project were:

- The Government of Syria, in particular the Ministry of Electricity, which benefits from strengthened capability for policy formulation and implementation
- Public Establishment of Electricity for Generation and Transmission (PEEGT), which benefits from the improved performance of the Baniyas power plant and subsequent extension of the management systems to other plant
- Public Establishment for Distribution and Exploitation of Electrical Energy

(PEDEEE) and the branches of its local distribution companies that should acquire skills in energy efficiency to be able to manage better the load growth

- Ministry of Industry - to serve better its industrial branches
- Ministry of Education - to strengthen the syllabus of the schools
- University of Damascus and eventually other universities - to improve their teaching programs and research activities
- Industrial consumers of energy - to save energy, lower their costs and improve their position in new competitive markets
- Residential electricity consumers, who benefit from lower costs of supply, more efficient appliances and better information
- Local private-sector companies - to improve their skills and contribute to the private sector offer of services expansion
- Local NGOs involved in the provision of energy services that can improve their understanding and strengthen their activities
- Manufacturers of appliances who should be better positioned to compete on world markets

Results expected

It was expected that by the end of the project Syria will have a strong institutional and technical base for continuation of the efforts to utilize the energy efficiency potential of the country and to achieve the related reductions of greenhouse gas emissions.

On the demand side the project was expected to lead to:

- establishment of a fully functioning Energy Services Centre at the Ministry of Electricity, including permanent office space, a dedicated staff of 15 professionals and equipment necessary to carry out the energy conservation

services, program design and implementation and policy research;

- establishment of a specific financial mechanism as an incentive to investments in energy efficiency following the DSM assessment potential and the design of residential DSM pilot program;
- establishment of a National Energy Efficiency Program including: information materials and programs regarding energy efficiency, policy research and recommendations for possible legislative and other action, load and energy end use research capacity building, program monitoring and evaluation capability and results reporting, development of energy efficiency codes and standards.

On the supply-side the project was expected to lead to:

- establishment of energy efficiency and maintenance management systems and the installation of the equipment necessary to support these systems in Banias units 1 – 4;
- establishment of efficiency and reliability targets for Banias units 1 – 4;
- trained staff to fully support the efficiency and maintenance management systems;
- creation of an efficiency and maintenance management team in the technical department of PEEGT to transfer the lessons learned at Banias plant to other power plants.

3.4 Mid-term evaluation report

In 2002 mid term evaluation of the project has been performed in compliance with the requirements of the Standard Procedures of the UNDP Monitoring and Evaluation Unit. The purpose of the evaluation is to provide donors, government and project partners with an independent assessment of the status, relevance and performance of the project against the expectations of the project document. Brief summary of the main findings and recommendations in the

Mid term evaluation report³ is presented below.

Summary of findings

Demand side (Objectives 1 and 2)

The Syrian Energy Services Centre has been established though the process took longer than foreseen, mainly because older engineers in Syria are often unfamiliar with the concepts of energy efficiency and it took time to build up and train a complement of recent graduates. SESC staff was trained in Egypt by Alexandria Electricity Distribution company, number of training courses were organized by the centre afterwards (governate distribution companies, local industries). SECS staff has started to perform energy audits for public industries. According the evaluation report the Centre has been effective in establishing cooperation with the governate-based distribution companies. It has created energy efficiency teams in all distribution companies and several have performed their own audits. The Centre has also been effective in developing working relations with the General Organizations within the Ministry of Industry that are responsible for different branches of industry – textile, chemical, woods. The project has created a good network of collaborators in the governates and in industry.

Relatively little has been done towards the establishment of a National Energy Efficiency Program. Some progress has been made with information dissemination - SESC brochure and quarterly newsletters, brochures on insulation, boiler efficiency, residential sector flyers, posters and materials for Ministry of Education school program has been produced and disseminated. Joint project was developed with Ministry of education to introduce energy efficiency issues in school curriculum, committee set to develop detailed activities. University of Damascus has plans to introduce course on energy efficiency in Mechanical and Electrical engineering faculty. The report outlines that the efficiency might be improved by a more use of local specialists in advertising

³ Draft version of the Mid term evaluation report has been used to present the main findings and recommendations, no final version of the report has been presented during the final evaluation mission and after.

and media. To determine the effectiveness of the information campaign the evaluators proposed to commission consumer surveys, the survey could also help in identifying targets, content and means of distribution. Good information materials have been produced also by the UNDP/GEF projects Egypt and in Palestine and the evaluation team recommended an exchange of materials between the three projects that would be beneficial for all parties. The other activities have been neglected (DSM and policy analysis, energy efficiency hot line and awards, energy efficiency standard and labels). The evaluation report recommends an urgent start of these activities.

Supply side (Objectives 3-5)

By the time of the evaluation very little work has been done under these objectives mainly due to delay in the rehabilitation of Banias units. Evaluators observation are that the work envisaged under these objectives is well within the capabilities of the project staff and can be highly effective but requires that a determined and well-managed program is put in place and that the necessary preconditions of rehabilitation and firing conversion are soon completed.

Summary of recommendations

General recommendations to project management and implementation

1. The uncommitted funds should be used to extend the project for one year in order to achieve the original aim of the project, to build a sustainable capacity to design and implement energy efficiency strategies.
2. There should be a clear separation between the Executive and Implementation functions and within the Implementation function there should be a clear separation between direction and management. Two project managers should be hired under the Project director – one on demand and one on supply side activities. Meetings of the Steering Committee should be resumed and the Executive function should be performed by the Steering Committee chaired by the Deputy Minister.

3. A new set of outputs to the Immediate Objective 1 to be approved by the project management:

- Output 1. Walk through audits of 200 plants
 - Output 2. Detailed energy audits covering boilers, steam and electrical systems of 50 plants
 - Output 3. Preparation of detailed design and feasibility studies for 20 investment projects
 - Output 4. Supervision of installation of 10 projects in conjunction with company staff
 - Output 5. Development of a database of industrial energy use, by product and by process to support the energy efficiency policy implementation
 - Output 6. Development of a training program
 - Output 7. Development of an exit strategy for the transfer of the methodology and technical capability to the National Energy Research Centre and/or the private sector at the end of the project.

4. More use should be made of local skills through the budget for national consultants.

5. Specific recommendations to project outputs (not detailed here)

Since no log frame was included in the initial project document, the evaluation team has constructed a complete log frame based on the project document and has proposed a new log frame for the changed outputs of Objective 1.

Impact of project review

The Tripartite Review meeting held after the mid term evaluation has recommended to project management to take into consideration all recommendation of the project review. During the final evaluation the observation is that only part from the general recommendations as well as the specific output recommendations have

been implemented. The project has been extended with one year and the new outcomes for Objective 1 have been adopted. Concerning the project management – no additional staff have been hired to separately manage demand and supply side objectives and there is no clear records and documents to justify that regular Steering committee meetings have been held. It look like that the practice of non usage of national consultants have been continued and the explanation about this was that there is no existing expertise in Syria on energy efficiency issue except from the project staff itself.

3.5 PIRs and TPRs

The following annual project reports/progress implementation reports have been prepared by the project team and reviewed during the final evaluation.

- Project inception report (October 1999)
- Annual project reports 2000 (September 1999 – December 2000), 2001 (January 2001 – December 2001), 2002 (January 2002– December 2002), 2003 (January 2003 – May 2004) and 2004 (July 2004 – June 2005). The reports present overview of project activities during the reported period, as well as summary of main problems affecting the project implementation. The reports have been presented and approved at the annual tripartite meetings.
- Annual Project Implementation reports (PIR) for 2000 – 2006⁴. The reports follow the standard GEF/UNDP format and contain rating of the achievements by project outcomes based on the logical framework developed during the Mid-term evaluation. The overall rating of the project achievements for all years of the project implementation is Satisfactory (S).
- Annual Tripartite meeting reports 2000, 2002-2005. All reports give specific recommendations towards improvement in project implementation as well as approval of changes in planned project activities (e.g. cancellation of Energy efficiency award, transfer of the hot line service to web based service).

- By the time of the final evaluation (September 2006) the final project report was not developed.

Some of the major decisions taken by during the Tripartite meetings concerned the project duration. The end date set in the project Inception report on October 2003 and later this has been postponed several times:

- The Mid-term evaluation report (September 2002) has recommended one-year extension of the project. This is due to the fact that during the time of the evaluation there has been a considerable delay in achieving the outputs for both demand and supply side components as well as at the time of the evaluation the project funds have been substantially under spent. The evaluation team proposed the uncommitted funds to be used for one year non-cost extension of the project in order to achieve its objectives. The recommendation was accepted and the expected end day was set to October 2004 (no official record or document has been presented to formalize the decision taken, except a recommendation in the TPR 2003 report for project management to take into consideration all Midterm evaluation recommendations).
- The annual report of 2003 (covering the period Jan 2003 - May 2004) proposed an additional one year extension and the project end date was set to October 2005. TPR meeting in 2004 has approved the extension and official letter from UNDP for the approval has been requested and received.

⁴ A draft version of the PIR for 2006 was available at the time of the evaluation

4. Findings and Conclusions

4.1 Project Formulation

The project was initially designed in 1996, at about the same time as other energy efficiency projects in the Arab region, following a 1994 exploration of energy saving opportunities. During the design, STAP review and GEF approval process, the project was adapted to reflect comments about the scope and approach of the project. The implementation of the project started in 1998, with the redesign of the project, in two separate parts, for the supply and the demand-side activities. This redesign included an extensive review of the national situation, with little attention for the previous work or review comments. The project was further implemented, starting in 1999, based on the redesigned project plan, recorded in the UNDP project document.

Overall, the project design as used for this project (UNDP project document version) is rather poor: it was a reflection of the needs for energy efficiency of the country, but had little attention for the implementation capacities and arrangements needed to deliver improvements, not of the scope of activities that could be combined into one project. The result was a project document with close to 40 largely independent activities, all to be implemented by one unit within one Ministry, and with a budget insufficient for that scope.

Given that the project was designed approx 10 years ago, and that there have been many personnel changes with all involved parties, it is difficult to assess the project design phase in detail. National ownership and stakeholder involvement during project design appear to have been (too) limited, and have not evolved much outside of the parties directly involved in project implementation since. There is no reference to stakeholder consultations or planned stakeholder involvement (outside of government units) in the project document.

The overall appreciation of the project formulation is unacceptable. Rated elements are:

- Conceptualization / Design: unsatisfactory
- Stakeholder participation: unsatisfactory

Conceptualization/Design (R)

Rating: unsatisfactory

A joint UNDP/World Bank study 'Energy Sector assessment report' identified electricity loss reduction in transmission and distribution, along with improvements in power plant efficiency and availability as high priorities for Syria. One power plant, at Baniyas, was singled out as it was one of the largest in the country and operating significantly below desired operating conditions. This focus was later extended to cover not only supply-side energy efficiency, via a demonstration project at Baniyas, but also industrial, residential and public sector demand side energy efficiency. This extension, although understandable given the main needs of the country, should be considered a strategic mistake, as it changed the project from a well-targeted one into a project covering about every aspect of electricity generation and use in the country, which is clearly impossible in a single project, especially in an area which was new to a country (and UNDP).

The conceptualization further evolved with a feasibility study into industrial energy efficiency pilots, by means of (four) energy audits of industrial facilities, as well as a further audit of the Baniyas power plant. The audit of Baniyas resulted in an estimate that (bad) maintenance aspects were responsible for 65 – 80% of the loss in efficiency at the Baniyas plant, and the remained due to operational reasons. The industry audits resulted in the recommendation that an extensive human resource development program should be implemented which includes, but is not limited to, courses and on-the-job training in energy use, conservation and efficiency measures.

A national energy centre was designed as the core element of the demand-side of the project, to continue with energy audits on

site and work on better housekeeping, energy saving investment opportunities, and other activities. The centre was planned to operate as an energy services company (ESCO) charging industries for its services. This concept was considered to be very promising at the time; today views are a less optimistic about the feasibility of the ESCO concept for energy audits, especially in developing economies. The idea of an energy centre to perform detailed audits and support an improvement process at industrial facilities has been applied many times, and successfully, and can be considered as a good way of tackling industrial energy efficiency. The rationale for tagging this onto a supply-side energy efficiency project was - and remains - very weak, however, as the focal point of the activities, their time line, investment needs and involved parties are almost completely different.

The project design, as presented in the GEF Project Brief, further included the development of a national energy efficiency program and the introduction of integrated resource planning tools. Regarding these latter aspects, no reference is made to the very low, heavily subsidized electricity prices in Syria. These prices have been increased in the last ten years, but were extremely low at the time that the project was designed. This is a well-know barrier to any demand-side energy efficiency measure, and initiatives should have been taken to work towards more realistic energy prices and/or find alternative models for investing in energy efficiency (like government or utility-financed measures). However, as the price issue was not raised, these essential aspects have not been dealt with. Further, autonomous electricity demand growth rates are not listed in the project design; these are around 10% per year (source: IEA energy statistics, www.iea.org). In other words, the project envisaged to save less than 2% electricity demand against an expected rise in demand of around 45% over the same period, which is hardly a justified cause and should have led to a call for a more⁵.

⁵ National electricity demand has more than doubled over the time it took to implement the project, thus making the planned impact of the project rather futile for (what was intended to be) a national strategy.

After approval of GEF-financing for the project, UNDP initiated a new project design stage, this time in two parts: one focusing on the Baniyas power plant, and one on demand-side matters. This project design stage seems to have started almost at zero again, not taking into account the directions that had been developed and externally reviewed during the preparation of the GEF project brief. The new design focused, on the supply-side, almost exclusively on installing energy efficiency and maintenance monitoring equipment, in coordination with a planned rehabilitation of the Baniyas power plant, and training for its use. The recommendation from previous preparatory work, also reported in the GEF project brief, that the vast majority of losses was due to maintenance issues and that human resource development would be key to improving that, was ignored in this new design. On the demand-side, the new project design included a wide range of activities, including seven (!) different, partially overlapping industrial energy audit components in parallel, and a variety of different measures (from a country-wide demand side management-assessment, to a residential DSM program and a standards and labels program) as sub-components. It should have been obvious from the start that this was completely out of scope for any project team, especially in a country without prior experience in energy efficiency programs. This was later proven by the fact that of the 16 different demand-side activities, only one has been fully developed as planned, and then only after twice the time planned for the project.

In summary, the GEF project brief already included a challenging project design, by combining two rather different components and not paying enough attention to the role of other parties and the distorting effect of heavily subsidized energy prices. It would have been rated below satisfactory, had it been used in the project. The following new project design, however, managed deliver a project design that is actually a big step down from this already challenging starting point. It is difficult to understand why UNDP choose to first initiate such a new design phase, having already had two (and perhaps three) analyses, and then adopt a design which is clearly impossible to implement.

This is further reflected on in the recommendations section.

Evaluation indicators for this item:

1. Project design targets root causes of energy consumption: In a way, as it targets all electricity demand. There is no fusing or prioritization of activities towards root causes, however.
2. Project design (summarized in LogFrame) is appropriate and suitable for the national context: No, it is rather inappropriate, and not based on a logical framework or other structured planning process
3. Project design includes sufficient indicators to track progress and measure outputs: No, no indicators were present in the design. Some were later introduced during the mid-term review, but only on activity level.

Country-ownership/Drivenness

The project builds on the national recognition that energy efficiency is essential to securing the energy supply system for the country. It was initiated at a time of lack of electricity supply capacity, and the need to act on this was clear. Since power generation and distribution are government-owned, a substantial share of the demand is used in state-owned industries and all electricity consumption is heavily subsidized by the state, it is in a unique position to act and apply least-cost solutions to energy supply and demand.

The fact that an increase in electricity generation capacity was needed, and that it would be even better if this could be delivered by means of an efficiency improvement in power plants, seems to have received a good reception with the Syrian government. The government itself had planned to invest a very substantial sum in the upgrade of the Baniyas power plant, in coordination with, and as co-financing to, the project.

The fact that this co-financing was not delivered until the end of the (extended) project, however, somewhat undermines the priority that the Syrian government seems to have given to the issue of supply

side improvements. The ownership of the project also did not seem to have stretched beyond the Ministry of Electricity, however, and there is little to no evidence of other government units or non-governmental party involvement in the project design.

The project appears to have started as an outside initiative, with little institutional commitment in the Syrian society. This has improved somewhat during implementation, but more and longer efforts would have been needed to secure a full institutional backing of the energy efficiency activities, especially on the demand side.

The non-Ministry of Electricity stakeholders that have been exposed to the project indicate that this was fairly recently, and have little or no understanding of the overall scope of the project. This indicates a limited involvement during project design. A steering group was active a times during the project, but seems to have had little attention for the overall direction of the project, which is understandable as it was so wide-ranged that the majority of activities would be not of interest to most stakeholders. Together, this indicated that national ownership of the project was weak at the project's start, although this has improved somewhat during the implementation of the project.

Evaluation indicators for this item:

4. Project concept originates from within and is supported by national institutions: no, the project concept appears to have originated without much national involvement, and support beyond the Ministry of Electricity appears to have been limited.
5. Project concept targets pressing national environmental and development needs: yes, improving energy efficiency is an important environmental and development goal.

Stakeholder participation (R)

Rating: unsatisfactory

Stakeholder participation in the design phase of the project is difficult to assess, given the fairly long time between project design and this evaluation, and the fact that most key personnel of involved parties has changed since the project design phase. None of the parties involved in the final stages of the project, including stakeholders, reported to having been involved in project design. No roles or capacities of stakeholders are reported in the project document. Comments by current stakeholders representatives (reported in section 4.1.2) indicate that stakeholder involvement in the project design phase has been very limited.

Evaluation indicators for this item:

6. Stakeholders have been actively and passively informed about the project and its results: No, only when they were targets of project activities.
7. Key stakeholders have been consulted about core project decisions and have provided significant input into the project: No, some consultation has taken place, but to a very limited extent.

Replication approach

During project design, some lessons learnt from other countries have been applied, particularly regarding the energy centre. During project implementation, experiences and lessons learnt have been exchanged with similar ongoing projects in the region (Jordan, Egypt). This has been beneficial to this project, and may have benefited the other projects as well.

No formal exchange of experiences is foreseen after this project, although that would certainly be recommended. This project includes some important lessons and can share good and bad experiences, which are likely to be of interest to other countries, many of which are developing energy efficiency programs, or would benefit from such activity.

Some of the experiences of this project are indicated in the Lessons Learned section of this report.

Evaluation indicators for this item:

8. Project has communicated lessons learned and sought cooperation with new or ongoing projects of similar concept: yes, during project implementation (not before or after)

UNDP comparative advantage

The project has been implemented by UNDP mainly as a stand-alone activity, with limited links to other projects in the country. This is not surprising, as the project concept was new to the country and no other projects UNDP or GEF-funded were operational in the energy field. As an alternative, UNDP could have tried to link the project to other internationally-funded activities, like the European Union projects in the region dealing with energy matters, mainly in recent years. No indication of such links has been found, however. The project has benefited from contacts with other countries, mainly Egypt. To what extent this is the result of a UNDP intervention is not clear, though.

In relation to other UN organizations, UNDP was well-placed for the capacity building and stakeholder involvement aspects of the project, that should have been dominant in the demand-side part of the project. The UNDP advantage in the supply-side part, which consisted in majority of an investment in power-plant (monitoring) equipment, is less clear.

9. Project is linked with other projects or programs in the sector via well-developed management arrangements: somewhat, via cooperation with projects in other countries in the Arab region.

4.2 Project Implementation

Overall, project implementation was mediocre. Good use was made of experiences in another country, however, the implementation approach lacked focus and the use of good management tools. Even though it was clear that the project was burdened with too many objectives and activities, no action was taken to alleviate this work overload, until it was too late and work on many activities just stopped.

A large part of the difficulties in implementing this project have their origin in the deeply flawed project design. Part of this, however, could have been

counteracted by a better supervision of the project, and a better response to interim reports and the observed state of the project. The management style for this project seems to have been 'laissez faire', which is not recommended for this kind of projects.

The project had intended, originally, to target a variety of sectors in the Syrian society, but in the end has mainly focused on the Ministry of Electricity (the executing agency) itself and related units. Some actions were taken towards other parties, but these lacked a coherent, integrated approach. Monitoring of the project was conducted, but follow-up to this was limited, even though quite serious issues emerged in the various stages of the project. Financial management was disastrous, and there is no record available at all for more than half of the GEF budget spending, and incomplete records for the rest of it, and it is highly recommended that UNDP takes immediate corrective action on this.

The overall appreciation of the project implementation is mediocre. Rated elements are:

- Implementation Approach: marginally satisfactory
- Monitoring and Evaluation: marginally satisfactory
- Stakeholder participation: marginally satisfactory

Implementation Approach (R)

Rating: marginally satisfactory

The project has experienced various challenges in its implementation, to a large part stemming from the too wide scope of the project design, and has experienced several successive delays. The inability to execute all activities included in the project design was clear during project implementation, and various operational measures were taken to maximize the work on these various activities. No strategic discussion was initiated, however, on the scope of the project. Although it is recognized that such a discussion is not easy to initiate, it should have been obvious at the time of the mid-term

evaluation that such a strategic re-orientation was needed. At that review, it was established that after four years of project implementation, which was also the planned project duration (according to the UNDP project document), work had started on about one quarter of the planned activities, none of these had come close to the planned output, and no or very limited work had been undertaken on remaining three quarters. It should have been clear that with such a track record, a substantial extension of the project duration would have been needed to complete at least the part of the project for which work had started, and that completing the full planned list of activities was impossible. Instead, it was decided to step up efforts to work on all activities, in a way adding to the overload of activities. Only at the very end of the project, after several extensions, it was decided to cancel work on some activities.

A project logical framework was not part of the original project design; a limited version was prepared as part of the mid-term review. Consequently, no logical framework was used in the first four years of project implementation. No other strategic management tool was in place during that period, and the use of the logical framework introduced during the mid-term review has been limited in the last years. As this framework was defined on the level of activities and outputs only (not on outcome or impact level), its usefulness as a strategic management tool would probably have been limited had it been used to a larger extent.

The overall project management has been extremely challenging with having only one person in charge of managing all activities. No manager could be expected to have managed so many activities, in such different directions, on his or her own. Although the mid-term evaluation recommended to assign, in addition to the project director, two project managers to managing the project activities on a day-to-day basis, one for demand side activities and one for the supply side activities, this has not been implemented.

Project progress has been recorded in monthly, quarterly and yearly implementation reports, and has been

review at tri-partite meetings. Project management and the UNDP CO have been in regular contact during the implementation of the project. No records have been kept of the initial stages of the project (1998 / 1999), when the implementation started with the re-design of the project. Records from late 1999 onwards are available at the UNDP CO.

A project website was developed jointly with the Ministry of Electricity, and as part of it an energy efficiency e-mail service was developed, to substitute an originally planned telephone hot-line service.

The project employed the services of two consultancies at the start of the project, one covering demand-side outputs, the other covering the supply-side activities. It was decided to engage in two large contracts (one each) to cover all international consultancy. This resulted in difficulties later on when one consultancy was not delivering as requested by the project management, and the contract was ongoing. Finally, the contract terminated and the consultancy stopped. International consultancy seems to have been employed in the last four years of project implementation, however, visible results from this are limited to support for a DSM analysis. There have been extensive contacts with a similar project in Egypt, however, which resulted in substantial technical support to the project.

Some of project activities have been withdrawn at the end of the project, though no clear explanation has been made for that. For example the energy efficiency hot line has been replaced by an e-mail service (linked to the project website), although the 2004 PIR reports that the necessary hardware for the telephone hot-line has been purchased and training of the line staff has started. The output Energy efficiency awards was also removed from the project, with the reported explanation that the Ministry of electricity rejected the evaluation criteria for such awards. No alternative activity was put in place. No national energy efficiency program seems to be developed and approved during project implementation. There's no evidence of discussions about these and other changes in the project implementation, and it seems that the

decision was taken for practical reasons only. Although practical aspects should have a role in such considerations, it should not be the only reason, nor should these decisions been taken without a strategic discussion on the impact of the decision and the support of the implementing and executing agencies (e.g., via a tri-partite review).

Evaluation indicators for this item:

10. Logical Framework is used as a management tool during implementation: not in the first years, and very limited use in later years.
11. Implementation management is adaptive to changes in the project environment: very limited, only by cancelling activities that lacked sufficient government support
12. ICT have been used to support project implementation and dissemination: a website was developed, but a telephone hotline was cancelled
13. The project established suitable operational relations between involved institutions and key stakeholders: yes with government parties, but very limited with non-governmental parties
14. The project employed the required technical capacities and made appropriate use of these: use of consultancy was too limited, but use of information from comparable project was very good.

Monitoring and evaluation (R)

Rating: marginally satisfactory

The project used standard monitoring mechanisms, like monthly reports, PIRs, APRs and tri-partite reviews. In addition, a mid-term evaluation was conducted, but due to the delays in the project only after four years of implementation. A final evaluation, the topic of this report, is conducted now, approx eight years after the start of the implementation of the project and almost ten years after approval of the project by the GEF.

Annual project reports have been prepared, annual tripartite meeting have been

organized, and Steering Committees have been organized regularly during the project implementation phase.

Mid term evaluation that took place has given extensive recommendations on project management and specific project outputs. The mid-term evaluation did not comment on the overall scope of the project and neither on reasons for the substantial delays that were present at that time already. This is partially explained by the use of an evaluation format that focused on details at the activity level, as was then required by the GEF. That there was no discussion on the reasons for the non-delivery of the project on approx three-quarters of its planned outputs after the planned four-year implementation period, however, is difficult to understand.

Not all of the recommendations of the mid-term evaluation have been implemented afterwards by the project management, and it is unclear why it was decided to implement part of the recommendations and others not. Some recommendations were quite substantial, like redirecting one of the project objectives. This seems to have been followed-up in the project. Yet, no record exists of this decision being taken.

Regular quarterly reports and financial reports have been presented by the project director to UNDP office, most of them are in Syrian language and it was not possible for the evaluators to review these. APRs and PIRs have been prepared by the UNDP CO with support from the project director.

In retrospect, UNDP project oversight project was active, calling for a speedier project implementation, but more drastic measures should have been take to overcome the significant project delays.

There is no evidence of tracking the government's co-financing in the project by the project management or UNDP, for both cash and in-kind government contributions.

Evaluation indicators for this item:

15. The project has established progress monitoring and has undergone regular

evaluations, which have led to required adaptations of the implementation: yes, but not as regular as required and follow-up was weak.

Stakeholder participation (R)

Rating: marginally satisfactory

The involvement of stakeholders in project implementation seems to have been limited mainly to organizations within the structure of Ministry of Electricity and participation in some activities of industry or university representatives. Consultations with parties other than the Ministry of Electricity during implementation of the project on necessary changes in the project structure, assessment of project results, or planning of activities have been of a limited depth. It appears that the project view upon all parties outside the Ministry as 'clients' for project activities, rather than as potential co-implementers that could help make the project a success.

A steering group, including representatives of other Ministries and government agencies and university and private sector representatives, was active during the project. Regular meetings have taken place and reports are available in Arabic. Some reports were available also in an English translation and have been reviewed for this evaluation. Communication seems to have focused on project activities that involved one of the parties present, with little attention for the overall direction of the project. This is understandable as the project was so wide-ranged that the majority of activities would be not of interest to most stakeholders, however, it is still a sign of weak stakeholder involvement.

The Ministry of Electricity has been very supportive of the project in general. It has provided all project staff, as well as office space and has been instrumental for the project in gaining access to other government units dealing with electricity generation and distribution in the country. The Minister and Deputy Minister of Electricity have participated in most of the events of the project, and energy efficiency departments have been created in the 14 governorate electricity companies. This is a good reflection of how a close collaboration

with a major stakeholder can benefit the implementation of a project.

The information materials produced by the project have been disseminated to different stakeholder groups. Apart from some incidental information, no information is available on the overall feedback as result of this dissemination or the awareness raising activities of the project. Several workshops and conferences were organized with participation of industry, industry associations, universities, and an engineering syndicate.

It is the evaluators' impression that the relation between the project team and the wider community has more characteristics of a sender – receiver relationship, than of a real participatory approach. The project has taken various actions to reach out to stakeholder groups, and has been successful in some areas. Especially in the activities at the Baniyas power plant, it was noticeable that the training and awareness raising activities of the project have led to a change of mind with the management of the plant, and more attention for an efficient operation of it. Similar impacts have occurred in some other recipients of attention, like utility teams (now) handling power factor corrections. These are good impacts of the project, however, it is not a reflection of stakeholder participation. It is believed that the impact of the project could have been stronger, and more wide-spread, if it had been tried to involve all stakeholders in the project, and jointly or collaboratively implement activities targeting these stakeholders.

Evaluation indicators for this item:

16. The project properly involved national and local stakeholders in implementation and decision making: yes for the Ministry of Electricity, but no for other stakeholders.
17. The project disseminated the required information to all relevant stakeholders: information was disseminated, but there's limited feedback on its impact

Financial Planning

The overall project budget has been USD 4,755,000 of which USD 4,070,000 was GEF

financing; USD 180,000 OPEC and USD 505,000 UNDP financing. The UNDP project document contains an annex J-2 (copy provided by UNDP) in which the GEF funding is specified by budget lines and by years (1998-2001). For some of the budget lines costs have been planned specifically for demand side (Objective 1 and 2) and for supply side (Objective 3-5) activities and also there is a separate section concerning project management cost.

From the project documentation reviewed the overall observation is that standard UNDP procurement rules have been followed for hiring international consultants as well as for equipment procurement. Annual financial audits have been conducted for the years 2000-2005, which state that appropriate internal controls and record keeping systems are maintained by the project management and are in accordance with the Syrian law.

The co-financing from the Syrian government for objectives 3 and 4 (supply side) which was included in the project document was 38 mln. USD. In the draft PIR 2006 the amount of co-financing reported is 62 mln. USD. There are no financial records provided by the Ministry of Electricity or UNDP to support the reported amount of government co-financing. It was noted during a visit to the Baniyas power plant that rehabilitation work on units 3 and 4 of the plant had been completed some time ago, but that work on units 1 and 2 was still ongoing. Together, this rehabilitation work should constitute the vast majority of the GoS co-financing for the project. New monitoring equipment for power plant units 1 and 2, purchased out of GEF funds, had been installed already, even though this can be connected to the plant units only after the rehabilitation is completed. The co-financing for the rehabilitation of the Baniyas power plant units 3 and 4, which should have been provided by the Government of Syria, seems to have been provided by a grant from JICA, Japan (according to the February 2000 monthly report). It is reported in PIRs and APRs, however, as a GoS cofinancing. On the other hand, the government seems to have contributed with an additional amount of approx USD 68,000 for condition monitoring sensors for the Baniyas this

year, for which there . The GEF and UNDP parts of the budget did not have funding available for this.

Financially, this situation implies that the delivery of the GoS co-financing has not only been delayed significantly, but also that at conclusion of the project, the majority of the co-financing had not been delivered. No mechanism was put in place to monitor the delivery of this co-financing, and no arrangements were made to make sure that it would be delivered at all. Even one year after completion of the project, at the time of the final evaluation, delivery of this rehabilitation work was not completed and there was no information available, apart from observing the state of the work, when the rehabilitation would be completed and the monitoring equipment would be installed on the units.

The government has further provided in-kind contribution to the project in terms of project personnel and office space. Most of the project staff (project director and SEEC engineers) have been government employees and paid by the Ministry of electricity, but no monetary representation of these costs was available.

The table on the next page presents the initially planned GEF budget as in the project document annex per objectives and budget lines. It was learned that the years 2003 and before were administered in an older financial system, and that this information was no longer accessible via the Atlas system currently in use. UNDP has provided copies of the financial records for all years of the project, and this has been used by the evaluation team to prepare a financial overview of the project. Financial information is available for all years of the project, and seems to be in accordance with UNDP procedures. The available information allows for a comparison of spending versus the originally requested budget on the main budget lines, although no overview of spending per objective or output of the project could be established. It should be noted that the CDRs 2000-2003 are in different format than those for the last three years (2004-2006). Because of this, some adjustments were made by the evaluators during the calculations of the spending in the table above. Those include:

a) the lines for national staff and consultants and for administrative support were merged since no administrative support exists in the 2004-2006 CDRs; b) the training and travel budget lines are merged since it looks like in first 4 years the costs for travel were calculated under the Training budget line (e.g. study tours). It was noted that the costs for travel in the last three years are much higher than those for the organization of training sessions. Further it was noticed that there is a difference between the amounts for international consultants and equipment stated in the last PIR 2006 (USD 855,000 for international consultants and 2,255,000 USD for equipment) and the calculations made by the evaluation team, though the final amount disbursed prior to the final evaluation are the same as stated in the PIR.

The table below presents actual project disbursement per year. It was composed based on the financial records of the project.

The overall project disbursement has been delayed. This is due to the overall delay in the project implementation. From the CDRs 2004 and 2005 it can be seen that a major share of the project cost was disbursed in the last two project years – USD 555,340 in 2004 and USD 903,230 in 2005. The cumulative actual disbursement reported in the last draft PIR 2006 is USD 4,042,118.

Budget Line	Planned budget			Actual spending
	Total Demand side (Objectives 1&2)	Total Supply side (Objectives 3-5)	TOTAL PROJECT	TOTAL PROJECT
International consultants	\$513,695	\$424,660	\$938,355	\$649,433 [*]
Regional consultants	\$209,250		\$209,250	n.a.
National staff and consultants	\$322,051	\$87,600	\$428,851	\$45,085 [#]
Equipment and supplies	\$236,910	\$1,278,592	\$1,515,502	\$2,380,700
Travel	\$12,350	\$34,000	\$652,492	\$648,139
Training	\$276,142	\$330,000		
Subcontracts	\$16,000		\$16,000	\$154,387
Miscellaneous	\$27,234	\$100,000	\$215,714	\$164,410
Project management				
Administrative support	\$19,200			
UN DESA SSC	\$93,836		\$93,836	n.a.
Miscellaneous	\$88,480			
Total	\$1,613,632	\$2,657,884	\$4,070,000	\$4,070,000[*]

* Not including the international consultants for final evaluation
incl. administrative support
% incl. the cost for the final evaluation to be disbursed by end 2006

The last 27,000 USD left are allocated for the final evaluation by an international consultants team, thus making the disbursement ratio 100 %.

The project has spent substantially more on equipment than planned (+50%), and substantially less on national and international consultancy (-50%). Lacking further information, no assessment of this

	1999	2000	2001	2002	2003	2004	2005	2006	Total project
PROJECT PERSONNEL									
International consultants		23616	49186	236021	98997	93166	148447		649433
National									
Administrative support	785	3567	5444	5551	4611	9996	10121		45085
Monitoring and evaluation			54	494	1143				
National consultants	518			1122	1155	524			
CONTRACTS									154387
Contract A advertising firm					6167	93456	33748		
Contract B consumer research			4000						
Contract C Electricity audit					17016				
TRAINING									648139
Training supply side				11555	101447	77025	120214	564	
Training demand side	1172	870	178801	77857	78634				
EQUIPMENT		41127	46623	260754	1178714	273840	579724		2380782
Miscellaneous		233	122342	8093	10755	7333	10976	4678	164410

information is made.

The following observations are made:

- It is evident that the co-financing delivered during the project is well below what is reported in the PIRs, even if it might add up to the reported sum in the future;
- Financial records are available for all years of the project, in accordance with UNDP procedures. Unfortunately, very limited information is available about spending per objective, and no information on spending per output, implying that it is very difficult to make cost-effectiveness assessments (during the evaluation but also during the project);
- The project team and UNDP country office could not provide an integrated financial overview of the project, even if all yearly budgets were administered according to procedure; the budget table presented above was prepared by the evaluation team using various sources. It appears that such information was also unavailable during the implementation of the project;
- The project budget seems to include errors, even though it has been audited. For example: the 2005 CDR includes a budget line for Contraceptive pills amounting to USD 409, for which there is no justification in the project;
- The UNDP files for this project do not include: a copy of the GEF project brief; CEO endorsement letter; and a signed copy of the UNDP project brief. The availability of the latter two is an administrative matter without material consequences; the missing GEF project brief should have guided the implementation of the project;
- The cost effectiveness of the project could not be evaluated due to no availability of information on the actual spending per objective and output;
- It should further be noted that significant efforts were needed, by both the UNDP country office and the evaluation team, to prepare the

information presented in this section, and that financial information available in a better integrated format would have been beneficial for the supervision of the project.

Evaluation indicators for this item:

18. The actual spending on project activities was cost-effective and proportional to the projects objectives: impossible to evaluate
19. Financial management was timely and adequate: yes, although the use of a multi-annual budget differentiating budgets and spending per objective and output would have improved this

Sustainability

The sustainability of some of the project outcomes was arranged with stakeholders during the project, which resulted in good organizational arrangements for three aspects of the project. The sustainability of the overall objectives of the project is questionable.

This issue is further discussed in section 4.3.2 Sustainability, dealing with the extent to which the benefits of the project continue after finalization of this project (and the external assistance provided with it).

Execution and implementation modalities

The project was implemented by UNDP Syria, and executed by the Syrian Ministry of Electricity. Some initial problems were observed with recruitment of the project staff and project director by Ministry of electricity and UNDP. Contrary to standard practice, the project director was recruited via a closed procedure from within the Ministry of Electricity, and not by an open call and selection procedure as is common for these positions. Although it is recognized that a project director coming from within the executing agency will be instrumental in maintaining a good interaction of the project with the usual operations of the agent, it should also be noted that it is usually considered a benefit if the project director is independent from the government.

In this project, it is obvious that the involvement of the Ministry of Electricity

in the project was very intensive, and the impact of the project on the Ministry's work was also quite significant, but activities outside of the Ministry, and involvement of other parties, was quite less evolved. This is in line with what can be expected if the project and the executing agency are closely connected, as was the case here. It would have been recommendable if it project had been placed at arms length of the Ministry, to stimulate a stronger orientation at other parties as well.

The selection of international consultants have been done according standard UNDP procedures. Serious problems have occurred with the performance of the consultant initially selected for the demand side work. The selected company changed the initially proposed international experts, the newly proposed experts did not performed well, but the contract has not been terminated nor were any actions taken by UNDP or the project execution body to change the contract conditions. The unsatisfactory performance of the consultant was declared as one of the main reasons for the delay in some project activities.

Evaluation indicators for this item:

22. UNDP provided adequate oversight of the project and assignment of the required experts: to some extent, but the involvement of more shorter-term consultants for specialty tasks, would have probably benefited the project.

4.3 Results achieved with the project

This section first presents the status quo achieved by the project on each output identified in the project document. Following this, and based on the status quo observed and the impact generated in the country, results are assessed and rated per objective of the project.

Status Quo for Immediate Objective 1, Establish the Syrian Energy Services Centre

There is a limited information on the activities performed under this objective from the project beginning till the mid term evaluation in September 2002. A new set of outputs have been proposed in the mid term evaluation report and approved by the project management. These are used

for the rest of the further status quo description.

Outputs 1.1-1.4: Walk through audits on 200 plants; Detailed energy audits covering boilers, steam systems and electrical systems for 50 plants; Preparation of detailed design and feasibility studies for 20 investment projects; Supervision of installation of 10 projects in conjunction with company staff

Energy efficiency teams were established in the 14 governorate electricity distribution companies to perform the energy audit activities in their region, audit equipment has been delivered to the teams. They have performed a number of energy audits in their regions. Biggest attention during the audits as well as in the audit recommendation implementation has been given to power factor correction. More than 75% of audited companies has power factor below 0.9, majority of which were public ones. These activities have become usual service provided by most energy efficiency teams in the 14 governorates, which is offered nowadays after the end of project in October 2005. This has been confirmed during the evaluation mission by discussion with representatives of Rural Damascus Electricity Company and Hama Electricity Distribution Company. Few pilot lighting projects have been implemented to introduce CFL instead of incandescent lighting. Those include Umayyad Mosque, Al Maryamiah Church, Central Prison in Hama, shopping centres, etc.

Output 1.5: Development of a data-base of industrial energy use, by product and by process as a support to energy efficiency policy

Some collection of data has been done using questionnaires send to industries, but project staff has some difficulties with collection of the information. In 2001 survey on the electricity consumption was implemented together with the Central Bureau of Statistics which covered 1700 commercial and industrial samples and 4000 residential sector samples. The survey report has been developed and published in the end of 2001. According the results from the study the residential sector in Syria consumes more than 50% of the

electricity followed by industrial sector with 28 %.

Output 1.6: Development of a training program

Under output 6, different training activities have been organized and implemented for the SESC staff itself as well as for staff from the 14 governorates electricity distribution companies. In 2001 the project staff has passed three weeks training course on energy auditing in Alexandria Electricity Company in Egypt. Additional visit was organized to Alexandria Electricity Company and to University of Alexandria in 2002 for Syrian University doctors to exchange experience on the energy efficiency curricula and activities in Egypt. In 2004 15 experts from the project staff has passed two week DSM training in Greece and 8 experts attended training in Germany on thermal building insulation code.

Additionally as part of the project activities a number of training workshops were organised for textile, food industries, chemical industries and engineering industries establishments, training for Rural Damascus engineering Syndicate. There is no information available on the follow up results of the training and the number of project initiated as result of the workshops.

Thematic workshops and conferences took place in Damascus, Hama, Aleppo, Tartos, Daraa and other cities. Participants were government officials, engineers from governorates, university representatives, industries. Representatives from some of the industries (e.g. Steel factory in Hama) that have implemented power factor correction also attended the regional workshops and conferences, but no activities have been initiated to disseminate their own positive results among other similar industries.

Output 1.7: Development of an exit strategy to transfer the methodology and technical capability to the National Energy Research Centre and/or the private sector at the end of the project.

In 2003 National Energy Research Center was established under the Minister of

Electricity. The center is situated in the premises of MoE and by its activities it should support and coordinate studies and research related to energy generation, planning and conservation, as well as will support MoE for the utilization of renewable energy recourses. After NERC creation all project staff has been transferred to the center, which has caused some delay in project implementation. This however has been a temporary problem, which has been resolved after discussions between the project management, NERC management and the Ministry of Electricity. By the time of the final evaluation it looks like that most of the activities performed by project staff prior NERC creation has been continued afterwards. There are some studies done for possibilities for NERC to work as an ESCO, but with the current electricity tariff this does not seem a feasible option.

Status Quo for Immediate objective 2, National Energy Efficiency Program
Output 2.1, Information Dissemination and Promotion Program

Various information materials have been produced by the project - SESC brochure, 4 quarterly newsletters, brochures on insulation, boiler efficiency, residential sector flyers, posters, TV adds. Various media activities have been organized via newspapers, radio and TV. The materials were distributed mainly during conferences, workshops and exhibitions. It is not clear how effectively the residential sector was approached - how and if the flyers were distributed to households, and whether there have been some communication back with end-use consumers to evaluate the effectiveness of the campaign (TV adds, newspaper articles, etc.). Joint activities were developed with Ministry of Education to introduce energy efficiency issues in school curricula. The project staff has developed and printed a manual for teachers on different energy and energy efficiency issues. University of Damascus has introduced course on energy efficiency in Mechanical and Electrical engineering faculty.

Output 2.2: Energy Efficiency and Conservation Hotline

The activities under this output have been postponed for years with no clear decision from the project team on how to design the hotline service. Only by the end of the project it was proposed to replace the phone hot line service by an e-mail service. The reason for that was the overall impression that the telephone line would be used by end-use consumers mainly for complains from the high electricity bills for example rather than to get advice on efficient energy use. The e-mail service is available through the project website (www.moelec.gov.sy) and up to date the project staff has received very limited requests for consultation.

Output 2.3: Launch of NEEP Awards for Energy Efficiency Program

The energy efficiency award did not receive support from MoE and the activities under this output have not been developed further. No alternative was developed.

Output 2.4: Full DSM assessment of energy/electricity use

The first project years were dedicated mainly on integrated resource planning (this was not specified as activity in the UNDP project document, but was initially introduced in the GEF project document). IRP plan has been developed with the support of international consultant, but there is no information available whether this has been used further by the MoE.

DSM assessment was initiated only in 2001 and the study was completed in 2003. The electricity demand forecast study showed that residential sector and industry electricity consumption are with contributing most to the overall growth in the country electricity demand. Based on the data collected during the household survey as well as the information gathered during the demand forecast, some 18 end-use electricity saving measures have been identified. From these three pilot programs were chosen for further development of pre-feasibility studies - time of use metering, industrial motors and motor systems and building envelope improvement.

Output 2.5: DSM pilot program in residential sector

No DSM pilot programs have been implemented during the project. There is planning however to start with the implementation of the three feasibility studies developed as part of the DSM assessment.

Output 2.6: EE S&L

The work on standards and labels has started in 2001 by establishment of a committee responsible for development of a working program to improve refrigerators efficiency as well as to coordinate the activities for introduction of S&L for appliances. A draft ordinance for energy labeling of refrigerators is developed, which is expected to be adopted after the adoption of the Energy conservation law as sub law legislation. No information is available on the content of the ordinance and whether it deals only with the label itself, or is defining procedures for compliance checking, testing of appliances, etc.

Output 2.7 Energy policy initiatives analyzed and designed

Draft Energy conservation law has been developed and is currently under comments in different governmental institutions. The draft law targets energy efficiency for large consumers, S&L implementation, and use of renewable energy. No copy of the law has been presented during the evaluation mission so no further information can be presented here.

Status Quo for Immediate Objective 3: Demonstrate Baniyas Efficiency Management System

Output 3.1: Scope of work for Implementation of EMS

Critical factors for successful implementation of EMS are recognized. In particular the availability of condition monitoring sensors turned out to be essential. The professional approach of ABB, the firm installing the EMS and MMS system, have been very helpful to obtain the proper set of sensors.

Output 3.2: Establish Appropriate Targets for Energy Efficiency

The targets set in the project description (no more than 0.5% less than the original performance) should be replaced by figures related to the optimal operational conditions identified by the CMS and EMS. Due to the ongoing rehabilitation of units 1 and 2, establishing the targets should be the first thing after coming into operation of the units. The management seems to focus the larger part of its attention to the improvement of the performance of the units 3 and 4, and to speed up the rehabilitation of the units 1 and 2.

In their Technical Statistical Report the PEEGT should adjust the capacity of the Baniyas plant to these optimal target figures.

Output 3.3: Detailed List of Monitoring Parameters

The monitoring parameters are evident as an intrinsic part of the EMS and MMS as turned out by samples at random taken of the hardware of the system during the visit of the Baniyas plant.

Output 3.4: Complete Monitoring System Established

The first step to obtain a profitable Efficiency Management System (EMS) is to have available a suitable set of condition monitoring sensors installed and in operation. As some vital sensors were only used as portable ones during the installation of the plant, it was not possible to monitor the condition real time based on principal parameters. This appeared during the installation of the EMS and the MMS. The missing sensors have been installed now and are in operation in the monitoring system. However, due to the delay in progress of the mechanical rehabilitation of the units 1 and 2, the full implementation and final testing of the EMS and MMS in the plant is delayed as well.

Output 3.5: Baniyas Power Plant Staff Capable of Operating and Maintaining EMS

During the site visit it turned out that the plant staff mentioned the first results of the CMS and EMS although this system was

only partially in operation. The monitoring of the operational conditions of the units 3 and 4 already resulted in lower emissions. This was clearly visible through the much lighter colored smoke coming from the chimneys. Variation in smoke was also observed during the plant visit. The technical manager plant operations reported that the system indicated when the unit runs above its safe power operation point, e.g. 160 MW power asked for and delivered to the grid against 140 MW safe operation. Knowing this is an important contribution towards the safe and reliable operation of the electricity supply network in Syria.

Status Quo for Immediate Objective 4: Baniyas Maintenance Management System

Output 4.1. Scope of work for Implementation of MMS

Critical factors for successful implementation of MMS are recognized. In particular the availability of condition monitoring sensors turned out to be essential. The professional approach of ABB, the firm installing the EMS and MMS system, have been very helpful to obtain the proper set of sensors. Awareness of well planned maintenance was observable but had apparently not given a high priority given the delay in starting up the units 1 and 2. The technical manager plant operations said that he had some concerns about the condition of the units 3 and 4 based on the signals from the CMS.

Output 4.2. Establish Appropriate Targets for Reliability

Clear targets have not been mentioned, although the staff apparently was getting acquainted with new approach of maintaining reliability by preventive maintenance instead of running until failure. Getting the plant in full operation attracts a large part of the staff's attention and effort.

Output 4.3: Fully functional Maintenance Management System installed

The first step to obtain an profitable Efficiency Management System (EMS) is to have available a suitable set of condition monitoring sensors installed and in operation. As some vital sensors were only

used as portable ones during the installation of the plant, it was not possible to monitor the condition real time based on principal parameters. This appeared during the installation of the EMS and the MMS. The missing sensors have been installed now and are in operation in the monitoring system. However, due to the delay in progress of the mechanical rehabilitation of the units 1 and 2, the full implementation and final testing of the EMS and MMS in the plant is delayed as well.

Output 4. Baniyas Power Plant Staff Capable of using MMS

The staff is well under way to use the MMS, but it is not fully implemented yet in all the units. The essential starting phase of the MMS is the CMS, that monitors the condition of the units real-time, is successfully implemented for units 3 & 4. Therefore, the capability could not be identified nor demonstrated.

Status Quo for Immediate objective 5: Establish PEEGT Efficiency and Maintenance Management Support Team

Output 5.1: Institutional and Organizational Structure and Resources Identified

A sound manner to identify organizational structures and resources is to check its operational result. At the level of the Minister of Electricity the need for strengthening the network resulted already in the planning of additional HV-lines and transformer capacities. Also the need for an increase in spinning reserve in the power generation capacity is a point of high priority. The statistical report of the PEEGT is sound and clear in identifying the coming problems due to lack of reserve power. The operational result in the dispatch is positive as electricity generation close to the edge of the operational window is now recognized due to the starting up of the Damascus Power control centre as was reported by the management at the Baniyas plant. The central team is well involved in the CMS at Baniyas.

Output 5.2: Adequate and Fully Operational Equipment Available

The equipment, hardware and software, has arrived and is set in operation. It is now ready for application at other power stations. This readiness has been hampered by the delay at Baniyas as the experience with the missing sensors in that station required additional attention. However, that experience triggered the fine-tuning of the equipment for the central team.

Output 5.3: Operational System of Reliability Indices

The indices have to be based on the results obtained at the Baniyas power plant. As Baniyas is not yet in full operation, because of the delay in rehabilitation of units 1 & 2, the required results are not available yet. Based on observations during the final evaluation we expect that the process of setting indices on reliability will continue.

Output 5.4: Capable Trainers and Training Modules

The staff of the Baniyas power plant proved to be well trained and prepared for the rehabilitation and upgrading of the plant. The effectiveness of their work is considerably supported by the knowledge exchange with the engineer from ABB. This support will help them to establish their capabilities to a firm basis required for their status as a benchmark for other power plants. Compared to the time schedule in the project there is a strong delay.

Output 5.5: Thorough Review of EPS Section Undertaken

As the Efficiency and Performance Section of the Central Team has the full operation of Baniyas as a starting point, it could not even start this operation. So there is no other result than the completion of the equipment.

4.4 Assessment of Results Achieved

In this section, the results achieved with the project are assessed, in comparison to the originally stated objectives of the project and in relation to what could realistically be achieved by a project of this size and duration. The assessment builds on the overview of the results achieved as

reported in section 4.3, listing the various outputs of the project.

The overall appreciation of the project results is marginally satisfactory. The objectives of the project have been achieved only for smaller parts of the project, and there is not a single objective that has delivered as planned. To a large part, this must be attributed to the poor design of the project, however, a lack of focus and prioritization in the implementation of the project, as well as substantial delays in the provision of inputs and the execution of the project, have also had a substantial impact on the low realized outcome of the project.

The sustainable impact of the project is likely to be limited to three topics:

- Condition monitoring and efficiency monitoring systems will be implemented at new power stations in the country;
- Power factor corrections have been applied widely during the project, and teams have been set-up in all regional utilities to continue this work;
- The National Energy Research Centre was created.

Further, attention for energy efficiency is increased at the Ministry of Electricity.

Although these are important long-term impacts, it is a relatively small achievement compared to the size and duration of the project.

Rated elements are:

- Projected emission reductions based on realized project results (improvement target): marginally satisfactory.
- Syrian Energy Services Centre operational as an independent unit and funded from non-project sources (Immediate Objective 1): satisfactory
- National Energy Efficiency Program adopted by Government of Syria and put into operation with government funding (Immediate Objective 2): unsatisfactory

- Baniyas Efficiency Management System installed and resulting in demonstrate efficiency improvements at plant operation (Immediate Objective 3): marginally satisfactory
- Baniyas Maintenance Management System installed and resulting in demonstrate efficiency improvements at plant operation (Immediate Objective 4): marginally satisfactory
- Power plant efficiency and maintenance management programs transferred to at least one other power plant (Immediate Objective 5): unsatisfactory
- Documented evidence of increased power system reliability (Immediate Objective 5): unsatisfactory

Attainment of Outcomes & Achievement of objectives (R)

Emission Reduction Objective

Rating: marginally satisfactory

The overall objective of this project was to achieve greenhouse gas emission reductions, by implementing a combination of supply and demand-side measures. It was expected that demand-side measures would account for an energy saving of 1.4% annually by 2008, and supply-side measures for 0.4% annually. It should be noted that these are rather modest targets in relation to the size of the efforts of the SSECP and in view of the substantial investments that the Government of Syria was planning to do.

There is no ex-post calculation of the greenhouse gas emission impact of this project, or of the energy saving impact, making it difficult to estimate the achievements on this objective. The latest demand side management report estimates that, as a result of planned DSM activities, an energy demand reduction would be achieved of 1.2% by 2009, which, taking into account the delays in the project, is an impact similar to what was planned. Although the preparation of the plan was part of the project, the implementation of it to a large extent will have to take place afterwards. It is therefore unclear whether this impact can be attributed to the project. The demand-side management

activities executed by the project have been rather limited, and it is expected that their impact is low, below the impact planned for the project.

The project has had a good impact in power factor corrections, both at end-users (industrial customers) and in the power distribution network (substations). Substantial improvements have been achieved, and these must have resulted in energy efficiency improvements at power plants. Lacking further data, no calculation of this impact can be presented here.

The improvements at the Baniyas power plant have also been substantial, and it is expected that this has resulted in energy savings and greenhouse gas emission reductions. If the rehabilitation of the Baniyas power plant continues as planned, this will add further savings. However, lacking further data, no calculation of this impact can be presented for this aspect either.

Further information regarding the energy efficiency of the Syrian electricity system is included in annex 7, detailed technical comments.

Evaluation indicators for this item:

23. Projected emission reductions based on realized project results (baseline: annual energy conservation of 1.83% pa and 7.6 million tons CO₂ emission reduction cumulatively by 2008): an impact of this magnitude is probably realized, but there is no data to support this.

Immediate Objective 1, Establish the Syrian Energy Services Centre

Rating: satisfactory

The project set out to establish a Syrian Energy Services Centre to provide a wide range of energy efficiency advice and services to residential, industrial and public customers. The Centre was supposed to operate as an energy services company (ESCO), charging its customers for its advice and/or provide energy saving investments in industrial facilities in exchange for a share of the associated energy cost savings. This approach was

flawed, and has never been implemented. Following the mid-term evaluation, it was decided to re-orient the Centre towards an advisory role, providing energy saving advice to customers free of charge.

This has been a successful approach, and even though the project has not formally set-up the intended Centre, it has operated as one and delivered advice to mainly industrial customers. A collaboration was established with the 14 utilities servicing the governates of Syria, and energy efficiency teams were established there also. These teams, at the project and in the governates, have been most successful in introducing or improving power factor corrections, in industrial facilities and distribution network sub-stations. This has had a significant impact on the overall performance of the Syrian distribution network, and an expected (though not proven) impact on power plant energy efficiency, which results in fossil energy savings and/or a higher electricity output at the plant.

Further intended activities of the Centre, mainly in direct energy savings in industrial facilities, have had a lesser impact. There have been successes in assisting industries with simple measures like boiler controls and adjustments, but there is no indication of a wider understanding of energy efficiency issues or increased investments in energy efficiency at industrial facilities.

Towards the end of the project, the activities for this objective have been transferred to a newly established National Energy Research Centre (NERC). This represents a significant investment by Syria, and provides sustainability to these activities. At the time of the evaluation, the NERC was operational and expanding in scope and employees, and a transfer to a new and larger facility with dedicated laboratories was in preparation. The NERC appeared to have a qualified staff and good resources, but seemed to lack a coherent vision of its role and a strategy for improving energy efficiency on the ground. There was a tendency to focus on research and innovative long-term projects, while Syria would probably benefit more from a focus on implementation and simple short-term energy savings. Although the

establishment of the NERC marks a very important step by Syria towards a better use of energy, a re-orientation of the NERC's strategic priorities would be likely to add significantly to its effectiveness for the country.

Evaluation indicators for this item:

24. SECS operational as an independent unit and funded from non-project sources: yes, under a new name and with good government support. A re-orientation of the NERC towards energy savings support would be advisable.

Immediate Objective 2, National Energy Efficiency Program

Rating: unsatisfactory

This objective planned to initiate a variety of energy efficiency activities, together leading to a well-established national energy efficiency program. This should have included information campaigns, a hotline, awards, a DSM analysis and DSM program, standards and labels, and policy development.

Work on this objective appears to have been incidental, with some TV ads directed towards the residential sector, materials and activities targeting schools, a website and email information, a DSM report, a refrigerator energy label preparation and preparatory work for an energy conservation law. This lacks coherence, and the activities in general seem to have to brief to be able to have a lasting impact in the country. Many planned results have not been delivered, and specifically those activities that could have resulted in energy efficiency improvements beyond the duration of the project have not come to fruition.

It is unfortunate that a DSM analysis was delivered close to the end of the project and that no follow-up on it has been initiated. Similarly, refrigerator energy labels were analyzed and preparations were made for a standard and label in Syria, but not followed through. Such a follow-up could be the task of the NERC (see objective 1), but that was not yet arranged at the time of the evaluation. Overall, no national energy efficiency program has

been put in place, and the various activities under this objective have been to fragmented to really prepare Syria for more energy efficiency.

To put this in perspective: the objective as formulated in the project document was ill-designed and unbalanced, and a separate project would have been justified (and probably required) for the implementation of this objective. The project should not have been expected to deliver on all of the planned activities for this objective. However, an earlier selection of realistically achievable goals and a focus on those, taking into account the time it takes to fully implement a DSM program or a standards & labels regulation, would have been possible and should have taken place.

Evaluation indicators for this item:

25. NEEP adopted by Government of Syria and put into operation with government funding: no, some activities have been implemented, but the overall performance is weak and no follow-up program was established.

Immediate Objective 3: Demonstrate Baniyas Efficiency Management System

Immediate Objective 4: Baniyas Maintenance Management System

Rating: marginally satisfactory

The objectives 3 and 4 are closely interlinked, and are best treated in one assessment. In fact, an efficiency management system (objective 3) can only operate properly if it is based on a functioning maintenance management system (objective 4), and it might have been more appropriate if the two objectives had been combined from the start. In the implementation of the project, the two objectives have been treated as one, reflecting the linkages between the two parts.

The end of the work on these two objectives can be characterised as having, at the Baniyas power plant, (1) the availability of four rehabilitated power generation units, (2) with the ability to monitor the condition of the units and perform scheduled maintenance, and (3)

the ability to operate the units at an optimal energy efficiency.

Several activities were planned for this to become a reality, starting with the rehabilitation of the generation units, at which time also condition monitoring (or maintenance monitoring) equipment would be installed, the training of staff in the use of that equipment in the implementation of scheduled maintenance practices, the installation of efficiency monitoring equipment, and the training of staff in the use thereof. Although the above steps can be implemented in parallel, it should be taken into account that the logical sequence is as listed here, and that next steps only make sense if initial steps are implemented.

A difficulty regarding the objectives 3 and 4 of the project has been the delay in the rehabilitation of the power plant units. Two units (no 3 and 4) have been rehabilitated around 2000, but two more units (no 1 and 2) are still not rehabilitated. This fact undermined the ability of the project to fully deliver on both objectives discussed here, and the results achieved are consequently less than planned. Nevertheless, the project has had good impacts in some areas.

The basic requirement for the effective use of a maintenance management system is the understanding of the whole set of elements of the system:

- sensors monitoring the condition of the units in the power plant,
- the applicability of the computerized model representing the performance of the power plant units in terms of efficiency and save operation within the operational window.

During the evaluation, the power plant management showed a good understanding of the maintenance and efficiency management systems, and enthusiasm for applying it for a better operation of the plant once it will be in full operation. The establishment of a proper maintenance program is recognized as a common activity for the Baniyas power plant staff plus specialists at the NERC and PEEGT's Central team. The mindset of the plant

management, an important criterion for establishing the success of the project in this area, has changed from a focus on 'run to failure' to 'scheduled maintenance'. This is an important and probably lasting impact of the project.

During the project, in the process of applying maintenance and efficiency management systems on the rehabilitated units 3 and 4, critical factors for the successful implementation of an EMS have been recognized. In particular, it was learned that the availability of condition monitoring sensors is essential to be able to manage the efficiency of the units. The installation of the efficiency management system on units 3 and 4 of the power plant was completed a few months before the evaluation (in other words, at the very end of the project, or a bit afterwards), and it had not been put to full operation yet. This was expected to happen in the coming months.

Even though the CMS and EMS were only partially in operation, the monitoring of the operational conditions of the units 3 and 4 had already resulted in lower emissions, which could be established by visual inspection of the smoke coming out of the chimneys. It was further learned that the plant manager was well-aware of the safe operational window of the plant, even if he was forced to operate the plant outside of this window. Such knowledge, if acted on, can contribute to the safe and reliable operation of the electricity supply network in Syria.

An issue affecting the usefulness of the improvements in Baniyas is the upcoming situation of power shortages in Syria. Under those circumstances, expected in the near future, it will likely be very difficult to operate a plant at its best efficiency, or even within its safe operational window, as it is likely that in such situations a plant will have to produce to the limit of its maximum power. It is even possible that the newly acquired practice of scheduled maintenance will be abandoned under such circumstances.

The Ministry of Electricity reported that all new power plants in Syria will be equipped with condition monitoring equipment, and that this will be installed at older plants

also. Other power plant managers learned of the usefulness of such systems via the management of the Baniyas power plant. Even though the intended result of the project for these objectives was not achieved, the decision to replicate the systems at other plants signifies an important step up for the country, and an important impact of the project.

Evaluation indicators for this item:

26. EMS installed and resulting in demonstrate efficiency improvements at plant operation: not yet, due to the delayed and incomplete rehabilitation of the plant and installation of the systems.
27. MMS installed and resulting in demonstrate efficiency improvements at plant operation: partially, on 2 of the 4 units, and results have been observed by visual inspection but there are no monitoring data present.

Immediate objective 5: Establish PEEGT Efficiency and Maintenance Management Support Team

Rating: unsatisfactory

The unbalanced project design made it particularly difficult to implement the activities for this objective properly. The design focused on various details, while ignoring main issues like real time condition monitoring of the electricity generation process.

The implementation of the activities planned under this objective depended on the results from objectives 3 and 4 being available. As partial results were delivered at the very end or after of the project, and the remainder is probably available in the coming time, none of the planned activities for this objective has been delivered.

Nevertheless, a 'Central team' was established at PEEGT, and it is ready to take up the required activities in the future. Further dissemination of the results (to be) achieved at the Baniyas power plant to other power plants in the country would be important to replicate the improvements made there.

Evaluation indicators for this item:

28. Efficiency and maintenance management programs transferred to at least one other power plant: not yet, although it is planned that other power stations will be equipped with maintenance management sensors.
29. Documented evidence of increased power system reliability: no assessment has been made so far, and it may take some time before such an assessment can be conducted.

Sustainability

The overall sustainability of the project is characterized by three main, lasting impacts in the country:

- Condition monitoring and efficiency monitoring systems will be implemented at new power stations in the country. This signifies an important replication of that part of the project, at Syria's own initiative and expense;
- Power factor corrections have been applied widely during the project, and teams have been set-up in all regional utilities to continue this work. It is expected that this will continue without further support from the project, and thus have a continued and increasing beneficial impact for the country;
- The National Energy Research Centre was created, largely to follow-up on the

work of the project. This Centre is well-staffed and will be provided with more resources and a dedicated facility in the near future.

There further is a significantly increased attention for efficiency and good plant management at the Ministry of Electricity. The impact of the project outside of the Ministry of Electricity and its associated organizations, however, is quite limited.

Many planned outputs of the project have never been realized, and thus cannot have a lasting impact in the country. Many other activities, especially on the demand-side, have been fragmented or small-scale, or have not been carried through till the end and it is expected that there will be a limited sustainable impact at best for the other activities of the project.

Energy audits, for example, have become an activity of energy efficiency teams at regional utilities. The success of that activity during the project, however, has been limited and no change or upgrade was foreseen to make it a bigger success. Actions in the residential sector, like TV adds, have been very fragmented, and are not likely to have a lasting impact. Other activities, like energy efficiency materials for schools, are unconnected to the rest of the project and to the normal activities of the Ministry of Electricity, leading to a low expected lasting impact.

A note should be made about the National Energy Research Centre (NERC). This Centre follows-up to the SSEECF project, but is so far positioned itself as a research establishment, working on issues like renewable energy and more complex systems. In this current positioning, this is unlikely to provide much direct benefits to the country, which is still facing substantial energy efficiency issues and the need for conservation in view of an upcoming power supply shortage. Without a re-orientation of the NERC towards delivering energy efficiency and conservation, instead of researching it, the contribution of the Centre to sustaining energy efficiency in Syria will be much lower.

Evaluation indicators for this item:

20. The project established a sustainable impact in the country, which will continue independently: yes, with a few important results, but in isolated parts of the project. Large parts of the project will probably have little to none independent follow-up, however.
21. The project established arrangements with relevant organizations or other instruments to secure a continued impact: yes, via the NERC. Arrangements with other organizations have not been established, however.

5. Recommendations

5.1 Corrective actions for the design, implementation, monitoring and evaluation of the project

Various corrective actions are needed for this project, to improve the administration of the project in various aspects, and to secure that non-yet-completed activities are followed-through to a (more) sustainable state.

On the administrative side, it is recommended that:

- All project documentation is made easily available for future use by the NERC and other parties within and outside of Syria, e.g. via a CD-ROM or website. Preferably, this would include (the preparation and publication of) a summary final report of the project as well;
- Sustainability plans are created for the successful power factor correction activities, to ensure that this activity will continue with the appropriate mandate and funding in the future.

On the content of the project activities, it is strongly recommended that:

- A mechanism is put in place to monitor the progress of the rehabilitation of the Baniyas power plant and the installation of the condition and efficiency monitoring systems there. This should include the monitoring of the operational conditions at the plant, to learn if the new systems have resulted in efficiency improvements and a higher reliability due to the better planning of the maintenance;
- The various demand-side activities are integrated and further developed in a National energy efficiency program (targeting both supply and demand side energy efficiency). Part of it would be the follow-up to the industrial energy audits started with this project, implementation of the priority DSM measures identified in the DSM study (building energy efficiency and electric motor efficiency), finalizing the S&L

legislation for refrigerators and starting the implementation of the various measures;

- As much as possible stakeholder groups are involved in the process of selecting and implementing priorities and actions for the National energy efficiency program;
- A strategy is developed for the National Energy Research Centre, targeting the urgent needs of the country. A role in the implementation of the National energy efficiency program should be part of that strategy;

Although the actions listed here will not correct the faulty design of the project nor mitigate the effects of issues in the implementation of it, these actions will improve the sustainability of the various results of the project, and reinforce it on some aspects where it has fallen short.

5.2 Actions to follow up or reinforce initial benefits from the project

It should first be noted that corrective actions are needed for various activities of the project, to achieve that the results achieved in the project are secured and benefit the country in the longer run. This should be the first priority for follow-up work. Building on this, some actions are recommended to expand the impact of the project in the country.

- Activities with industrial sector on energy auditing should be continued and expanded. Audits should take into account the energy efficiency of the overall industrial process and the buildings, and focus on low-cost or no-cost measures that can be applied quickly and on a large scale;
- A Demand Side Management program should be developed covering on low-cost or no-cost measures for the residential and commercial sectors. The current plan stresses on the option to invest in better equipment which is paid back by energy savings over various years. There are simpler measures

available, however, that require less investment and deliver savings more quickly, thus benefiting Syria more. These measures should be added, as a priority, to a DSM program;

- Work started on energy standards and labels for refrigerators and air conditioners should continue, leading to the adoption of national legislation for standards and/or labels, the development of verification and enforcement institutions and procedures, and the implementation of an S&L program at the national level. It is recommended that the standards and labels currently in use with Syria's main trading partners are reviewed, and that standards and labels are chosen for Syria that are coordinated or harmonized with those of the main trade partners;

- The project has led to an increased awareness for the benefits of efficiency improvements in the power supply system and a willingness to take action to improve it. It is recommended that Syria's efforts are supported via the regular provision of high-level consultancy, for feedback on the country's strategy and help in formulating a birds eye view on the evolution of the (efficiency of the) electricity network.

- Specifically for the national energy system (outside of the project), it is advised that Syria:
 - Focuses on peak power production capacity;
 - Increases the hydropower capacity by installing a pumping system;
 - Speeds-up the commissioning on new plants and plant rehabilitations;
 - Tracks out-of-optimal generation in general dispatch reports;
 - Vigorously implements simple DSM measures (good housekeeping, etc)

5.3 Proposals for future directions underlining main objectives;

Syria has a large potential for further energy efficiency and conservation, in both the supply and demand side. Future projects should build on the activities initiated with this project, however, taking into account the needs of the country. As the country is facing power shortages in the coming years, activities that improve the efficiency and capacity of power supply, and activities leading to quick energy savings should be considered especially. Some suggestions are:

- Introduce 'quick savings' programs for the residential, commercial and industrial sectors, to introduce low- or no-cost energy saving measures in these sectors. (immediately start with good housekeeping) To create a large uptake of such programs, an integrated strategy, clear messages, strong government and civil society support and sustained campaigns are needed. Pilot or demonstration projects could help to communicate the benefits of energy savings to business and the public, especially if these get particular attention in television programs and newspapers over a long time;
- Introduce energy standards and labels for other major appliances, standard industrial equipment and lamps, to gradually transform the market for these products towards higher energy efficiency. Priority should be given to products that have a high market share, a large national energy demand and for which more efficient models are already available in the country. Further, standards and labels can be easier to introduce if similar regulations are already in place with trading partners;
- Financial mechanisms can be introduced to support investments in energy efficient equipment, especially for public industries that often lack the budgets to invest in better equipment. Since the electricity rates are subsidized, energy savings directly benefit the government's budget, thus justifying that financial support is given;
- Create a national data base with information on the energy consumption by sectors, implemented energy efficiency projects and results. The information could be used in the process of development and actualization of the national program, for selection of priority areas of the program and for monitoring of the results.
- A recommendation not directly linked to the follow-up of this project, but to new projects in general, is to establish a multi-annual financial overview of originally planned, currently planned budgets and actual expenditure per objective and output. Such an overview can be of great value for the management and supervision of a project, and for tracking results versus inputs.

6. Lessons Learnt

The project, including its design, implementation and results, shows many insightful lessons. Some of these lessons point to good aspects of the project, and repetition of the underlying practices in other projects would be recommended. Some point to clear failures in this project, and also provide very useful lessons for future projects. It is impossible to provide a full overview of all lessons learned here, and the project management and the stakeholders involved are encouraged to describe their lessons learned, and report these (e.g., as part of the project final report, in a conference or magazine paper).

A good lesson in this project is that the capacities built in a project can be secured for the country by providing a smooth follow-up of the project's work in a state organization. With the implementation of project activities, important human capacities have been created within the various structures of the MoE. The project engineers had no experience with energy efficiency at the project start but have build significant knowledge on it during their work on the different project outputs. The government has kept this capacity within the Ministry of Electricity by the creation of a National Energy Research Centre (NERC), which can continue to work on project activities and make them sustainable. Similarly, energy efficiency departments have been created in the Electricity distribution companies in the directorates, which have been trained and are working on energy auditing for local clients. These departments can support future the implementation of future energy efficiency activities on a regional level. This does depend, however, on the correct strategy for these organizations. In Syria, the NERC is currently focused on energy research and much less on delivering energy efficiency, which would probably give a less useful follow-up to project activities.

A major lesson of this project is that an in-depth analysis of the country, on all relevant aspects is needed for a proper design of a project. This analysis should not only focus on the objectives that the project wants to achieve, but even more so

on what is going on outside of the project's proposed activities and how this might affect the project's effectiveness. In this project, such an analysis should have included an analysis of the national electricity system, preventing that the energy efficiency management systems being put in place at a power plant might not come to fruition because the national electricity generation system doesn't allow for the optimization of a plant on energy efficiency any more, due to expected power shortages. With such an analysis, an integrated overview of the project's context should be created, and how this is expected to evolve in the coming years with and without the project. Based on that, a project can be designed that is more effectively targeting the needs of the country.

A third lesson is that energy price subsidies need to be taken into account into the project design and implementation. Energy prices in Syria, and many other countries, are heavily subsidized or otherwise not reflecting real market prices. In this project, the (artificially) low end-user prices have been a barrier for investments in energy efficiency, as investments now have low energy cost savings, and the cost-effectiveness for the end-user is much reduced. Thus, many investments that are cost-effective on a national level are not being taken. The energy price should be factored into the project design and in cases of heavily subsidized energy, this could imply relying on government or utility-funded DSM programs instead of end-user investments, justified by the fact that energy savings also primarily benefit the state or utility that is subsidizing the delivered energy.

The capacities of the country for implementing a project should be taken into account, reflecting that it takes time to build the capacities to implement energy programs and deliver energy efficiency improvements. International support can help in building capacities and structure activities, but are no substitute for national capacities. National capacities need to be developed in pace with the

start-up and implementation of project activities, implying that only a limited number of activities should be taken up, and that initial activities are fairly easy to implement. Further, activities should not be planned to be too depending on each other, whereby one activity can only start when another is completed. Such stacking of activities reduces the opportunity to absorb delays in the implementation of activities, which often happens in new projects, and leads to many activities that must be started too late towards the end of the project.

When a project is ongoing, but not delivering as planned, it is important to re-evaluate the original objectives and decide on a prioritization of objectives and activities. This prevents that management and implementation capacity is fragmented across a too large number of activities, resulting in no or too limited implementation of activities, although substantial resources have been put in. In this project, the project has tried to deliver on too many different activities, but work on many activities was stopped before completion when time and budgets ran out. If such an overload of activities is occurring, it is better to prioritize on a manageable number of activities, and deliver on those, than to continue till it's too late and miss out on many activities.

The involvement of different stakeholder groups was limited during the implementation of the project; most of the participating parties were from within the Ministry of Electricity structures and outside contribution was limited to conference and workshops participation and information dissemination about project activities. No efforts were made to discuss with stakeholders the project activities and plans, barriers and problems and how to overcome these, necessary changes in the project document and outcomes, project results, etc. This resulted in little societal uptake of the programs' goals, and little to none drive for continuation of activities once the project ends. Efforts should be made to create long-term collaborations with relevant stakeholders during the development and

implementation of energy efficiency projects and programs, eventually leading to coordinated implementation of activities, with co-decision making and joint ownership of project activities.

Finally, a lesson is that the follow-up of a project has to be arranged well before its completion, to make sure that activities

implemented during the project are properly continued once the project stops. In this case, provisions were (and are) needed for the monitoring and evaluation of the performance of the power plant where new systems have been installed. Specifically for this project also, provisions were needed to monitor the rehabilitation of the Baniyas power plant, which was in

the (co-financed part of the) project but was not delivered during the implementation period. Once the project is completed, there no more is a structure to set-up such provisions, and it is important to prepare for the end of a project well before its end date.

7. Evaluation Report Annexes

7.1 Evaluation Terms of Reference

TOR for Final Evaluations Of SUPPLY- SIDE EFFICIENCY AND ENERGY CONSERVATION AND PLANNING

SYR/97/G31; SYR/97/001; SYR/97/E02

I. Introduction

The overall objective of the project is to strengthen the capacity of the Syrian Arab Republic to implement and sustain a long term energy efficiency that has well documented positive impact on both the global as well as the local environment. At the same time the project is in line with the country's sustainable development objectives.

The long term Goal of the project is to reduce the green house gas emissions resulting from the combustion of the carbon based fuels and the consumption of the electric power, and thereby contribute to the mitigation of Climate Change.

The project funds are devoted to removal of barriers as a cost effective mechanism of institutional strengthening and capacity building within the Ministry of Electricity in general and the two Syrian electricity establishments. More specifically, the project will remove barriers to the effective adoption of energy efficiency measures in the Syrian power sector and the introduction of energy conservation in the private and public sectors.

Through barriers removal mechanism, the project will address the need for restructuring greater efficiency, self sustainability and for the introduction of appropriate technologies and concepts within the Syrian energy Sector. Furthermore, through barrier removal, the effective adoption of energy efficient measures in the Syrian supply and demand side sectors encouraged and nurtured.

The projects have five immediate objectives:

1. Syrian energy service center
2. National Energy Efficiency Program

3. Baniyas Efficiency Management System

4. Baniyas Maintenance Management System

5. PEEGT Efficiency and Maintenance management support team

By the year 2008, the objectives will reduce energy consumption by a total of 1 . 83 % compared to the current levels and to reduce CO2 emissions by 765.5 Ton

The Project started its activities in October 1999; the planned actual date for its completion is October 2003. The total budget of the project is US \$ 4 . 755 million (excluding in kind), funded by GEF, UNDP, and OPEC as Follows (US \$ 4.070000 GEF, US \$ 505000 UNDP TRAC1 &2, US \$ 180000 OPEC). The in kind contribution of the government is US \$ 38,119,565.

The executing agency is the Ministry of Electricity

II. Objectives of the evaluation

The Monitoring and Evaluation (M&E) policy at the project level in UNDP/GEF has 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, program 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. These might be applied continuously throughout the lifetime of the project -e.g. periodic monitoring of indicators-, or as specific time-bound exercises such as mid term reviews, audit reports and terminal evaluation.

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. A final Evaluation of a GEF-funded project is required before a concept proposal for additional funding can be considered for inclusion in a GEF work program. However,

a final evaluation is not an appraisal of the follow-up phase.

Based on this directive UNDP Syria Co. initiated this evaluation by at the request of the National Executing Agency.

This evaluation is intended to assess the relevance, performance and success of the project. It looks at early signs of potential impact and sustainability of results, including the contribution to capacity development and the achievement of global environment goals. It will also identify/document lessons learned, suggest actions to be taken at the local level to facilitate effective follow-up of the project in line with its long term development objective and make recommendations that might improve design and implementation of other UNDP/GEF projects.

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, to assess the extent to which the global environment objectives and the improvements targets, as described in the project document, have been achieved and, to analyze the efficiency and cost effectiveness of how the project has moved towards its objectives and outcomes.

In addition, and in-line with GEF M&E guidance, this evaluation will cover the following:

- Analysis of the attainment of global environmental objectives, outcomes/impacts, project objectives, and delivery and completion of project outputs/activities (based on indicators).
- Evaluation of project achievements according to GEF Project Review Criteria:
- Implementation approach
- Country ownership/Driveness
- Stakeholder participation/ Public Involvement

- Sustainability
- Replication approach
- Financial planning
- Cost-effectiveness
- Assessment of the project's monitoring and evaluation systems

The Report of the final evaluation will be targeted at meeting the Evaluation needs of all stakeholders (GEF, UNDP, MOE, and other relevant stakeholders participating in the project)

III. Products expected from the evaluation

The main Deliverables of the final evaluation will be:

- An Inception Report
- A Final evaluation Report based on the general format outline at Annex 1

Inception Report

The Inception Report will be provided after the review of basic information of the project, and will outline the work plan and the key issues to be addressed during the mission in the Syrian Territories.

Final evaluation Report

The Final evaluation Report will include a) findings, conclusions and recommendations in relation to the issues to be addressed identified under sections 2 and 3; 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 Project management or UNDP/Syria.

The Evaluation Report will be written in the format outlined in Annex 1 and will not exceed 60 pages in total)

Within one week of completion of the country part of the mission, the draft report should be submitted to the Executing agency /National Project Director, UNDP Syria CO and GEF Regional Coordinator for review and comments.

IV. Methodology or evaluation approach

The evaluation process will be carried out through a period of forty two days (42) days, including (15) days mission to Syria where the Ministry of electricity(MOE) /National Project Director and UNDP / GEF Program Officer will be represented in addition to the consultant. The consultant will coordinate and work with the MOE/NPD and UNDP/Syria, and other stakeholders if required. The consultants will be based in Damascus, and carry out visits, as needed, to various locations in the Syrian Territories.

The methodology will cover:

Preparatory stage : Five days

- Preliminary desk study review of relevant documentation provided by UNDP/Syria and Project management (Annex 3).
- Circulation of information with main stakeholders to determine the key issues to be addressed during the mission in the Syria.
- Submission of Inception Report

Field Mission : fifteen days

- Briefing for evaluators
- Completion of desk study review of relevant project documentation (if necessary).
- Interviews and meetings with the senior management of the Syrian Energy Authority, project management and staff, target energy consumers, UNDP/Syria, and other stakeholders.
- Validation of preliminary findings of the mission with the Project management and UNDP

Preparation of Final evaluation Report: 21 days

- Within two weeks after completion the field mission the first draft report will be submitted and circulated for comments, and feedbacks from MOE/ National Project Director and UNDP.

- Preparation of final evaluation report :1 week

V. Evaluation team

The evaluation mission will consist of two international consultants for the demand and Supply side. Each will be responsible for defined objectives.

The evaluation team will be composed of:

1. An international team leader, responsible for establishing the evaluation structure, team planning, mission methodologies, backstopping the data collection and synthesis of preliminary findings. The international team leader will have overall responsibility for the final content and quality of the Final Terminal Evaluation Report. Team leader should be aware of the GEF-UNDP evaluation policy and requirements and be knowledgeable of aspects related to Energy efficiency and climate change and. Strong mentoring skills within cross-cultural teams working under tight deadlines is essential; the team leader is also responsible for covering the technical issues related to the demand Side in particular, objectives 1&2 of the project.
2. An international energy efficiency/supply side expert. Scientific background but with experience working in multi-discipline and cross-cultural teams. Familiarity with the energy efficiency and issues related to the supply side in particular covering the issues related to the Supply Side in particular objectives 3, 4&5 of the project. Good experience in evaluating energy efficiency projects. Particularly internationally funded donor projects. UNDP evaluations experience a benefit.

Expected qualifications of the Evaluator/Evaluator Team:

- Advanced degree in energy related field Demand side/Supply side ;
- At least 10 years' working experience with activities promoting energy efficiency in demand and supply side in particular: the power plants, commercial, public and residential sectors, including topics such as public

awareness raising and marketing, energy sector management, institutional capacity building and financing; energy power plants.

- Experience in the evaluation of technical assistance projects, preferably with UNDP or other United Nations development agencies and major donors;
- An understanding of GEF principles and analysis of expected impacts in terms of global benefits;
- Demonstrated ability to assess complex situations in order to succinctly and clearly distill critical issues and draw forward looking conclusions;
- Excellent oral and writing communication skills in English;

VI. Implementation arrangements

The evaluation is led by UNDP Syria CO. The CO Program Officer in cooperation with the National Project Director will provide day to day support to the evaluation team the Co. is also responsible for liaising with the project team to set up the stakeholders interviews, arrange the field visits, co-ordinate with the Government for hiring national consultants and ensure the timely provision of per diems and travel arrangements within the country for the evaluation team. The TORs will follow the UNDP-GEF policies and procedures, and together with the final agenda will be agreed upon by the GEF Coordination unit, UNDP CO and the Government. The three parties will receive a draft of the final evaluation report and provide comments on it prior to its completion. UNDP/Syria and Project Director will provide the international consultants with all available information and data related to the project, as well as office facilities in the various appropriate locations to support the Consultants and to insure efficient performance of the work.

The mission will maintain close liaison with UNDP Resident Representative/Program officer, concerned agencies of the government, and the National Project Director.

VII. Scope of the evaluation- specific issues to be addressed.

In pursuit of the overall objective, the following key issues will be addressed 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
- Analyze 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
- Assess 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
- Examine the project's compliance with the application of the incremental cost concept.
- Review the implementation of monitoring and evaluations plans

VIII. Annexes

Annex 1: Sample outline of the Final Evaluation Report

Annex 2: UNDP/GEF terminology and guidelines for final evaluation

Annex 3 List of Documents to be reviewed by the evaluators

Annex 1:

Evaluation Report: Sample Outline

Minimum GEF requirements¹ are underlined

Executive summary

- Brief description of project
- Context and purpose of the evaluation
- Main conclusions, recommendations and lessons learned

Introduction

- Purpose of the evaluation
- Key issues addressed
- Methodology of the evaluation
- Structure of the evaluation

The project(s) and its development context

- Project start and its duration
- Problems that the project seek to address
- Immediate and development objectives of the project
- Main stakeholders
- Results expected

Findings and Conclusions

(In addition to a descriptive assessment, all criteria marked with (*) should be rated⁶)

¹ Please refer to GEF guidelines for explanation of Terminology

⁶ The ratings will be: Highly Satisfactory, Satisfactory,

Marginally Satisfactory, Unsatisfactory

- Project formulation
- Implementation approach (*) (i)
 - Analysis of LFA (Project logic /strategy; Indicators)
 - Lessons from other relevant projects (e.g., same focal area) incorporated into project implementation
 - Country ownership/Driveness
 - Stakeholder participation (*)
 - Replication approach
 - Cost-effectiveness
- UNDP comparative advantage
- Linkages between project and other interventions within the sector
- Management arrangements
- Implementation
 - Implementation approach (*) (ii)
 - The logical framework used during implementation as a management and M&E tool
- Effective partnerships arrangements established for implementation of the project with relevant stakeholders involved in the country/region
 - Feedback from M&E activities used for adaptive management
 - Financial Planning
 - Monitoring and evaluation (*)
 - Execution and implementation modalities
 - Management by the UNDP country office
 - Coordination and operational issues
- Results
 - Attainment of objectives (*)
 - Sustainability (*)
 - Contribution to upgrading skills of the national staff
- Recommendations
 - Corrective actions for the design, implementation, monitoring and evaluation of the project
 - Actions to follow up or reinforce initial benefits from the project
 - Proposals for future directions underlining main objectives
- Lessons learned
- Best and worst practices in addressing issues relating to relevance, performance and success
- Annexes
 - TOR
 - Itinerary
 - List of persons interviewed
 - Summary of field visits
 - List of documents reviewed
 - Questionnaire used and summary of results

Annex 2

Explanation on Terminology Provided in the GEF Guidelines to Terminal Evaluations

Implementation Approach includes an analysis of the project's logical framework, adaptation to changing conditions (adaptive management), partnerships in implementation arrangements, changes in project design, and overall project management.

Some elements of an effective implementation approach may include:

The logical framework used during implementation as a management and M&E tool

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

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

Feedback from M&E activities used for adaptive management.

Country Ownership/Driveness is the relevance of the project to national development and environmental agendas, recipient country commitment, and regional and international agreements where applicable. Project Concept has its origin within the national sectoral and development plans

Some elements of effective country ownership/driveness may include:

Project Concept has its origin within the national sectoral and development plans Outcomes (or potential outcomes) from the project have been incorporated into the national sectoral and development plans Relevant country representatives (e.g., governmental official, civil society, etc.)

are actively involved in project identification, planning and/or implementation

The recipient government has maintained financial commitment to the project

The government has approved policies and/or modified regulatory frameworks in line with the project's objectives

Project's collaboration with industry associations

Stakeholder Participation/Public

Involvement consists of three related and often overlapping processes: information dissemination, consultation, and "stakeholder" participation. Stakeholders are the individuals, groups, institutions, or other bodies that have an interest or stake in the outcome of the GEF-financed project. The term also applies to those potentially adversely affected by a project.

Examples of effective public involvement include:

Information dissemination

Implementation of appropriate outreach/public awareness campaigns
Consultation and stakeholder participation
Consulting and making use of the skills, experiences and knowledge of NGOs, community and local groups, the private and public sectors, and academic institutions in the design, implementation, and evaluation of project activities

Stakeholder participation

Project institutional networks well placed within the overall national or community organizational structures, for example, by building on the local decision making structures, incorporating local knowledge, and devolving project management responsibilities to the local organizations or communities as the project approaches closure

Building partnerships among different project stakeholders

Fulfillment of commitments to local stakeholders and stakeholders considered to be adequately involved.

Sustainability measures the extent to which benefits continue, within or outside the project domain, from a particular project or program after GEF assistance/external assistance has come to an end. Relevant factors to improve the sustainability of project outcomes include: Development and implementation of a sustainability strategy.

Establishment of the financial and economic instruments and mechanisms to ensure the ongoing flow of benefits once the GEF assistance ends (from the public and private sectors, income generating activities, and market transformations to promote the project's objectives).

Co financing (Type/Source)	IA own Financing (mill US\$)		Government (mill US\$)		Other* (mill US\$)		Total (mill US\$)		Total Disbursement (mill US\$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
Grants	GEF :4.070	4.070			UNDP:0.505	0.505				
Loans/Concessional (compared to market rate)										
Credits										
Equity investments										
In-kind support			38.120	62..000						
Other (*)					OPEC:0.180	0.180	0.180	0.180		
Totals										

Development of suitable organizational arrangements by public and/or private sector.

Development of policy and regulatory frameworks that further the project objectives.

Incorporation of environmental and ecological factors affecting future flow of benefits.

Development of appropriate institutional capacity (systems, structures, staff, expertise, etc.) .

Identification and involvement of champions (i.e. individuals in government and civil society who can promote sustainability of project outcomes).

Achieving social sustainability, for example, by mainstreaming project activities into the economy or community production activities.

Achieving stakeholders consensus regarding courses of action on project activities.

Replication approach, in the context of GEF projects, is defined as lessons and experiences coming out of the project that are replicated or scaled up in the design and implementation of other projects.

Replication can have two aspects, replication proper (lessons and experiences are replicated in different geographic area) or scaling up (lessons and experiences are

replicated within the same geographic area but funded by other sources). Examples of replication approaches include:

Knowledge transfer (i.e., dissemination of lessons through project result documents, training workshops, information exchange, a national and regional forum, etc).

Expansion of demonstration projects. Capacity building and training of individuals, and institutions to expand the project's achievements in the country or other regions.

Use of project-trained individuals, institutions or companies to replicate the project's outcomes in other regions.

Financial Planning includes actual project cost by activity, financial management (including disbursement issues), and co-financing. If a financial audit has been conducted the major findings should be presented in the TE.

Effective financial plans include: Identification of potential sources of co-financing as well as leveraged and associated financing⁷.

Strong financial controls, including reporting, and planning that allow the

project management to make informed decisions regarding the budget at any time, allows for a proper and timely flow of funds, and for the payment of satisfactory project deliverables

Due diligence due diligence in the management of funds and financial audits. *Co financing includes:* Grants, Loans/Concessional (compared to market rate), Credits, Equity investments, In-kind support, Other contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and beneficiaries. Please refer to Council documents on co-financing for definitions, such as GEE/C.20/6.

Leveraged resources are additional resources—beyond those committed to the project itself at the time of approval—that are mobilized later as a direct result of the project. Leveraged resources can be financial or in-kind and they may be from other donors, NGO's, foundations, governments, communities or the private sector. Please briefly describe the resources the project has leveraged since inception and indicate how these resources are contributing to the project's ultimate objective.

⁷ Please refer to Council documents on co-financing for definitions, such as GEE/C.20/6. The following page presents a table to be used for reporting co-financing.

Cost-effectiveness assesses the achievement of the environmental and developmental objectives as well as the project's outputs in relation to the inputs, costs, and implementing time. It also examines the project's compliance with the application of the incremental cost concept. Cost-effective factors include: Compliance with the incremental cost criteria (e.g. GEF funds are used to finance a component of a project that would not have taken place without GEF funding.) and securing co-funding and associated funding.

The project completed the planned activities and met or exceeded the expected outcomes in terms of achievement of Global Environmental and Development Objectives according to schedule, and as cost-effective as initially planned.

The project used either a benchmark approach or a comparison approach (did not exceed the costs levels of similar projects in similar contexts)

Monitoring & Evaluation. Monitoring is the periodic oversight of a process, or the implementation of an activity, which seeks to establish the extent to which inputs, work schedules, other required actions and outputs are proceeding according to plan, so that timely action can be taken to correct the deficiencies detected.

Evaluation is a process by which program inputs, activities and results are analyzed and judged explicitly against benchmarks or baseline conditions using performance indicators. This will allow project managers and planners to make decisions based on the evidence of information on the project implementation stage, performance indicators, level of funding still available, etc, building on the project's logical framework.

Monitoring and Evaluation includes activities to measure the project's achievements such as identification of performance indicators, measurement procedures, and determination of baseline conditions. Projects are required to implement plans for monitoring and evaluation with adequate funding and appropriate staff and include activities such as description of data sources and methods for data collection, collection of baseline data, and stakeholder participation. Given the long-term nature

of many GEF projects, projects are also encouraged to include long-term monitoring plans that are sustainable after project completion.

Financial Planning, Co-financing:

* Other is referred to contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and beneficiaries.

Leveraged Resources

Leveraged resources are additional resources—beyond those committed to the project itself at the time of approval—that are mobilized later as a direct result of the project. Leveraged resources can be financial or in-kind and they may be from other donors, NGO's, foundations, governments, communities or the private sector. Please briefly describe the resources the project has leveraged since inception and indicate how these resources are contributing to the project's ultimate objective

Annex 3

List of documents and reports to review

- Project document
- The logical framework matrix and the annual workplans;
- The annual reports (APRs, PIRs and TPRs)
- The monthly reports;
- The mid-term evaluation report
- Selected documents on different activities of the project.

7.2 Itinerary of the Evaluation

The itinerary followed is described in the evaluation outline developed for this evaluation, which is repeated here.

Introduction

This evaluation outline describes the approach proposed for the evaluation of the UNDP/GEF project "Supply- Side Efficiency and Energy Conservation and Planning" (Syr/97/G31; Syr/97/001; Syr/97/Eo2), the assessment of its contribution to capacity development and global environmental goals, and the identification of lessons learned, recommendations for future projects and forward vision recommendations regarding the sustainability of project outputs.

Background for this Evaluation

The project "Supply- Side Efficiency and Energy Conservation and Planning" (further: the project) is funded by the Global Environment Facility (GEF), managed by the United Nations Development Program (UNDP), and executed under the Syrian Ministry of Electricity (MoE). The project falls under the Climate Change focal area, and aims at reducing greenhouse gas emissions by improving demand-side energy-efficiency through the creation of a multi-purpose Syrian Energy Services Center and National Energy Efficiency Program, and by improving supply-side efficiency through the demonstration of Efficiency and Maintenance Management Systems at the Banias power plant.

To evaluate the project results and impacts; promote accountability for resource use; document, provide feedback on and disseminate lessons learned; and provide forward vision recommendations to complement and sustain project outputs, UNDP requests this final project evaluation. This outline describes the proposed approach for this evaluation and its strategy, planning and deliverables, in accordance with the Terms of Reference provided by UNDP.

Evaluation Issues

The ToR describe the issues that need to be addressed in the final evaluation, the documents to be reviewed and the

stakeholders to be consulted. For some of the evaluation components (specifically Findings and Conclusions), the ToR specify which elements need to be addressed in the evaluation.

The evaluation should include the following issues (a full description of these issues is included as Annex I). Items marked with an (R) should also be rated in one of four classes.

- Executive summary
 - Brief description of project
 - Context and purpose of the evaluation
 - Main findings, conclusions, recommendations and lessons learned
- Introduction
 - Purpose of the evaluation
 - Key issues addressed
 - Methodology of the evaluation
 - Structure of the evaluation
- The project and its development context
 - Project start and duration
 - Problems that the project seeks to address
 - Immediate and development objectives of the project
 - Main stakeholders
 - Results expected
- Findings and Conclusions
 - Project Formulation
 - Conceptualization/Design (R)
 - Country-ownership/Driveness
 - Stakeholder participation (R)
 - Replication approach
 - UNDP comparative advantage
 - Project Implementation
 - Implementation Approach (R)
 - Monitoring and evaluation (R)
 - Stakeholder participation (R)
 - Financial Planning
 - Sustainability
 - Execution and implementation modalities
 - Results
 - Attainment of Outcomes/ Achievement of objectives (R)
 - Sustainability
- Recommendations
 - Corrective actions for the design, implementation, monitoring and evaluation of the project;
 - Actions to follow up or reinforce initial benefits from the project;
 - Proposals for future directions underlining main objectives;

- Lessons learned
- This should highlight the best and worst practices in addressing issues relating to relevance, performance and success.

These evaluation issues form the basis for the proposed evaluation. The projects relevance, performance and success, as well as emerging impact and sustainability of results, will be assessed against indicators for the above issues.

These indicators have been taken from the Project Document, as far as possible, supplemented with additional indicators where needed. A full list of evaluation indicators is prepared at the start of the evaluation, based on the above issues, and the project documentation. It should be noted that the availability of information, and the limitations in time and budget for the evaluation will limit the extend to which evaluation indicators can be assessed. The indicators provide the framework for the fact finding, analysis, ratings and recommendations of the evaluation.

Organization and approach of the evaluation

This evaluation will be performed as an external, independent assessment of the project, including a desk review of available project documentation (including the project document, progress reports, outputs and other sources of information), interviews with UNDP and MoE program officers, the project manager, the project consultant, and stakeholders. These interviews will take place during a (one-week) visit to Damascus. External experts may be contacted to gather background information or references and to check project data.

Evaluation Strategy

This evaluation aims at assessing the projects relevance, performance and success, early signs of impact and sustainability of results, identifying lessons learned, and making recommendations for the sustainability of project outputs and for future projects . For this, evaluation indicators will be developed, based on the evaluation issues stated in paragraph 1.2. The indicators are intended to measure the performance, management and impact of

Activity	I Direct output	II Direct effects	III External effects	IV Final outcome
Project activity A	Direct result (e.g. report or standard published, website developed) of one activity	Indirect result / effect on target group (e.g. report or standard used by target group, website used by target group) of one or a few activities	External results in targeted countries (e.g. adoption of building code legislation, installation of enforcement infrastructure, based on reports or building codes, websites, training etc) as a result of a group of activities	Final results in targeted countries (e.g. transformation of building market, changes in thermal performance of buildings, CO2-emission reductions) as a result of the whole project
Project activity B				
Project activity C				
Etc				

the project and will guide the evaluation process.

Evaluation Indicators

Evaluation indicators serve to measure the performance of the project on several aspects. An indicator targets an important, measurable aspect of an evaluation issue, with the aim to make a complex, principally qualitative issue measurable and (semi-) quantifiable. During the evaluation, fact-finding focuses on collecting data regarding these indicators (next to general qualitative and contextual information about the project), and during the analysis the projects results are valued against indicators (ranging from below to above what has been / might have been expected or was implied in the project design). Given the extent of the project and the complexity of the subject, not all aspects (of all issues) can be targeted during this evaluation. The evaluation indicators will therefore be selected to cover a large proportion of the project, but the availability of data and access to information sources will be taken into account. The evaluation indicators will be developed in close co-operation with UNDP program officers.

Although monitoring and evaluation is often a part of a project design, and ideally an integrated management tool, usually not all relevant evaluation aspects where foreseen at the initiation of a project and duly monitored during project execution. Additionally, a final evaluation often

includes issues (specifically about project design and impact / outcome) that are of lesser relevance during project execution and can only be assessed ex-post. Therefore, it is often needed to develop additional indicators to assess project design issues, the impact on stakeholders and the long-term impact (or early signs of this) of the project. These will be developed during the desk review of the project documentation, based on the (listed) evaluation issues. Draft evaluation indicators will be presented to the program officers and executors for review and comments, before these are finalized.

The development of the evaluation indicators will be structured according to the following system (see graph above).

Category I direct outputs are usually monitored through progress reports (as they are normally a direct output of the work to be done) and do not require specifically designed evaluation indicators. These outputs are usually delivered during the course of the project, can easily be observed and give an indication of the efficiency of the project.

Category II direct effects are usually a direct effect of activities, but are often not measured during the course of a project (though they could provide valuable information to the program management). These effects can usually be observed during or shortly after the completion of an activity, can be measured by enquiries,

surveys, interviews etc and give an indication of the efficiency of the project.

Category III external effects are an indirect result of project activities. These are usually (for projects like the development of thermal standards / building codes) the result of activities that target groups in target countries engage in as a result of project activities (e.g. government adopting thermal standard / building code legislation following participation in the project). These effects are usually more difficult to monitor, as they occur some time after completion of activities (typical time delays differ a lot, but a six months to one year delay would be a reasonable assumption) and are usually the result of more inputs (one being the project). External effects can be measured in a variety of ways, including interviews, surveys, observations, dependent on the type of effect, and give an indication of the effectiveness of the project.

Category IV final outcome is the final effect of the project in a target country (the market situation, building stock, energy consumption, etc). These are usually long-term effects of projects and can only be measured after longer periods (typically starting after three to five years, with effects lasting more than 10 years). Possible measurements include building market and building stock analyses and energy consumption analysis, but it can be difficult to prove a direct relationship between project activities and changes in market and stock. The final outcome is always the result of many activities, can give an indication of the effectiveness of a project but is not always very helpful for an evaluation of a single project.

Since the details of the 'Supply- Side Efficiency and Energy Conservation and Planning' project are not yet known, it is difficult to indicate whether observable effects can be expected in all categories. Based on the information provided, and on an understanding of the typical development of building standards, it may be expected that there will be observable effects in category I (direct outputs), category II (direct effects) and category III (external effects). It is unlikely that the Final outcomes (category IV) will be substantial, although it may be possible

(dependent on the project duration and the results achieved) that there are indications of early effects in the market. Directly observable effects in the building stock (and resulting carbon emissions) will likely be impossible to observe, although it may be possible to calculate the likely long-term impact of a thermal standard development in these fields.

Direct outputs can be evaluated by a comparison to the deliverables and output stated in the project document and usually do not require the definition of additional evaluation indicators. It will be analyzed whether the project document includes the necessary indicators covering category III external effects (where relevant and feasible) and category II effects (for other subjects), which will then be adopted as evaluation indicators for the evaluation issues. If needed, additional indicators will be developed, as described before.

Given the scope of this evaluation, the number of indicators will be limited to one or two (max. three) per evaluation issue, with more focus on (and more than one indicator for) issues that require a (semi-quantitative) rating next to a (qualitative) assessment.

Data collection and Analysis

The proposed approach for this evaluation will include three main components:

- The desk review of (all kinds of) project documentation, including the project document, progress reports, and outputs. This review will serve to (a) generate an overview of the project, its context, proceedings, outputs and outcome; (b) develop a list of evaluation indicators for the assessment of the project; and (c) to collect data regarding the evaluation issues and indicators. Further documentation (e.g. workshop reports, financial statements) may be needed to answer specific issues, in which case these documents will be requested from the project manager or consultant. When necessary, additional information on project activities may be requested from the project management and/or reference information may be collected from independent experts;
- Interviews with project officers and (representatives of) major stakeholders involved in the project. These interviews will serve to (a) complete the overview of the project, in its context, and the relevance and (future) impact of the projects outcomes according to the involved organizations and stakeholders; (b) complete the fact finding regarding the evaluation issues and indicators; and (c) assist in the assessment of the project by asking the involved organizations about their impression of the projects results on specific issues (indicators), where relevant. During these interviews, fact finding will be supported by questionnaires developed during the desk review phase (semi-structured interviews).
- The analysis of the collected information, and assessment of the projects relevance, performance, success and potential impact. Collected data will be analyzed and structured according to the evaluation indicators. Where target values for evaluation indicators exist (in the project proposal or elsewhere), the observed results of the project will be compared to these target values. Where these target values do not exist a status quo description will be given and an assessment of the projects results based on a review of the project documentation (and the implied assumptions in it), reference information from similar developments (of thermal standards) in other environments, stakeholders opinions and the evaluators judgment. Where requested, a rating will be given based on this information. Together with the overview and contextual information, this will form the basis for the draft and final evaluation report, which will also include conclusions, recommendations and lessons learned.
- Remarkable practices and lessons learned regarding the project and its development context;
- Remarkable practices and lessons learned regarding project formulation;
- Remarkable practices and lessons learned regarding project implementation and management;
- Recommendations regarding major problems, outstanding issues or possible improvements in the projects design, implementation, monitoring or management;
- Recommendations regarding the follow-up of the project to reinforce the full implementation of the projects results and/or directions for future work aiming at similar objectives.

Deliverables & Planning

The planning of this evaluation is constrained by the time necessary to collect all relevant information, to (logistically) prepare a mission to Damascus and meet the relevant parties, and to allow sufficient time for commenting by the involved parties. The indicated planning thus depends on the availability of the necessary documents, people and comments, and can only be guaranteed for (the planning of) own activities.

Deliverables of the evaluation

The deliverables of the evaluation are:

- List of evaluation indicators
- Questionnaires to be used during interviews
- Interviews reports (summary versions)
- Draft final report
- Final report

The list of evaluation indicators will be drafted during the desk review of project documentation and will be sent to the UNDP program officers for review. Comments will be reflected in the final

version of the evaluation indicators, to be finalized at the end of the desk review stage.

At the end of the desk review stage, questionnaires will be prepared to support fact finding during the interviews with involved parties in Syria. The questionnaires will be made available to UNDP for review.

Interviews with the project management and major stakeholders (as listed in the ToR) will be conducted in Damascus. The interviews will be semi-structured, assisted by the questionnaires (implying that there is no strict format for the interviews, but that the questionnaires will be used to raise issues with the interviewees and to guide the direction of the meetings). It is expected that interviews will on average take approx. 2 hours, and that all interviews can be arranged within the same week, and that the UNDP country office can assist in arranging the interviews. Summary reports will be made from each of the interviews, to be annexed to the evaluation report. The interviews will be followed by a debriefing meeting with UNDP (in the same week), to discuss the evaluation in general, and the initial conclusions from the evaluation.

The final report will be drafted within two weeks after completion of the interviews (and debriefing meeting), and will provide a complete overview of the evaluation as described in this outline. The report will be structured along the following lines:

- Executive summary
- Introduction
- The project and its development context
- Findings and Conclusions
 - Project formulation
 - Implementation
 - Results
- Recommendations
- Lessons learned

Annexes

The draft final report will be sent to UNDP, to be circulated among involved parties, for comments and feedback. Issues raised by the involved parties will be reflected in the final report, unless there are discrepancies in the opinions and/or findings of the involved parties and the evaluator, in which case these will be explained in an annex to the report. The final report is due within two weeks after receiving the UNDP feedback on the draft final report.

7.3 Evaluation indicators

This evaluation aims at assessing the projects relevance, performance and success, early signs of impact and sustainability of results, identifying lessons learned, and making recommendations for the sustainability of project outputs and for future projects. For this, evaluation indicators will be developed, based on the evaluation issues stated in the Terms of Reference. The indicators are intended to measure the performance, management and impact of the project and will guide the evaluation process. Data will be collected to assess the performance of the project, via a review of project documentation and outputs, and interviews with key persons (during a mission to Syria).

Indicators for the evaluation of project formulation⁸

Conceptualization/Design (R)

1. Project design targets root causes of energy consumption
2. Project design (summarized in LogFrame) is appropriate and suitable for the national context
3. Project design includes sufficient indicators to track progress and measure outputs

Country-ownership/Driveness

4. Project concept originates from within and is supported by national institutions
5. Project concept targets pressing national environmental and development needs

Stakeholder participation (R)

6. Stakeholders have been actively and passively informed about the project and its results
7. Key stakeholders have been consulted about core project decisions and have

provided significant input into the project

Replication approach

8. Project has communicated lessons learned and sought cooperation with new or ongoing projects of similar concept

UNDP comparative advantage

9. Project is linked with other projects or programmes in the sector via well-developed management arrangements

Indicators for the evaluation of project implementation

Implementation Approach (R)

10. Logical Framework is used as a management tool during implementation
11. Implementation management is adaptive to changes in the project environment
12. ICT have been used to support project implementation and dissemination
13. The project established suitable operational relations between involved institutions and key stakeholders
14. The project employed the required technical capacities and made appropriate use of these

Monitoring and evaluation (R)

15. The project has established progress monitoring and has undergone regular evaluations, which have led to required adaptations of the implementation

Stakeholder participation (R)

16. The project properly involved national and local stakeholders in implementation and decision making

17. The project disseminated the required information to all relevant stakeholders

Financial Planning

18. The actual spending on project activities was cost-effective and proportional to the projects objectives

19. Financial management was timely and adequate

Sustainability

20. The project established a sustainable impact in the country, which will continue independently

21. The project established arrangements with relevant organizations or other instruments to secure a continued impact

Execution and implementation modalities

22. UNDP provided adequate oversight of the project and assignment of the required experts

Indicators for the evaluation of project results

Project Development and Immediate Objectives (evaluating final outcome / impact of the project, related to Attainment of Outcomes/ Achievement of objectives (R) and Sustainability)

Reduce greenhouse gas emissions (Improvement Targets)

23. Projected emission reductions based on realised project results (baseline: annual energy conservation of 1.83% pa and 7.6 million tons CO₂ emission reduction cumulatively by 2008 – UNDP Project Document Immediate Objectives section)

Syrian Energy Services Centre (Immediate objective 1)

24. SECS operational as an independent unit and funded from non-project sources (UNDP Project Document Immediate Objectives section - adapted)

National Energy Efficiency Programme (Immediate Objective 2)

25. NEEP adopted by Government of Syria and put into operation with government funding (UNDP Project Document Immediate Objectives section - adapted)

⁸ These indicators are based on the Terms of Reference for Final Project Evaluation. Indicators have been selected to represent a large segment of the identified evaluation issues in a single, measurable item. Valuations of the evaluation issues (were applicable) will represent an average of the performance on the indicators for that issue.

26. Baniyas Efficiency Management
System (Immediate Objective 3)

EMS installed and resulting in demonstrate efficiency improvements at plant operation (UNDP Project Document Immediate Objectives section - adapted)

27. Baniyas Maintenance Management
System (Immediate Objective 4)

MMS installed and resulting in demonstrate efficiency improvements at plant operation (UNDP Project Document Immediate Objectives section - adapted)

28. PEEGT Efficiency and Maintenance
Management Support Team (Immediate
Objective 5)

Efficiency and maintenance management programmes transferred to at least one other power plant (UNDP Project Document Immediate Objectives section)

29. Documented evidence of increased
power system reliability (UNDP Project
Document Immediate Objectives section)

7.4 List of documents reviewed

During the final evaluation the following documents have been reviewed:

- GEF project brief (as available at www.gefweb.org, accessed on 21 September 2006)
- UNDP project document (electronic document, unsigned; signed version not available)
- Draft Mid-term evaluation report (final report not available)
- Project logical framework and revised Logical framework for Objective 1 (both produced during mid-term evaluation; not officially adopted)
- Inception report 1999
- Annual project progress reports (APRs, for the years 2000 to 2005; PIRs for 2004 and 2005; other years unavailable)
- Various monthly reports for 1999 and 2000 (incomplete series)
- Tripartite meeting reports
- Initial UNDP project budget, combined delivery reports
- Combined Delivery reports (CDRs) 2000-2006
- Project studies, materials and reports
 - Various general information materials and newsletters
 - Industrial energy audit guidelines and energy saving opportunities
 - Demand side management study, final report

7.5 List of persons interviewed

Abdul Raouf Yahia, National project director
Sunday 24 September

General overview on project activities and results achieved by project objectives (most of the details included in overview of project objectives 1 and 2)

- Electricity demand in Syria is continuously increasing and new power plants are build to meet this demand
- Baniyas power plant rehabilitation of units 1 and 2 still not finished, expected end is in 2007
- all project staff including the national project director are government staff paid by the Ministry of electricity or its establishments
- The project team was not very satisfied from the international consultancy company selected for objectives 1 and 2, this has caused some troubles and delays in the project implementation, after the mid term review ToRs for new consultants have been developed
- Energy auditing teams were trained in the 14 governorate electricity companies, which have done industry energy audits during the project are continuing, number of projects are implemented mainly power factor corrections and some pilot lighting projects (CFL installment), most of the industries involved are mainly public companies, very few private have participated
- Number of training activities have been organized for the project staff in Egypt, the project has continuously exchanged experience with similar projects in Egypt, training workshops and conferences organized in the country on specific energy efficiency topics
- NERC was established in MoE to support and coordinate studies and research related to energy generation, planning and conservation, utilization of renewable energy recourses. After NERC creation all project staff has been transferred to the center which caused a draw back of the project activities for

certain period of time, since the project staff has been engaged with other activities in the NERC

- Various information materials produced by the project and disseminated during workshops, energy efficiency TV advertisements were broadcasted on the national TV, manual for school teacher on energy efficiency produced. Industry association were used as main driving factor to disseminate the materials to all their members
- Not much activities during the project on energy conservation hotline and award, finally the hotline service have been substituted by a e-mail service via the project website (www.moelec.gov.sy)
- Integrated resource planning report was produced followed by DSM study completed in 2004 with three feasibility studies developed for demand side measures implementation, no further activities have been initiated
- Draft ordinance for energy efficient labeling of refrigerators is developed

Overall impression

- The project has been very successful in raising awareness on energy efficiency issues especially in the Syrian electricity sector and public industries
- The project have received good support from decision makers in the electricity sector, after the introduction of MMS and CMS systems in Baniyas, all new power plants are equipped with such systems
- More actions are still needed on the demand side, improvement of metering reduction of electricity losses
- In general the public industries does not have motivation for reducing the energy consumption, it is difficult to convince their management, introduction of real electricity tariffs is very difficult but the government is planning changes during the next 10 years.

NERC working groups

Eng. Nedal Karmoucheh, Planning Director of MoE

Eng. Ayman Idris, Energy Audit Team Leader

Eng. Nazeh Tannous, NERC

Monday 25 September

Detailed activities by project outputs for objective 1 and 2 were discussed:

- Energy audits - for the overall project duration the experts from SESC, the governorate distribution companies energy efficiency units with cooperation of the Ministry of Industry and University of Damascus have performed 250 walk through audits in different industrial sites, more than 100 detailed audits covering boilers, steam systems and electrical systems for 50 plants. Detailed design and feasibility studies have been developed with the support of Greek international consultants for 20 investment projects.
- Energy data base - the questionnaires have been designed before the project start, but the actual collection of data has started during the project. The data is collected in NERC, but it seems that it is not easy to collect the answers from all enterprises. For the private industries there is still no mechanism developed to collect the necessary data for the energy use. In 2001 survey on the electricity consumption was implemented together with the Central Bureau of Statistics which covered 1700 commercial and industrial samples and 4000 residential sector samples. The survey report has been developed and published in the end of 2001. According the results from the study the residential sector in Syria consumes more than 50% of the electricity followed by industrial sector with 28 %.
- Follow up strategy for NERC - at present it NERC has 40 employees and the five years plan developed foresees that the center staff will increase to 100. Most of the activities performed by project staff prior NERC creation have been continued afterwards. This included energy auditing, DSM study, standards and labels development. The new Energy Conservation Law is under development that will define institutional base for

future activities of NERC. There are some studies done for possibilities for NERC to work as an ESCO, but with the current electricity tariff this does not seem a feasible option.

- DSM study developed - for the aims of the study a detailed survey has been implemented in households in Damascus and rural Damascus to collect as much detailed information as possible on the electricity consumption in households. The study has three main parts –
 - a) electricity demand forecast till 2034,
 - b) 18 opportunities identified for electricity demand saving,
 - 3) three feasibility studies developed for demand side measures implementation. Based on the data collected during the household survey as well as the information gathered during the demand forecast, some 18 end-use electricity saving measures have been identified. From these three pilot programs were chosen for further development of pre-feasibility studies:
 - Time of use metering
 - Industrial motors and motor systems
 - Building envelope improvement

The three pilot programs are estimated to save about 11 GWh electricity annually, about 11 MW peak load savings, at a total cost of about 230 million SP.

- Standards and labels - the work on standards and labels has started in 2001 by establishment of a committee responsible for development of a working programme to improve refrigerators efficiency as well as to coordinate the activities for introduction of S&L for appliances. Members of the committee were experts from SESC, Syrian association of standards and measurements, Testing and research industrial center, local refrigerator manufacturers. To collect information about the average consumption of refrigerators present at Syrian market a sample of refrigerators has been tested. Following the test results the samples were classified between class B and G according to EU

label classification. The estimated average consumption of a refrigerator is about 785 kWh/year that means the total electricity consumption of refrigerators equals to 9 % of the total electricity production. Further the committee has worked out classification categories for refrigerators energy efficiency and a label design based on EU label has been proposed.

General impression on project

- most important achievements are awareness raising, energy auditing, Standards and labels policy development and the draft energy conservation law
- big difficulties with the general lack of data, the team has put a lot of efforts to collect and analyse their own data

Deputy Minister of electricity

Monday 25 September

- The DSM study prepared in the project was used in the development of 5 years MoE plan
- All new power plants are equipped with MMS and CMS following the experience from Baniyas power plant
- There is ongoing study on electricity tariffs, plan is to remove subsidies within 10 years
- There is need of improvements in the metering systems and collection of electricity bills in the country as well as to reduce the distribution losses

Dr. Engineer Ahmed Khaled Al Ali, Minister of Electricity

Monday 25 September

- The discussion with the Minister focused not so much on the implementation of the project, as on the expectations regarding the evaluation process and lessons for future energy efficiency projects in Syria
- The Minister stressed the need to have an unbiased, external evaluation and that all issues should be reported

- Energy demand in Syria is growing rapidly, and faster than the increase in supply. Energy efficiency is therefore urgently needed, to better balance demand and supply. Both supply and demand side energy efficiency are priorities for the Syrian government, and the Minister had a personal interest in seeing through more energy efficiency work.

- In the discussion, several options were discussed for future energy efficiency projects, including:

- An extension of supply-side maintenance and efficiency monitoring systems to more power plants (already ongoing, but might benefit from further attention)
- Building energy efficiency codes
- Appliance energy efficiency codes, particularly for refrigerators and air conditioners

Dr. Kemal Nejy, Chairman of Engineering Syndicate, Member of the project Steering committee, Damascus University professor
Monday 25 September

- a number of joint workshops as well as Energy Audit conference has been organized by the engineering syndicate and the GEF project
- joint training on energy auditing of members of the syndicate was organized with the project and the University of Damascus
- students of the Damascus University
- the general impression is the project is well known in the energy community in Syria and have been very successful in raising awareness on energy efficiency issues in that community

Eng. Ayman Abou-Saleh, Eng. Nedal Kashoom, Eng. Halima Murjan, Electrical Corporation of Rural Damascus

Monday 25 September

- The Electricity Corporation of Rural Damascus has been one of the regional

utilities implementing the power factor corrections program component.

- They have implemented measures at sub-stations serving residential and industrial customers, and have achieved good results in improving the power factor. For this work, they've been equipped (by the SSEECP) with measurement tools and analysis software.

Hama electricity Distribution Company, Eng. Mukhlef Al Hassan, manager of the energy efficiency team

Tuesday 26 September

- An overview was given on the energy efficiency team activities, which are focused mainly on industry energy audits, power factor corrections and a few pilot lighting projects
- The energy audit service provided by the team is for free for the clients
- The overall saving from the power factor correction measure in their region amount to 21 142 997 SYP with a total investments of 30 930 000 SYP.
- Power factor correction service has become regular activity and is continuing after the project end
- The energy audits are not performed by clients requests, rather it is planned activity of the Electricity of Hama itself
- the engineers working in the energy efficiency team have been trained and equipped with auditing metering equipment by the UNDP/GEF project
- the people working in the department have incentives (in terms of salary bonus) for improvements in the electricity system losses
- there is need for additional support for the improvement of the existing electricity metering system in Syria

Mr. Hadeed Hama (Hama iron factory), Eng.

Yahia Alousef, manager of power unit

Tuesday 26 September

- power factor correction implemented in 2001, the savings after finalization of the project is significant, initial planning for introduction of this measure in the factory has started before the start of the GEF/UNDP project in 1996
- the management of the factory is aware of the benefits and now is trying to find financing for implementation of other energy efficiency measures in the factory (e/g heat recovery)
- the factory is public and allocation of financing for energy efficiency measures is usually very difficult
- no overall impression of the other project activities, factory representatives have participated at a conference organized by the project on energy auditing and have exchanged their experience with other industries participating

Mr. Abdul Raouf Yahia (National project director)

26 September 2006 (2nd interview)

- Reported on the supply side support team and Baniyas power plant.
- Mid 2004 was the first target to finish rehabilitation of the units 1 & 2 at Baniyas, but it is not ready yet. Some sensors and instrumentation were not available at a cost of about US\$ 65,000 and could not be obtained from the budget of the project. These are now paid for by the government of Syria, however negotiations on details are still going on. System –EMS, CMS and MMS– for the units 3 & 4 does work now.
- Concerning the fuel Mr. Abdul said that extensions of international and national pipelines for natural gas (NG) are under construction to fire power plants with NG. Also a central control center for dispatch is being set up. New HV-lines will improve the interaction of the different power plants.

Eng. Mohammed Khalil sheik (Deputy general director NERC, also contact person to Baniyas power plant management team)

Tuesday 26 September 2006

Status information:

- The central team has now all equipment + software available and is starting now.
- The national power network is expanding and the central control center is setting adjustments of power to be generated by the different power plants. Mr. Mohammed showed the Technical Statistical Report 2005, a copy of which we later obtained.

More details regarding the Baniyas power plant.

- On line monitoring of condition related signals, require control actions if they deviate. (The fact that is mentioned explicitly, indicates a significant change in plant operations.) With MMS one can postpone the maintenance if there is no change in condition. But to become fully effective one has to collect data over a longer period. With MMS maintenance can be planned one year ahead.
- The rehabilitation of the units 1 & 2 suffer a delay of 1½ year because of the main contractor (an Iranian company) not of the subcontractor ABB, who is doing a great job at Baniyas.

Some remarks

- New combined power plants are delayed.
- While discussing the concern about the bad influence of the low power factor to the stability of the electricity supply system, Eng. Mohammed the lack of responsibility for improvement. The actions going on now in major industries on a voluntary basis are already quite helpful.
- Subsidies for hot water solar collectors will have much more impact in reducing the energy demand than subsidizing more efficient water heaters. This is a well proven technology in many countries in the middle east.

*Site visit Banias Power Plant**Eng. Mohammed Khalil sheki**Eng. Mohammad Ali Ghana (general director)**Eng. Ahmad Hasan Ali (plant manager)**Mr. Nedal Alda Her (technical manager plant operation)**Mr. Oliver Jennes (ABB Utilities GmbH, Power Generation Services, I&C and Electrical)*

Tuesday 26 September 2006

- Items discussed with management team:
 - MMS, EMS and CMS,
 - rehabilitation units 1 & 2,
 - operational performance of the plant
- The computerization of the systems (MMS, EMS and CMS) causes some transitional effects. There is a good progress in the capabilities of the people in the plant; they manage well to change from paperwork to a digital system. However, the people in the government and others they have to inform, very often require everything on paper as was the case previously e.g. purchases.
- A server in the EMS has been brought to Germany at ABB for repair and saving of all the data by Mr. Oliver Jennes. A serious problem for ABB is that the amount of USA-parts should be less than 10% otherwise the transport is blocked due to the USA-embargo of Syria. However, a solution has been found and the server is expected to return soon to Banias.
- They proudly reported that the CMS had detected upcoming problems in units 3 & 4 in an early stage. So they were able to take measures and could prevent a shut-down. Now they advise CMS to other power stations.
- Thanks to the CMS they could adjust the boiler with the result that the smoke out of the chimneys turned from dark grey to almost white, thus indicating a much better performance and more efficient use of the fuel. CO₂ is reported daily, and SO₂ and dust on a weekly basis.

- Problems arose with the installation of the EMS and MMS. Sensors and their instrumentation measuring on-line process parameters and the condition of the plant have been used as portable items during commissioning and delivery of the plant and have been removed after that. These elements (e.g. boiler temperature, flow and air ratio) were not installed permanently because of moneysaving in the commissioning of the plant. Financing these missing sensors turned out not to be possible from the project so it had to be negotiated for governmental financing, which is a very lengthy procedure and caused long delays.
- The general director Eng. Mohammad Ali Ghana, advises strongly to install these systems including the CMS-sensors in all plants existing and new ones.
- Concerning the rehabilitation of units 1 & 2, the general manager expects unit 1 around mid of October an unit 2 mid of December in full power.

*Mr. Nedal Alda Her (technical manager plant operation)**Mr. Oliver Jennes (ABB Utilities GmbH)*

Tuesday 26 September 2006, at Banias Power Plant

- Visual inspection and operational performance of the plant
 - Boiler 1 is now in a test phase of its rehabilitation: heating up and steam blow out at ¼ nominal pressure. The sound of the second steam blow out that morning is not yet at the desired homogeneous level as the first one was.
 - The EMS and MMS hardware are present, well installed and in operation. The new control room is under test. Starting up the complete system has to wait for the completion of the rehabilitation of units 1 & 2.
 - Visual and manual checking of the generator-turbines of units 3 & 4 proved the smooth operation of the units, actual power is 160 + 170 MW; power factor 0.9. These are sound

figures in accordance with the check I performed.

- With satisfaction the technical plant manager told that he knows well the power condition for safe operation thanks to the CMS. In case "Damascus" asks for more power, the more risky operation is clear now: "You know that more attention is needed under these conditions".
- The rehabilitation of the units 1 & 2 have been reviewed visually. Rehabilitated turbine parts are waiting for rebuilding the turbine and steam pipes are under treatment. Many workers are active in the generator hall and outside the building on the fuel pipelines; the new natural gas pipeline already approaches the boilers.
- It was advised not to enter into the boiler hall for safety reasons, in particular because tests are going on now.
- According to the status of rehabilitation I could observe, it is not expect that the dates the general manager gave will be met.

*NERC**Eng. Mohammed Khalil sheik (Deputy general director NERC)**Dr. Kamal Naji (PEEGT)**Mr. Mohammed Rahban (Central Team/Supply Side Support Team, power plants transition oil ⇔ gas)*

Wednesday 27 September 2006

- NERC is an important item in the project (now 40 people). Its role in the supply field is to contribute to the energy policy by encouraging, providing scientific background and research, and executing studies on applications. There is quite some attention for renewable energies as a relief for the growing demand.
 - Mass application proven renewables e.g. solar hot water collectors
 - Using more pilots for wind energy in a PPA (power production agreement)



- PV-applications in remote area's: special applications at the weak ends of the grid and off the grid.
 - Biomass from agricultural waste (in co-operation with Ministry of Agriculture): save energy and improve the environment. (Further questioning resulted in the recognition that this is a complicated area, so better to be started on a small scale)
 - Improvement of the efficiency of the whole chain of energy production ⇒ end use. Social aspects will be included if adequate specialists are attracted at increasing staff.
 - Energy policies: studying and giving advice on rules and regulations regarding efficient use of all energy carriers. In particular Law on energy saving; Law on electrical equipment; National code building isolation.
 - In NERC a team is making audits in factories, large communities and hospitals e.g. on power factor, energy savings and to disseminate information via brochures.
 - Central Team Power Plants is active on the fuel transition from heavy oil (high sulfur) ⇒ natural gas (30% less CO₂). Part of the natural gas comes from gas fields and part is associated gas from oil fields that has been flared previously. For this purpose the gas pipeline infrastructure is being extended in the country and internationally connected to Egypt, Jordan, Lebanon and Turkey.
 - To improve the emission situation of power plants in Syria the fuel transition also gives opportunities for an increase in combined cycle plants. These can be upgraded steam plants and new ones. Now about 50% of the generating capacity is of the steam turbine type (efficiency $\eta \sim 38\%$). Half of it can be replaced by CCGT (combined cycle gas turbine) ($\eta \sim 55\%$).
 - The Team welcomes the Maintenance Management System –MMS– as a way of reducing the number of unscheduled shut downs. Other measures are the installation of the Syrian Control Center for dispatch control of all the Syrian power plants; the old Center did not.
 - As a result of this project the number of power plants in Syria is increasing. New plants are / will be erected in consumption area's and are of type Dry Cooling: only water for steam not for cooling (e.g. Siemens). In 2020 there will be a generating capacity of 15,000 MW (4 -5 % renewable sources) with a load factor of 0.64. In order to increase this figure a program is under development to lower the peak demand relative to the average.
 - PEEGT (Public Establishment Electricity Generation and Transport) publication Technical Statistical Report 2005 does give many details on power generation figures of all power plants.
 - High voltage lines comply with the average performance figure in the region. There different HV-lines: 400kV; 230kV; 66kV; 20kV. In the low voltage network of 0.4 kV ~15% losses in the non technical area exist.
 - The project released many activities to improve the whole electricity supply system, part of these are already realized. Part are in preparation or planning. E.g. all new or rehabilitated power plants will have CMS, EMS and MMS.
- Site visit to Paper Factory*
Wednesday 27 September, Greater Damascus area
- The factory is privately-owned, producing various kinds of paper (mainly tissue and sanitary papers) from imported pulp.
 - The paper factory has been a front-runner in the adoption of energy efficiency measures, having implemented power-factor corrections on all motors, boiler controls, and other measures. It is also an innovation-driven organization.
- Site visit to Al-Dubs factory*
Wednesday 27 September, Greater Damascus area
- The factory is state-owned, producing textiles from natural and synthetic threads.
 - The factory has participated in the SSEECP project, implementing power-factor corrections and steam pipe insulations.
 - The overall energy efficiency at the factory was poor, and awareness for it appeared to be low. This was exemplified by the steam pipe insulation being only partially installed, although this is an easy measure to implement (not requiring any substantial technical knowledge).
 - There was no indication that the factory was on a route towards energy efficiency, or that it actively promoted this towards its peers.
- Deputy Minister of Education*
Wednesday 27 September
- The Ministry of Education has cooperated with the project in preparing and distributing guidelines for teachers about energy efficiency for use in primary and secondary schools.

Further, a training course was prepared for auditors on including energy efficiency aspects in school curricula.

- A Ministerial Order has been issued, for all primary and secondary schools to pay attention to energy efficiency.
- The activities towards schools have been well-received by teachers. Activities will continue, not within the project, but by the Ministry on its own.



7.6 Interview Questionnaires

National Project Director

- Overall impression of the project?
- Observed best and worst practices in project implementation?
- Project design is appropriate and suitable for the national context
- Project design includes sufficient indicators to track progress and measure outputs
- Stakeholders have been actively and passively informed about the project and its results
- Key stakeholders have been consulted about core project decisions and have provided significant input into the project
- Project has communicated lessons learned and sought cooperation with new or ongoing projects of similar concept
- Logical Framework is used as a management tool during implementation
- Implementation management is adaptive to changes in the project environment
- ICT have been used to support project implementation and dissemination
- The project established suitable operational relations between involved institutions and key stakeholders
- Projected emission reductions based on realised project results (baseline: annual energy conservation of 1.83% pa and 756.5 [thousand] tons CO2 emission reduction cumulatively by 2008 – UNDP Project Document Immediate Objectives section)
- Suggestions for follow-up work to sustain project outcome?

Questions on content

- Status quo in electricity tariff reform: subsidies abolished?

- Government co-financing: how is it tracked?
- Status quo in National Energy Efficiency Planning?
- Sustainability of Energy Services Centre: NERC?
- What are the results from project activities: overview?
- Status quo of EE credit facilities / amount of loans provided?
- Coordination / integration of project activities with plant rehabilitation?

Questions on project implementation

- Availability of GEF project document (version on GEFweb)?
- Availability of technical reports?
- Have there been revisions of project document / logframe?
- Availability of final mid-term review report?
- UNDP / GoS response to mid-term review & recommendations?
- Amount spent on international consultancy?
- Revenues received from training & energy audits?

UNDP CO

- Overall impression of the project?
- Observed best and worst practices in project implementation?
- Project design (summarised in LogFrame) is appropriate and suitable for the national context
- Project design includes sufficient indicators to track progress and measure outputs
- Project is linked with other projects or programmes in the sector via well-developed management arrangements

- The project employed the required technical capacities and made appropriate use of these
- The actual spending on project activities was cost-effective and proportional to the projects objectives
- Financial management was timely and adequate
- Suggestions for follow-up work to sustain project outcome?

Questions on content

- Status quo in electricity tariff reform: subsidies abolished?
- Government co-financing: how is it tracked?
- Status quo in National Energy Efficiency Planning?
- Sustainability of Energy Services Centre: NERC?
- What are the results from project activities: overview?
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- Availability of final mid-term review report?
- UNDP / GoS response to mid-term review & recommendations?
- Amount spent on international consultancy?
- Revenues received from training & energy audits?

<p><i>NERC</i></p> <ul style="list-style-type: none"> • Overall impression of the project? • Observed best and worst practices in project implementation? • Projected emission reductions based on realised project results (baseline: annual energy conservation of 1.83% pa and 756.5 [thousand] tons CO2 emission reduction cumulatively by 2008 – UNDP Project Document Immediate Objectives section) • SECS operational as an independent unit and funded from non-project sources (UNDP Project Document Immediate Objectives section - adapted) • NEEP adopted by Government of Syria and put into operation with government funding (UNDP Project Document Immediate Objectives section - adapted) • Suggestions for follow-up work to sustain project outcome? 	<ul style="list-style-type: none"> • Output 1. Information Dissemination and Promotion Programme • Output 2. Energy Efficiency and Conservation Hotline • Output 3. Launch of NEEP: Awards for Energy Efficiency programme • Output 4. Full DSM assessment of energy/electricity use • Output 5. DSM Pilot programme designed and implemented for residential sector • Output 6. Energy efficiency labels and standards • Output 7. Energy policy initiatives analysed and designed <p><i>MoE / NERC working groups</i></p> <ul style="list-style-type: none"> • Overall impression of the project? • Observed best and worst practices in project implementation? • Suggestions for follow-up work to sustain project outcome? 	<p>Immediate Objective 2: Develop the National Energy Efficiency Programme</p> <ul style="list-style-type: none"> • Output 1. Information Dissemination and Promotion Programme • Output 2. Energy Efficiency and Conservation Hotline • Output 3. Launch of NEEP: Awards for Energy Efficiency programme • Output 4. Full DSM assessment of energy/electricity use • Output 5. DSM Pilot programme designed and implemented for residential sector • Output 6. Energy efficiency labels and standards • Output 7. Energy policy initiatives analysed and designed <p><i>Minister of Energy / Deputy Minister of Energy</i></p> <ul style="list-style-type: none"> • Overall impression of the project? • Observed best and worst practices in project implementation?
<p>Immediate Objective 1: Establish the Syrian Energy Services Centre</p> <ul style="list-style-type: none"> • Output 1. Operational Quick Savings Programme (QSP) • Output 2. Operational Industrial Efficiency Programme • Output 3. Operational Boiler/Furnace Efficiency Programme • Output 4. Operational Steam System Efficiency Programme • Output 5. Operational Electric Motor Efficiency Programme • Output 6. Operational Power Factor Correction Programme • Output 7. Technical Training Programmes • Output 8. Long-term Business Plan for SECS developed and initiated 	<p>Immediate Objective 1: Establish the Syrian Energy Services Centre</p> <ul style="list-style-type: none"> • Output 1. Operational Quick Savings Programme (QSP) • Output 2. Operational Industrial Efficiency Programme • Output 3. Operational Boiler/Furnace Efficiency Programme • Output 4. Operational Steam System Efficiency Programme • Output 5. Operational Electric Motor Efficiency Programme • Output 6. Operational Power Factor Correction Programme • Output 7. Technical Training Programmes • Output 8. Long-term Business Plan for SECS developed and initiated 	<ul style="list-style-type: none"> • Project concept originates from within and is supported by national institutions • Project concept targets pressing national environmental and development needs • The project established a sustainable impact in the country, which will continue independently • The project established arrangements with relevant organisations or other instruments to secure a continued impact • UNDP provided adequate oversight of the project and assignment of the required experts • NEEP adopted by Government of Syria and put into operation with government funding (UNDP Project Document Immediate Objectives section - adapted)
<p>Immediate Objective 2: Develop the National Energy Efficiency Programme</p>	<ul style="list-style-type: none"> • Output 8. Long-term Business Plan for SECS developed and initiated 	

- Suggestions for follow-up work to sustain project outcome?

Central Team

- Overall impression of the project?
- Observed best and worst practices in project implementation?
- Suggestions for follow-up work to sustain project outcome?

Immediate Objective 5: Establish PEEGT Efficiency and Maintenance Management Support Team

- Output 1. Institutional and Organisational Structure and Resources Identified
- Output 2. Adequate and Fully Operational Equipment Available
- Output 3. Operational System of Reliability Indices
- Output 4. Capable Trainers and Training Modules
- Output 5. Exist Thorough Review of EPS Section Undertaken

General Director of Electricity Hama

- Overall impression of the project?
- Observed best and worst practices in project implementation?
- Project concept originates from within and is supported by national institutions
- Project design targets root causes of energy consumption?
- Stakeholders have been actively and passively informed about the project and its results
- The project properly involved government and other relevant institutions in implementation and decision making
- Suggestions for follow-up work to sustain project outcome?

Field Visits (Industry)

- Overall impression of the project?
- Observed best and worst practices in project implementation?
- Key stakeholders have been consulted about core project decisions and have provided significant input into the project
- The project disseminated the required information to all relevant stakeholders
- Suggestions for follow-up work to sustain project outcome?

Immediate Objective 1: Establish the Syrian Energy Services Centre

- Output 1. Operational Quick Savings Programme (QSP)
- Output 2. Operational Industrial Efficiency Programme
- Output 3. Operational Boiler/Furnace Efficiency Programme
- Output 4. Operational Steam System Efficiency Programme
- Output 5. Operational Electric Motor Efficiency Programme
- Output 6. Operational Power Factor Correction Programme
- Output 7. Technical Training Programmes
- Output 8. Long-term Business Plan for SECS developed and initiated

Deputy Minister of Education

- Overall impression of the project?
- Observed best and worst practices in project implementation?
- Stakeholders have been actively and passively informed about the project and its results
- The project established a sustainable impact in the country, which will continue independently

- The project established arrangements with relevant organisations or other instruments to secure a continued impact
- Project impact in universities and schools?
- Suggestions for follow-up work to sustain project outcome?

Annex: Questions & Issues for Discussion Questions on content

- Status quo in electricity tariff reform: subsidies abolished?
- Government co-financing: how is it tracked?
- Status quo in National Energy Efficiency Planning?
- Sustainability of Energy Services Centre: NERC?
- What are the results from project activities: overview?
- Status quo of EE credit facilities / amount of loans provided?
- Coordination / integration of project activities with plant rehabilitation?

Questions on project implementation

- Availability of GEF project document (version on GEFweb)?
- Availability of technical reports?
- Have there been revisions of project document / logframe?
- Availability of final mid-term review report?
- UNDP / GoS response to mid-term review & recommendations?
- Amount spent on international consultancy?
- Revenues received from training & energy audits?

Issues for discussion

- Starting point: Integrated resource planning = finding least-cost solution to providing energy services. Depends on correct pricing.
- Striking differences between GEF exec summary and UNDP prodoc. Why? – overall impression: UNDP prodoc more detailed, but substantially weaker than GEF exec summary.
- No LogFrame; very limited ICA.
- Technical perspective dominated in project, at the cost of policy & management perspective. Risk of tunnel vision.
- Output descriptions unbalanced: too much detail for technicalities, insufficient details on policies and strategies. Associated issue: no prioritisation of topics (in project design), no tariff reform strategy or tracking.
- Many references to Pakistani and Egyptian experiences, none to OECD experiences (in UNDP prodoc)
- Time needed for training professionals is low – maybe underestimated. Several good suggestions in GEF exec summary not in UNDP prodoc.
- Little attention for risk mitigation in project design.
- Over-reliance on ‘consultant 1’ and ‘consultant 2’ for outcomes 3 and 4 (almost everything depends on these two consultants)
- Strong focus on monitoring systems and reward mechanisms for outcomes 3 and 4.
- Strong point: use of experiences consultants to prepare ToRs for trainers etc.

7.7 Detailed Technical Comments

This annex provides a brief overview of aspects related to the energy efficiency of the Syrian electricity system. This has been used as background information for assessing the impact of the project and the sustainability of its results.

1. Energy demand increases with > 8% per year (PEEGT Technical Statistical Report 2005)
2. Energy demand side management reduction reaches 1.2% in 2009 and 4.3% (MoE final report DSM December 2004)
3. Present actual installed capacity: 7057 MW
4. Present actual available capacity: 6008 MW
5. Increasing demand requires to double the installed capacity in about 10 years, i.e. 700 MW to be set in operation each year.
6. Upgrading existing 1342 MW GT (gas turbines) power plants to CCGT-plants (Combined Cycle Gas Turbine) can give some 300 MW additionally.
7. CCGT-power plants only provide high efficiency power production under base load conditions. Therefore, flexible, efficient, intermediate and peak load generation capacity has to be increased. The load factor in 2005 is reported as $LF = 0.66$ which implies about 3500 MW base load the remaining 2500 MW has to be intermediate and peak load, these are less efficient inherently (ref. PEEGT 2005).
8. Hydropower with pumping facilities is a suitable option for peak and intermediate load generation. First opportunity to realize this increase in flexible capacity will be the installation of pumping capacity near the existing hydro-turbines in Tichreen, Baath and Thawra.
9. Although the installed hydropower amounts 1528 MW, the actual capacity is limited to 1200 MW due to lack of water. So installing pumping facilities can increase this by 300 MW.
10. The overall system efficiency of the electricity power generation can increase from the present value of 39% to >45% in ten years time provided proper measures are taken in all power plants and the load factor is increased proportionally.
11. A combined action of all actors in the field of electricity is required to obtain the potential of 10% reduction: 6% more efficient generation + 4.3% reduction in demand.

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