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home as well as energy used in personal transportation. It should also describe which media will be used in what ways to deliver the information.

2.1.5 Implement the plan developed in activity 2.1.3 in conjunction with the high level announcement of the launching of the NEEP. Given the preparation time for these materials (although most already exist in some form), the formal launch of the NEEP will need to wait until these materials are ready. This could be expected to be about nine months after initiation of the UNDP/GEF project.

2.1.6 Evaluate the impact of the residential information program. Contract with a local consumer research firm to conduct an analysis of the effectiveness of the information provided to consumers. The goal of the analysis would be to determine what actions the consumers had taken as a result of the information and an estimate of the impact of these actions in terms of energy savings.

Output 2.2 A Fully Operational and Assessable "Energy Efficiency and Conservation Hotline"

Launching of the NEEP will generate interest in energy efficiency and people will contact the Center with questions through letters, phone calls and possibly e-mail. It is important to be able to process these inquiries for several reasons:

- a) the questions people ask can provide guidance as to what information materials to develop and perhaps market feedback on programs
- b) hotlines are usually more effective than written pamphlets or fact sheets as a means of changing consumer behavior because the person calling is already aware and interested
- c) hotlines provide good visibility and public relations
- d) access to high quality technical information can possibly become a revenue generating service
- e) directing calls to a hotline avoids interrupting technical staff and thereby improves staff productivity.

Description

A "hotline" is simply an organized system for responding to consumer questions submitted to the Center. If this question answering capability is advertised and promoted, it can also be an important medium for distributing information to interested and usually motivated persons. A typical energy center hotline service has a dedicated person or persons answering queries. These may be full or part-time, depending on the volume of business. Queries are logged in on the computer, and then available information materials mailed to the individual in response to the question. Large hotline operations may handle dozens of questions each day, have dedicated full-time staff answering the phones, and large materials stores and mailing room capabilities to handle the volume of outgoing mail.

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The hotline operation will fall under the overall responsibility of the General Director, ESC, but will be the day-to-day responsibility of the Director, Information and Training. Initially, the hotline will be staffed on a part-time basis by various staff of the Center, perhaps rotating the assignment so each person gets a feel for dealing with the public. If hotline activity grows substantially, it may require a full-time, dedicated staff person.

Activities for Output 2.2

- 2.2.1 Procure a dedicated series of telephone numbers for the hotline and at least two telephones for the hotline. The hotline should also have its own address.
- 2.2.2 Assign ESC staff to operate the hotline on a rotation basis, perhaps one person per week. This will give all staff the experience of provide direct service to the public and a better understanding of the level of consumer knowledge and interest.
- 2.2.3 Develop a data base to track incoming calls and letters. Development of the data base should be assisted by a local consultant. The data base should track at a minimum the time and date of the call, type of caller (manager, technician, homeowner, etc.), sector (industrial, commercial, residential), nature of question, nature of response, and time and date of response. The hotline station should be set up such that the computer for entering this information is located with the telephone, preferably equipped with a headset and microphone to leave the person's hands free to type data into the computer. At some point in the future, the computer can also store answers to frequently asked questions to assist the person answering the question.
- 2.2.4 Advertise the hotline in conjunction with the launch of the NEEP. Heavy advertising is not advised, since the response can overwhelm the ability to answer the queries. Newspaper ads, or ads in trade journals should be sufficient at first to generate sufficient business for the hotline. As the hotline matures, more customized and technically sophisticated answers can be offered, eventually differentiating a fee-based technical information service from a free public information service. Ideally, both should be maintained.
- 2.2.5 Prepare monthly reports summarizing hotline activity. The reports should be used to provide feedback to Output 2.1 as to what information materials people are asking for.
- 2.2.6 If internet service becomes common in Syria, the Center should develop a web site

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to provide information to the public electronically. The web site can be set up for both free access and fee-based access, so as to maintain the services established in activity 2.2.4.

Output 2.3 Launch and Initiation of the NEEP and "Awards for Energy Efficiency" Program

The National Energy Efficiency Program should be launched with as much public visibility as possible. It is hoped that the highest possible Governmental figure would be willing to launch the program, much in the same way that H.E. the President of the Syria Arab Republic launched the very successful program to expand power generation capacity on September 8th, 1993, to eliminate load shedding and provide electricity to every Syrian citizen. At that time the need was on the supply side; now it is on the demand side. Launching of the NEEP with as much visibility as the power generation capacity expansion program would stimulate public interest and increase participation in the program, thus saving the Center considerable time and money that it would otherwise have to spend to advertise its programs in order to gain public attention and participation.

The launch of the NEEP should occur when the Center is fully prepared so that it can take advantage of the publicity without being overwhelmed. This could be expected to be about nine months after the initiation of the UNDP/GEF project and establishment of the Center. During this time, the Center would prepare an initial set of information materials, set up the hotline, have initiated the QSP, and have designed and begun implementation of some of the other energy services.

Activities for Output 2.3

2.3.1 Develop a plan for the programs and actions to be announced at the launch. These should include:

- Creation of the Syrian Energy Services Center
- Establishment of a series of energy efficiency services for industry and commerce, including:
 - * Quick Savings Service
 - * Industrial Energy Efficiency Service
 - * Boiler/Furnace Efficiency Service
 - * Steam System Efficiency Service
 - * Motor Efficiency Service
 - * Power Factor Improvement Service
- Technical Training Program
- Information Hotline
- Energy Efficiency Financing Program

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- Energy Efficiency Labeling and Standards Development Program
- National Energy Efficiency Planning
- Awards for Energy Efficiency
- Other policy initiatives

2.3.2 Develop media package and make arrangements for media coverage. Brief descriptions should be prepared for each of the services and programs identified in activity 2.3.1. These should be put together with a complete briefing package for the media explaining the need for the NEEP and how this program will help Syria and save money for the Syrian people. Various media should be notified of the launch date so that television, radio, and newspaper media can schedule coverage. A local ad firm should be hired to assist the Ministry and Center prepare effective briefing materials and plan and execute the launch events to achieve maximum impact.

2.3.3 Develop plan for the launch events. A comprehensive series of events will be designed to help launch the NEEP and the ESC. At a minimum, these will include the follow:

- Speech by the high level Government official announcing the NEEP, the creation of the SESC, and establishing the Awards for Energy Efficiency; the speech may include various declarations and policy initiatives such as the declaration of National Energy Efficiency Month, or an executive order requiring all major public sector plants, buildings and facilities to participate in the Center service programs, to establish internal energy efficiency targets and to designate an energy manager
- Television, radio and print media coverage of the speech
- A special section in major newspapers on energy efficiency supported by ads from major firms; articles in the special section prepared by ESC staff and others
- Visit by high level officials to SESC with full media coverage; possible other visits to plants that have already implemented energy efficiency projects and practices
- Press briefing by all involved parties including representatives of the Minister or Deputy Minister of Electricity, General Director ESC, and UNDP Resident Representative on the NEEP, ESC and the UNDP/GEF Project.
- Press interviews with other Ministers expressing their thoughts on the importance on improving energy efficiency to the Syrian people

These and other events will need to be carefully planned, orchestrated and executed in order to achieve maximum impact. The media firm contracted in Activity 2.3.2 should assist the MOE and ESC plan and execute the launch.

2.3.4 Execute launch. This will be the responsibility of the Minister of Electricity

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working in close coordination with the relevant Ministries and officials.

2.3.5 Design and conduct the Awards for Energy Efficiency. The awards should be given to for several sectors and categories within sectors:

Public Sector

- Industrial - large, medium and small
- Buildings - large, small
- Other - e.g. innovative project, government agency, etc.

Private Sector

- Industrial - large, small
- Buildings - large, small
- Other - new efficiency business or product; innovative project, etc.

The award program should be developed during the first nine months of the project and launched by the high level Government official as part of his launch speech. Development of the award program will be the responsibility of the General Director, ESC, and his/her staff. The program should include criteria for measuring candidates and should require sufficient information supplied by a candidate to fairly judge the project but not so much as to be a barrier to participation. The award program should be advertised in addition to the announcement by the highest levels to gain maximum participation. The ESC staff should obtain information from similar award programs in other countries, such as Pakistan, to provide guidance. Candidates should be given 12 months to implement their project and submit their applications to the ESC. Once winners have been chosen, the awards should be given to the winners by a high level Government official with full media coverage of the event, and pictures and plaques given to the winners.

Output 2.4 A Full Demand Side Management Assessment of Energy/Electricity Use in Syria

Peak electricity demand in Syria grew by 9.5% between 1994 and 1995 and is projected to grow at 9.2% annually from 1995 to 2005. Although Syria has managed to bring supply and demand in balance at the present time, at the projected growth rate, demand will again outstrip supply by the year 2004.⁵ It is thus essential that the Ministry of Electricity gain a better understanding of its load growth and, working through the ESC, develop programs to reduce the rate of growth through better load and demand side management.

The focus of this output is to conduct an assessment of the potential for demand side management (DSM) in Syria and while doing so, help build a sustainable institutional capacity to

5. Electricite de France, *Generation and Transmission Master Plan, Technical Report No. 5, Global Summary*, Electricity Sector Support Programme, June 1997, p. 3

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carry out load research, DSM analysis and integrated resources planning. The primary focus of the DSM assessment will be the residential sector, given that this sector consumes almost half of all electricity and is the fastest growing. Nonetheless, the assessment will cover all sectors consuming electricity so that a complete picture of DSM potential can be obtained.

General responsibility for conducting the DSM assessment will be under the General Director, ESC, with day-to-day responsibility lying with the Director, Finance and Analysis. The General Director ESC will need to work closely with the General Director PEEDEE and the Deputy General Director for Technical Affairs. As the government unit responsible for electricity distribution, the PEEDEE will be the logical unit to work with to collect customer information and to coordinate with and help build a load research capability with.

Activities for Output 2.4

- 2.4.1 Conduct training for staff of ESC and PEEDEE in demand side management and load research. The training should cover the general concepts of DSM, data needs, staffing and equipment needs to build a load research capability, DSM models and their operation and use, and the rudiments of integrated resources planning. The training will be done by an international expert in DSM with experience in developing load research programs and DSM modeling in developing countries.
- 2.4.2 Procure and install a DSM model such as EPRI's DSManager. Train staff of the staff in the use of the model should be done in conjunction with the design of the DSM assessment.
- 2.4.3 Design the DSM assessment. The ESC and PEEDEE staff will be assisted by an international expert in DSM assessments and the use of DSM models in conducting such assessments. The design should place particular emphasis on the residential sector since this is not only the largest electricity consuming sector, but also has the least data regarding electricity use. The assessment should make as much use as possible of data that will become available as a result of the various energy service programs being offered by the Center, particularly the QSP. Equipment needed to conduct the assessment, such as metering equipment, should be identified as part of the design process and procured.
- 2.4.4 Conduct the DSM assessment. The ESC and PEEDEE staff will be assisted in carrying out the assessment by the international expert identified in the previous activities. The results of the assessment should be presented in a detailed report and this report will be the basis for the pilot program Output 2.5.
- 2.4.5 The results of the DSM assessment should be discussed and integrated into other

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energy planning exercises within the government. This includes first and foremost the least cost capacity expansion planning conducted by the Ministry of Electricity. The results should also be incorporated into the energy plans developed by the Ministry of Planning.

Output 2.5 DSM Pilot Programs Designed and Implemented

Rapidly increasing electricity demand in the residential sector is a phenomenon common to many developing countries. In Syria, residential electricity consumption grew at 11.1% between 1985 and 1992 and at present constitutes 47.5% of all electricity consumed. 96% of all Syrian homes have electricity and households represent 83% of paying customers for PEEDEE. Average annual consumption per household was 2,530 kWh or 400 kWh per capita electrified in 1992.⁶ The most common electric appliances other than lights are TVs, refrigerators, fans and electric irons. Air conditioning use is growing rapidly but at present has a saturation rate of only 1-3%. Nearly half of total electricity consumption in the household sector is for cooling equipment, i.e., refrigerators, fans, freezers and air conditioning, despite of the low saturation of the latter two appliances.

The potential for DSM in the residential sector is substantial but has not been quantified. This is part of the purpose of Output 2.4 above. Lighting efficiency can be improved through greater use of fluorescent bulbs, particularly compact fluorescents, improved ballasts and efficient patterns of use. Refrigerators and freezers can be made more efficient through the use of more efficient compressors and insulation. Appliance labeling or a similar information program can be combined with rebates or other incentives to encourage the purchase of more efficient refrigerators and freezers (see Output 2.6). Air conditioners must be a particular target for DSM programs due to their contribution to peak demand and rapidly rising use. Improving efficiency of air conditioners and air conditioning can be accomplished through a number of means such as rebates, standards (most air conditioners and components are imported; import duties or other restrictions could be adjusted based on efficiency), improvements to the building envelope, reducing exposure to sunshine both on the air conditioner and the building, and many other techniques.

Design of DSM pilot programs would be based in part on the results of the DSM assessment in Output 2.4. Responsibility for the designs would be that of the General Director, ESC, but he would need to work closely with the General Director, PEEDEE and General Director, PEEGT and their staff. There are not sufficient funds in this UNDP/GEF project to implement the DSM pilot programs designed through this output. Instead, the designs will serve as a basis for a proposals for funding by international donor agencies to the Ministry of Electricity.

6. Ekono Energy Ltd., "Feasibility Study: Capacity Building for Demand Side Management and Power Plant Efficiency", Ministry of Electricity, Public Establishment of Electricity, Syrian Arab Republic, November 1994, p. 79

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Activities for Output 2.5

- 2.5.1 Form a DSM pilot program design team and advisory group(s). The design team will be directed by the Director Finance and Analysis within the Center and be comprised of other relevant Center staff and appropriate staff from PEEDEE and PEEGT. The advisory group(s) will be comprised of representatives of residential, commercial and industrial stakeholders and relevant appliance and equipment manufacturers. The entire effort will be assisted by an international expert in DSM pilot programs design.
- 2.5.2 Conduct a review of DSM pilot program experience in other countries. This review would include the U.S. as well as Europe and developing countries. The purpose of the review is to familiarize the design group with a wide variety of program designs, lessons learned, savings to be expected, costs, schedules and other important planning parameters.
- 2.5.3 Develop load shape objectives for the DSM pilot programs in conjunction with PEEDEE and PEEGT. This would involve reviewing current system load curves in the geographic areas selected.
- 2.5.4 Determining the contribution to loads from specific end use devices such as lighting, refrigerators, etc. and specific customer classes in each area. This will entail the procurement and installation of the necessary load monitoring equipment in the selected geographic area. Collect data over a sufficient period of time and and conduct the necessary load analysis to determine which customers and equipment are contributing to loads throughout the day/week/month.
- 2.5.5 Develop target electricity end uses, target audience, the sample geographic area and desired savings level to be achieved. Development of these targets will be based on the results of Output 2.4 as well as activity 2.5.3.
- 2.5.6 Select one or more programmatic approaches to be tested. These could include such approaches as rebates for the purchase of more efficient appliances; leasing programs such as the Illumex program in Mexico; information programs; home energy audits, either do-it-yourself or on-site audits with follow-up retrofit assistance; or a wide variety of other approaches. The selection will be based on a review of experience in other countries (2.5.2), the load shape objectives, expected savings, cost/benefit analysis based on different tests, manpower requirements and other relevant factors.

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2.5.7 Conduct focus group sessions to get feedback on the alternative programmatic approaches in order to refine the approaches or add or eliminate some. The purpose of the focus group sessions is to test customer receptivity to the design approaches in a low cost manner prior to expensive implementation.

2.5.8 Finalize alternative approaches to be tested and prepare design documents. The design documents should include a detailed description of the objectives of the pilot program, the various programmatic approaches to be tested, number of households participating, data to be collected and collection methodology and equipment required such as meters, evaluation methodology, schedule, costs, manpower requirements, and other relevant design factors. The document should be prepared such that it can be easily presented to a possible funding agency as a proposal.

Output 2.6 Energy Efficiency Labels and Standards Designed and their Adoption Initiated

Minimum energy efficiency standards have been shown to be the most cost effective action that can be taken by government to improve overall energy efficiency. Efficiency standards take time to develop and their development must closely involve the affected manufacturers and other stakeholders so as to achieve a high degree of consensus. Standards that are not consensus based will be difficult to enforce and even in the most advanced countries, a heavy investment in enforcement generally cannot overcome widespread lack of compliance.

Syria could benefit greatly by implementing minimum efficiency standards for key energy consuming appliances such as air conditioners, refrigerators, and freezers. As many of these appliances or their components are imported, Syria may wish to work in concert with some of her neighbors so that together they have greater influence with appliance and equipment manufacturers, which generally tend to be large multinational corporations.

The General Director, ESC, would have the lead responsibility for this output but would work in close cooperation with other relevant government agencies such as the Syrian Arab Organization for Standardization and Metrology within the Ministry of Industry, the Ministry of Economy, and other relevant agencies. A standards committee would be established for each appliance, either as a subcommittee to an existing standards committee or as free-standing unit. The standards committee would be comprised of appropriate government representatives as well as representatives of the manufacturers and affected consumers.

Activities for Output 2.6

2.6.1 Select the first appliance for which minimum efficiency standards and labeling requirements will be developed. It is suggested that air conditioners be the first

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appliance as this currently has a low saturation rate but is rapidly growing and is a primary contributor to summer peak. It is also purchased by middle and upper income families who are less price sensitive and thus may be more accepting of the elimination of the least expensive and most inefficient models.

- 2.6.2 Establish a standards and labeling committee. The committee will be composed of government representatives from the Ministry of Electricity, the Ministry of Industry, other relevant Ministries, manufacturers and consumer representatives. The committee will deal with both setting a minimum efficiency standard as well as developing a label which conveys energy efficiency and cost of use information to the buying public. The committee will be assisted by an international expert in energy efficiency standards in the appliance selected.
- 2.6.3 Conduct a survey of the range of efficiencies of the appliance found in the Syrian market. The survey should determine the range of efficiencies in each size class of the appliance and present the information so that estimations can be made of the number of sales of each size that would be affected by minimum efficiency standards, as well as the energy and power savings that would result.
- 2.6.4 Work with the committee in a consensus process to set a minimum efficiency standard for each size class of appliance. Once the standard is set, it should be codified in government regulations.
- 2.6.5 Develop a draft label for the appliance that is easy to understand and clearly conveys information regarding efficiency and cost of use information. The label should display information which shows how the particular appliance ranks relative to others of its class in terms of efficiency and cost.
- 2.6.6 Conduct focus groups to test the label design. Modify the design based on focus group inputs.
- 2.6.7 Assess the enforcement requirements for the label and standard program. Make recommendations for increased staffing or other resources to bring enforcement capability up to the required level. Also, assess the need for a consumer information program to educate consumers both of the new standards as well as how to read and use the new label.
- 2.6.8 Implement the new standard and the label. A grace period, such as one year, might be considered to allow manufacturers time to work off existing inventory which is below the standard and adjust their manufacturing and marketing to the higher efficiency models. Enforcement and consumer information programs should be

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implemented in conjunction with the implementation of the standards and labeling program.

Output 2.7 Energy Policy Initiatives Analyzed and Designed

A critical function of the Center (SESC) will be the on-going identification of barriers to improving energy efficiency and the development of policy recommendations to overcome these barriers. The policy development function will require the ability to analyze the economic and environmental costs and benefits to the country which would result from removing the barriers to efficiency. This may require engineering analysis, financial analysis, economic and legal analysis, computer modeling and other reasonably complex techniques to determine the precise impact on the country from the various barriers and options for removing the barriers.

The policy analysis function within the Center will be under the general responsibility of the General Director, ESC, and the day-to-day responsibility of the Director, Finance and Analysis. They will coordinate with the relevant government agencies and outside organizations as needed, depending on the area under investigation.

Activities for Output 2.7

2.7.1 Develop an internal policy team. The team will be led by Director, Finance and Analysis, and should include Director, Energy Services, two or three other Center staff, plus at least one representative each from PEEGT and PEEDEE. The purpose of the team is to assist in identifying priority policy and issue areas, and to provide an internal discussion forum to explore the ramifications and options surrounding each policy issue. The team could be expected to meet at least twice a month, but possible more often, depending on how pressing the issue being analyzed was.

2.7.2 Develop a list of priority policy issues. The first task of the team will be to develop a list of policy issues and then through a group process technique, prioritize the issues for analysis. An illustrative list is:

- **Center revenues** - The services the Center provides to industrial and commercial customers will be priced. One issue is what the price of various services should be, since the cost of services will be the result of UNDP/GEF grant funding and the cost to the government of salaries and overheads. A second, more difficult issue, is how should the revenues be spent? Options include:
 - * Reimburse Center costs, particularly for local consultants and contract services, thereby making the UNDP/GEF grant go farther. This is the mechanism that has been proposed for this project. The issue remains as to how these revenues should be spent after the UNDP/GEF project

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has ended.

- * Create an energy conservation fund which can be used by the Center to create incentives for program participants. The incentives could be rebates on high efficiency equipment, cash awards for winners of the President's Efficiency Awards, etc.
- **Energy Pricing Policies** - Various pricing issues could be studied including removal of price subsidies, time-of-use pricing, marginal cost pricing, pricing of rural electricity and its impact on the market for off-grid distributed generation.
- **Energy Efficiency Standards in Government Procurement** - Incorporating minimum efficiency standards into government procurement practices not only helps save the government money, but it acts as a market stimulus for more efficient products.
- **Lifecycle Costing in Government Procurement** - The use of lifecycle costing in government procurement, particularly major installations, again not only saves the government money but also creates a stronger market for energy efficiency.
- **Incentives for Energy Efficiency within Public Sector Industries** - Pay structures and management systems often do not provide sufficient incentives in public industries to promote efficient management and operation. This area would be studied to identify areas ways in which to incentivize both management and staff to use energy more efficiently.
- **Mandatory Energy Audits** - Mandatory energy audits for plants and buildings over a certain size may be justifiable if it is found that there is a low participation rate of these facilities in the Center's programs. The mandate could also be extended to management, e.g., requiring the designation of an energy manager and reporting energy consumption and planned energy efficiency measures, as well as implementation, e.g., requiring that certain measures be implemented or that certain targets be met, such as international benchmarks for energy consumption per unit output.
- **Legal Foundation for Energy Efficiency** - It is likely that few, if any, of the laws and decrees governing Syria address the efficient use of energy as an objective or concern of public agencies or corporations. This study would review all relevant laws to determine whether they address energy efficiency and propose amendments to those laws where efficiency can meaningfully and usefully be incorporated.

2.7.3 Select a critical policy issue from the list developed in 2.7.2 and conduct a detailed policy analysis. This analysis will be assisted by an international expert in the subject chosen. The result of the study will be a recommendation for action, which will then be moved through the appropriate channels of

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government.

IMMEDIATE OBJECTIVE 3. BANIAS EFFICIENCY MANAGEMENT SYSTEM

Systems in place for efficiency management on Baniyas units 1 to 4 that will enable the station to maintain the efficiency levels on these units after project completion at a specified target level. The targets levels will be set subsequent to finalizing the tender guarantees for the unit 1 and 2 rehabilitation and will reflect those levels. For efficiency, targets will include the guaranteed efficiency improvement for performance level increases due to equipment improvements as a result of rehabilitation. In addition, targets will factor in the component of efficiency that is directly related to optimum day-to-day operation of the unit.

The target for efficiency improvement of the overall performance of each unit will be set based on the guaranteed post rehabilitation performance at specified operating conditions for units 1 and 2 and the original manufacturers acceptance test levels for units 3 and 4. The efficiency should be no worse than 0.5% less than those levels. This will be defined in the definition phase of the rehabilitation project.

The executing agency responsible for achieving this objective is the Ministry of Electricity, and within the Ministry, the Power Generation Directorate within the Technical Affairs branch of PEEGT. The head of the Efficiency and Performance Section will have day-to-day responsibility for implementing the tasks listed below and will be assisted in these tasks by his staff, international consultants and the staff at the Baniyas Power Station.

Success Criteria

By the end of the project, the Ministry of Electricity, PEEGT and Baniyas Power Station will have accomplished the following results:

- procured and installed EMS equipment in coordination with the rehabilitation of the Baniyas Power Station;
- established efficiency targets for the rehabilitated plant and a system for monitoring its efficiency;
- trained the staff within Baniyas on EMS such that the staff is fully capable of achieving target efficiency levels after the cessation of UNDP/GEF funds;
- established an incentive program for Baniyas staff and management to maintain and improve the efficiency of the plant.

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Output 3.1 A Detailed Scope of Work for Implementation of MMS Systems Prepared

Activities for Output 3.1

3.1.1 Using this document as a guide, appropriate international consultant(s) (acceptable to the MOE and UNDP) will be selected to help carry through the detailed tasks of this objective. Selecting a single consultant for the supply side energy efficiency work and separate consultants for other activities such as the maintenance and training activities or seeking a consultant company that has available both the specific maintenance and performance experience (or at least can demonstrate that they can assemble a team of experienced personnel under their direction) are options for provision of the necessary international expertise in the field. If possible, a utility, or partnership of utility and consultants are likely to offer the best opportunity to ensure the necessary high level of expertise, experience and coordination skills are brought to the project.

In order to better clarify activity responsibilities in this document, reference will be made to separate consultants for Supply Side Energy Efficiency “*International Efficiency and Performance Expert*” (Consultant 1), Maintenance Management - “*International Reliability and Maintenance Expert*” (Consultant 2) and Training Efficiency (Consultant 3.1) and Training Maintenance (Consultant 3.2). However as noted in the paragraph above, a single consultant company or even possibly one or two consultants with a broader range of skills may be selected.

Expert International Energy Efficiency Consultant will organize and coordinate the activities required. This consultant will also provide the hands on training to ensure that the necessary learning takes place by the key PEEGT personnel needed to sustain the activities beyond the end of this project. The consultant should be selected in early 2000 to ensure that time is available to make the necessary coordination with Baniyas rehabilitation for equipment purchase and installation.

3.1.2 .The Supply Side Energy Efficiency (Consultant 1 - EE) consultant will travel to site, review the state of the Baniyas units, and collect information necessary to provide a **detailed scope of work** for the project. The consultant will submit the scope of work to the appropriate persons in the MOE and UNDP (see Exhibit 4) for concurrence prior to proceeding.

3.1.3. The EE consultant (Consultant 1) will provide or contract for a Training Consultant (Consultant 3.1) familiar with training power plant staff on power plant efficiency to prepare a training module and program capable of being delivered to

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operations and maintenance staff from PEEGT stations. Consultant 2 (Training) shall work with existing PEEGT trainers to deliver the initial program to Baniyas staff.

Output 3.2 Appropriate Targets for Efficiency Established

Appropriate targets for efficiency will be established for Baniyas units 1 to 4 prior to the completion of the rehabilitation program. These targets will be used to track program success but will also help establish a sustainable commitment from the station for improvement through a performance monitoring process. These targets will be translated to MOE approved performance targets for units 1 to 4. Targets will be contracted between the General Director of the PEEGT and the Baniyas station General Director. These targets will be established prior to the end of 1998 for implementation the following year.

The PEEGT General Director shall be the responsible party for activity 3.2.5. The Energy Efficiency Consultant (Consultant 1 - EE) shall be the responsible party for all other activities to support Output 3.2.

Activities for Output 3.2

- 3.2.1 The EE consultant will review the final tender document for Baniyas units 1 and 2 rehabilitation and using this as a guide when considering the guarantee levels for efficiency committed to, shall determine performance levels that could be considered for efficiency targets.
- 3.2.2. The EE consultant will review unit 3 and 4 acceptance test performance data and establish efficiency levels for these units that are appropriate considering test results and a reasonable expectation of normal day-to-day operating procedures.
- 3.2.3. The EE consultant (Consultant 1), with assistance from the Efficiency and Performance Section to be set up as part of this program, and in discussion with the Station, will review the level of performance achievable and recommend a target for the next three year period. Consultant 1 will also institute a process for using the new EMS systems to help track performance against these targets. Targets chosen should adequately reflect overall station performance, be relatively simple, and void of any ambiguity. Targets should also recognize that achievements will not be instantaneous and targets should be set to recognize an improvement over a three year period.
- 3.2.4. The EE Consultant (Consultant 1) will work with the PEEGT General Director to help ensure appropriate targets are agreed to between that office and the Baniyas General Director. Two sets of targets will be set up. Contracted targets will be for the

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following year only but the station will advise the PEEGT General Director of predicted yearly targets for the next three years.

3.2.5 The EE consultant (Consultant 1) should develop an appropriate reward system for performance achievement in discussion with the UNDP, the MOE and other expert advise. This is an important and integral part of the overall target process. A reward system is a necessary tool to support the Baniyas General Director and to assist him in achieving these targets. Success in meeting the targets (or failure) must be appropriately rewarded to ensure an effective feedback process is in place to drive improvement. Consultant 1 will be responsible to develop a rewards program agreeable to the UNDP and subsequently recommended the program to the MOE. Some iteration in the process to establish a program that can be agreed to by the MOE is likely. The MOE will to implement this system for performance achievement at Baniyas.

The system must be of an appropriate monetary value to provide sufficient encouragement for additional efforts in the area of reliability and efficiency and to reward all the team. Some reward would be available to all of Baniyas staff but of course would consider a scale reflecting the influence each may have. For example, the Station clerical help may get a token while the maintenance foreman would receive equivalent to a few hundred dollars. The total compensation should be tied to the high cost savings to the country that improvements would provide. The system should include a financial benefit either monetary or other (travel, education, time-off etc.) and a recognition system (employee of the month, etc.).

The program should be carried out on a trial basis for 2000 and 2001. GEF should fund the cost of the reward system up to a maximum of USD 75,000 for each of the two years. Considering a 1% efficiency improvement if achieved at Baniyas would save the GoS in the order of 1 to 2 million USD per year, and considering that motivation has been identified as a large part of the problem at Baniyas, the reward sum appears reasonable in total. Considering that Baniyas employs on the order of 700 people, on average, rewards per employee are about USD 100, less than 10 % of an employee's salary. Discussions with staff on this subject suggest that rewards much less than this would be ineffective and discussions with MOE management suggest much more than this would be unacceptable.

Output 3.3 Detailed List of Parameters For Monitoring Efficiency and Equipment Condition of Baniyas Units 1-4 Plant Components Completed by 2nd Quarter of Implementation

The Energy Efficiency (EE) consultant will be the responsible party for the activities associated with 3.3.

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Activities for Output 3.3

- 3.3.1 The EE consultant (Consultant 1) through a literature review, consideration of appropriate levels of costs and using their own experience, will establish a list of components that should be monitored to help track equipment performance. It is likely not cost effective to monitor the condition of all equipment. The equipment that should be monitored is dictated by the cost of continuous monitoring and the potential for efficiency improvement. This needs to be decided by an experienced power plant performance engineer. However, for most condensing power plants, the base from which these selections are made is generally standard and in the case of Baniyas, is expected to be fairly straight forward. See the diagram entitled "Structure of the Efficiency Monitoring System" in Annex 1.
- 3.3.2 The EE consultant (Consultant 1) will determine the measurement points needed to provide the necessary information to establish the thermal performance of the equipment noted in activity 3.3.1.
- 3.3.3 The EE consultant (Consultant 1) will review the condition and accuracy levels of the existing measurement instrument sensors (primary elements) noted in activity 3.3.2. In order to effectively monitor performance, the accuracy level of the determination must be quite high considering the good paybacks for even small levels of efficiency and improvements. Without the accuracy and confidence in the data, determining and correcting deficiencies cannot be done effectively.
- 3.3.4 The EE consultant (Consultant 1) will establish the costs and determine any major difficulties with upgrading equipment required for the EMS system. In some cases these may be excessive and necessitate a further review of the process, starting from 3.3.1.

Output 3.4 Complete Monitoring Systems Established

Complete monitoring system for data collection, recording and display of power plant equipment performance and overall plant efficiency of Baniyas units 1-4 on a unit basis. This consists of sensing equipment such as thermocouples, pressure transmitters, transducers, flow elements, etc., and computer monitoring and display systems. Equipment needs to be on site by the end of 2000.

The Energy Efficiency consultant (Consultant 1) will be the responsible party for activities to support 3.4.

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Activities to Support Output 3.4

3.4.1. The EE consultant (Consultant 1) will prepare technical specifications for necessary equipment. A detailed review of current technology and methodologies needs to be carried out as part of this task. Such a review should incorporate a literature review and discussions with experts in this field. The consultants need to provide evidence that such a review has been part of the specification process and provide good rationale on selection decisions. In addition to the review this work would involve tasks like:

- determining output needs such as types of data displays;
- information requirements such as heat rate curves and cost data displays;
- review of instrument requirements, interface requirements and other input concerns;
- location of terminals, etc.
- future needs for compatibility with remote access (like SCADA systems);
- technical support services needed.

Details of an expected sample layout are included in Annex 1. **Compatibility of the existing sensing equipment already available at the stations with the selected monitoring and display equipment must be a prime consideration.** Any costs of replacing current sensing equipment should be minimized where possible.

It will not be possible to make allowances for all future scenarios, but it is important that maximum consideration be given to flexibility and expansion characteristics of this equipment to support future requirements. This includes careful consideration of future plans of the MOE in the area of computerized data collection and communication systems. Because of the lack of such systems in the PEEGT power plants at present, the need to make the system “user friendly and reliable”, (likely to be a compromise to sophistication and speed), is of extreme importance.

3.4.2 Taking into consideration UNDP and GoS procurement guidelines and advice, the EE consultant (Consultant 1) shall work with the GoS and UNDP to arrange for the purchase and installation of the sensing equipment. This equipment will be installed during the rehabilitation program and integrated with that schedule. The installation schedule must ensure that the system is fully functional by completion of the unit 1 and 2 rehabilitation.

3.4.3 Taking into consideration UNDP and GoS procurement guidelines and advice, the consultant (Consultant 1) will organize the purchase of the computer monitoring and display system from a supplier on a turn-key basis. The supplier will be responsible for the procurement, assembly, installation, commissioning of the equipment and training of necessary personnel in its use and benefits. **Equipment purchase can be done under the rehabilitation purchasing umbrella especially since the timing is**

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aligned to that project. The consultants (Consultant 1) should carry out a performance review of the equipment to confirm the system meets expectations.

Output 3.5 Baniyas Power Plant Staff Capable of Operating, Maintaining Efficiency Monitoring System

Staff capability to effectively operate and maintain an efficiency monitoring system and employ the information to improve plant performance. About 50 % of the staff training should be completed within two months of the units' return to service subsequent to the rehabilitation completion. The remaining staff should be trained within three months.

The PEEGT will be the responsible party for activity 3.5.1. The EE consultant (Consultant 1) will be the responsible party for activity for activities 3.5.2 to 3.5.4.

Activities for Output 3.5

3.5.1 The PEEGT will need to establish the new position of *Plant Efficiency Engineer* expected to be part of the existing Baniyas Technical Department reporting to the "Directorate of Planning and Training". Generally this position would provide station support to the Central Team (within Efficiency and Performance Section of PEEGT - see page 24) and deal with less complex areas of efficiency improvement. More specifically, responsibilities of the position will be to:

- liaise with the Central Efficiency Team to help set up special tests.
- review efficiency data and advise Central Team and/or appropriate station staff of performance problems.
- ensure the integrity of the EMS output data.
- provide station efficiency reports to head office group and station.
- advise station management on efficiency related issues with support from central team.

Clerical support for data collection would be done in the existing "Office of Performance" also located in the "Technical Department".

3.5.2. *Expert level training* (see page 25) of Plant Efficiency Engineer (newly established position) and person in charge of the Technical Department on efficiency improvement, performance analysis, performance measurement, plant operating costs, and the installed monitoring system. The training would include 1-2 weeks classroom training, one month work at an external utility (either through E7 support or contract if necessary - however E7 support for this activity should be actively sought) divided between a central efficiency support group and appropriate station department, and one month work with efficiency expert (consultant or other) at Baniyas site after the

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unit returns to service. Training on the operation and maintenance of the monitoring system would be provided by the supplier/manufacture as a package with the procured system.

3.5.3. *High level training* of unit operators on site with respect to the key operational requirements for efficient operation, and the impacts and associated costs of non-optimum performance levels. This includes such things as costs of poor performance, targets to be met, use of the system data to identify poor performance, etc. High level training of operations staff on obtaining appropriate data from the EMS system computers and its interpretation.

3.5.4. *High level training* of two instrument engineers and Department Head of Instrument Maintenance on the operation and maintenance of the installed monitoring system by the manufacturer/supplier.

3.5.5. The Administrative Director should under the guidance of the Deputy Minister of Electricity and the appropriate department within the PEEGT, the UNDP and Consultant 3.1 seek E7 assistance to supplement the training efforts of this objective. While all avenues of assistance should be explored with E7, requirements for training noted in activity 3.5.2 that requires Syrian staff to work within another utility should be top priority. This is easily accommodated by a utility and is difficult to accomplish through any other means than on a pro-bono basis. An E7 project document will need to be prepared and submitted to E7 for mid 1998 steering committee approval. The project document should lay out the benefits of this project in reducing CO2 emissions along with man-hour estimates and project scope. The current UNDP project document contains sufficient documentation to prepare a proposal to the E7. It is important to note in this context that E7 have been active in the middle east for some time with projects in Egypt and Jordan that are quit similar in nature to the kind of training that is being proposed for E7 support through this project. Support can also be obtained through E7 utility sponsorship and it may be effective and desirable to approach E7 utilities to champion the project. In Jordan for example EDF, RWE, ENEL and Ontario Hydro took part in the project.

IMMEDIATE OBJECTIVE 4. BANIAS MAINTENANCE MANAGEMENT SYSTEM

Systems in place for maintenance management on Baniyas units 1 to 4 that will enable the station to maintain the reliability levels on these units after project completion at a specified target level. The targets levels will be set subsequent to finalizing the tender guarantees for the unit 1 and 2 rehabilitation and will reflect those levels. Reliability is generally expressed as a

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percentage of output delivered to output available or a similar figure with some minor adjustments. For reliability, targets on all four units at Baniyas will not be more than 2 percentage points lower than the post overhaul guaranteed unit 1 and 2 reliability levels after two years of operation.

The implementing agency responsible for achieving this objective is the Ministry of Electricity, and within the Ministry, the Power Generation Directorate within the Technical Affairs branch of PEEGT. The head of the Efficiency and Performance Section will have day-to-day responsibility for implementing the tasks listed below and will be assisted in these tasks by his staff, international consultants and the staff at the Baniyas Power Station.

Success criteria

By the end of the project, the MOE and Baniyas Power Station will have achieved the following results:

- procured and installed MMS equipment in coordination with the rehabilitation of the Baniyas Power Station and the installation of the EMS equipment;
- established maintenance targets for the rehabilitated plant and a system for monitoring maintenance;
- trained the staff within Baniyas on MMS such that the staff is fully capable of achieving target maintenance objectives after the cessation of UNDP/GEF funds;
- established an incentive program for Baniyas staff and management to maintain the plant in it rehabilitated condition.

Output 4.1 A Detailed Scope of Work for Implementation of EMS Systems Prepared

Under the direction of the Director of PEEGT, the Power Generation Directorate will have the overall responsibility of implementing this output.

Activities for Output 4.1

- 4.1.1 Selection of an expert consultant in the area of maintenance management
(Consultant 2) is the same process as selection of the EE consultant (Consultant 1) described in section 3.1.1. As noted there, a single or multiple consultant or a team are all suitable options for this project. For clarity of this document to recognize the area of expertise is independent of the efficiency management skills, the consultant activities to support Immediate Objective 4 are assumed to be carried out by a Maintenance Management consultant similar to the approach taken in Objective 3. Expert consultants in the area of maintenance management (Consultant 2) of large power plants that will be able to organize and coordinate the activities required and

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provide the hands-on training to ensure that the necessary learning takes place by the key PEEGT personnel to sustain the activities beyond the end of this project. The make-up of the consultant team may incorporate more than one expert if necessary to carry out individual tasks. The maintenance consultant (Consultant 2) should be selected in early 1998 to ensure that time is available to make the necessary coordination with Baniyas rehabilitation for equipment purchase and installation.

4.1.1 The maintenance consultant (Consultant 2) will travel to site to review the state of the Baniyas units and collect information necessary to provide a detailed scope of work for the project. The Consultant(s) will submit the scope of work to the appropriate person in the MOE (see Exhibit 4) prior to proceeding.

4.1.2 The Maintenance consultant (Consultant 2) will contract a Training consultant (Consultant 3.2) familiar with training power plant staff in maintenance to prepare a training module and program capable of being delivered to operations and maintenance staff from PEEGT stations. The consultant shall work with PEEGT trainers to deliver the initial program to Baniyas staff. Please note that can, but do not need to be the same person/company.

Output 4.2 Appropriate Targets for Reliability Established

Appropriate targets for reliability will be established for Baniyas units 1 to 4 prior to the completion of the rehabilitation program. These targets will be used to track program success but will also help establish a sustainable commitment from the station for improvement through a performance monitoring process. These targets will be translated to MOE approved performance targets for units 1 to 4. Targets will be contracted between the Director General of the PEEGT and the Baniyas station Director General. These targets will be established prior to the end of 2000 for implementation the following year.

The PEEGT Director General will be the responsible party for activity 4.2.4. The Maintenance Consultant (Consultant 2) will be the responsible party for the remaining tasks.

Activities for Output 4.2

4.2.1 .The Maintenance consultant (Consultant 2) will review the final tender document for Baniyas units 1 and 2 rehabilitation and using this as a guide when considering the guarantee levels for reliability committed to, shall determine performance levels that could be considered for reliability targets.

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4.2.2 .The Maintenance consultant (Consultant 2) will compare reliability levels from past operating performance data on units 3 and 4 and ensure that these units can be maintained at the same performance levels as the rehabilitated units.

4.2.3 .The Maintenance consultant (Consultant 2) with assistance from the Efficiency and Performance Section (to be set up as part of this program) and in discussion with the Station, will review the level of performance achievable and recommend a target for the next three year period. In conjunction with the approval, the consultants will also institute a process for using the new MMS system to help track performance against these targets. Targets chosen should adequately reflect overall station performance, be relatively simple, and void of any ambiguity. Targets should also recognize that realizing the full potential of the new systems will not be instantaneous and targets should be set to recognize an improvement over a three year period.

4.2.4 .The Maintenance consultant (Consultant 2) will work with the Director General of PEEGT to help ensure appropriate targets are agreed to between the Director General and the Station Manager. Two sets of targets will be set up. Contracted targets will be for the following year only but the station will advise the Director General of predicted yearly targets for the next three years.

Output 4.3 Fully Functional Maintenance Management System Installed

Fully functional Maintenance Management System installed at Banias that is operational by the end of the rehabilitation on 1 and 2. The system will employ modern methods of:

- tracking equipment condition
- documenting equipment repair problems and solutions
- listing requirements, costs and availability of spare parts
- predicting equipment problems and repair needs
- documenting repair procedures
- assessing equipment impacts on performance
- scheduling outages
- providing equipment repair costs, running hours etc.
- issuing purchase orders

The hardware needs are similar to and can be tied in with the EMS system described in "Structure of EMS System" in Annex 1. The tie in is shown in the Annex 1 EMS layout overview drawing. In addition, **it must be recognized that the input from the EMS system is a key component of the overall Maintenance Management system with respect to tracking equipment performance.**

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As previously noted in the section "General Overview of MMS and EMS" Section B, the maintenance management system is more than a hardware issue. Part of that system affects the normal business operation of the plant especially in the way the maintenance department functions. The Maintenance consultant needs to review Banias maintenance practices in detail and develop a system of modern management processes for implementation. For example, such things as stores operation, spare parts ordering, location and structure of the way maintenance staff are employed in plant activities are all part of this. Since this is an organizational issue, it is likely to be of major concern to both station and PEEGT management and needs their approval. Consultants must, therefore, have agreement from those parties, i.e., the Director General of Banias, and appropriate central management (likely to be the Deputy Director for Technical Affairs) to implement any recommendations.

The Maintenance Consultant (Consultant 2) will be the responsible party for activities to support output 4.3.

4.3.1 Taking into consideration UNDP and GoS procurement guidelines and advice, the Maintenance consultant (Consultant 2) will prepare a technical specification document to solicit tenders on supplying hardware, software, installation and training, for an available MMS that will satisfy the requirements noted above under 4.2. This should follow in parallel with the procurement and installation of the EMS. There are many systems on the market that are likely to suit the needs for Banias. While an exact match may not be found, it is expected that an available system that has a proven record would be available for a close fit. Similar concerns need to be addressed as were outlined in 3.5.1 with respect to the EMS and the possibility of future needs and hardware changes at Banias. Specifically, the system needs to be as flexible as possible to support any future expansion, be user friendly and reliable. .

4.3.2 Taking into consideration UNDP and GoS procurement guidelines and advice, Consultant 2 will prepare and document a detailed procedure for ordering equipment associated with station repairs and maintaining spare parts as part of the predictive maintenance component of the MMS. This should include responsibility levels for approval, guidelines for approval processing, and a procurement template for providing need, urgency and cost benefits (i.e., a business case analysis) that would meet the needs of decisions makers to provide necessary approvals. The PEEGT should be requested to adopt the template for use at Banias for equipment purchase and the process should be instituted as part of the overall MMS.

Output 4.4 Staff Capability to Use MMS Systems Exist

Banias station and other appropriate PEEGT staff capable to effectively use maintenance management system to improve performance. About 50 % of the staff training should be

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completed within two months of the unit's return to service subsequent to the rehabilitation completion and the remaining staff trained within three months.

The Maintenance Consultant (Consultant 2) will be the responsible party for all activities to support Output 4.4.

Activities for Output 4.4

- 4.4.1 . *High level training* for the Baniyas Director of Operation, the Director of Maintenance and Director of Planning and Training, and all direct reports, leader of the Unit of Maintenance Programming and Unit of General Monitoring on all aspects of the MMS system operation and benefits. The training would include 1-2 weeks classroom training. The expert consultant in maintenance management would work with the Director of Maintenance and their staff for about one month to transfer expertise to key personnel. The Baniyas Director of Maintenance and those staff directly supervised by him that are working in the area of plant maintenance would be provided high level training by an expert in MMS either at the Baniyas station or at a training facility or utility outside the country.
- 4.4.2 . The Director of Maintenance would work for about a one month period at a foreign utility's station. The chosen station should have a good MMS system in place. Training on the operation and maintenance of the MMS hardware and software would be provided by the supplier/manufacturer at site. E7 Support should be sought for this activity as well.
- 4.4.3 . *Expert level training* of Section Head and Maintenance Engineer in the central Efficiency and Performance Section on all aspects of the Baniyas MMS System. If possible, the Maintenance Engineer and the Baniyas Director of Maintenance should be trained together with this head office group. This would develop a closer working relationship among these personnel.
- 4.4.4 . The Administrative Director should under the guidance of the Deputy Minister of Electricity and the appropriate department within the PEEGT, the UNDP and Consultant 3.2 seek E7 assistance to supplement the training efforts of this objective. Please see activity 3.5.5 for further reference.

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IMMEDIATE OBJECTIVE 5. PEEGT EFFICIENCY AND MAINTENANCE MANAGEMENT SUPPORT TEAM (Central Team)

Provide incremental assistance to the PEEGT to establish a small focused central specialized team that will encourage the sustainability of an efficiency and maintenance management program established at Baniyas and ensure the transfer of these concepts to at least one additional station. UNDP/GEF assistance will provide initial training and equipment to ensure the capability of this team is at a level to provide specialized advice and assistance to the station and the PEEGT in the areas of reliability and efficiency performance. This Central Team will be located within the existing efficiency and performance section of the power Generation Directorate.

For power plant efficiency, the team capability needs to be at a level required to carry out and analyze results from a performance audit of similar complexity as the post overhaul performance acceptance tests. The team must also be able to demonstrate with documented evidence that within a two year period after inception, they have contributed to sustaining the target levels of power plant efficiency in the PEEGT. Similarly on the reliability side, the team should, again within a two year period, be able to demonstrate through documented evidence that the team has helped to sustain target levels of power plant reliability.

While part of the project is to establish a site efficiency function, the site function tasks are generally different than that of the central team. The site function provides a more general day to day monitoring of the programs and systems put in place by the central team. The central team will

Success Criteria

By the end of the project, the MOE and Baniyas Power Station will have achieved the following results:

- the establishment of a permanent, three-person Efficiency and Maintenance Support team (Central team) within the Efficiency and Performance Section (EPS) within the Power Generation Directorate of PEEGT capable of providing expert advice and assistance to all PEEGT power plants on the establishment of efficiency and maintenance management systems within their plants
- the Central Team will be fully equipped with instrumentation necessary to carry out its responsibilities including a workshop with repair and calibration facilities
- training modules and an on-going training program for PEEGT power plant staff in the areas of efficiency and maintenance management incorporated into the training curriculum at the Jandar training center

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- a complete review and report on the progress of the EMS/MMS program prepared by the Central Team staff and presented to the MOE and UNDP

Output 5.1 Institutional, Organizational Structure and Resource Requirements for Central Team Established

The Energy Efficiency (EE) consultant (Consultant 1), with assistance from the maintenance consultant (consultant 2), to provide detailed requirements for the organizational structure, capabilities, equipment needs and logistics for setting up a centralized team within the Power Generation Directorate in PEEGT Technical Affairs/Power Generation Directorate and obtain necessary agreements from PEEGT for execution of the set-up. A team leader needs to be established prior to the start of the GEF project and the full team selected early in 2000. Capability of the team should be at an average competency level with an expectation that continuous improvement will occur with experience. Terms of Reference for each position within the central can be seen in Annex 2.

The Energy Efficiency consultant (Consultant 1) will be the responsible party for activities to support output 5.1 except 5.1.2. The PEEGT will be the responsible party for carrying out activity 5.1.2.

Activities for Output 5.1

5.1.1. The consultants (Consultants 1, 2 and 3) will work as a team to prepare a document proposing detailed requirements for the central team including responsibilities, organizational structure, relationships within the PEEGT, capabilities, training needs, equipment, space requirements, timing and logistics of hiring. Staff should be hired from within the existing PEEGT. While it is unlikely that the specialized training in performance monitoring and maintenance management is available in the PEEGT, employees with suitable engineering and technical background with a high level of knowledge of power station equipment performance, power plant operation, personnel skills to deal with varied station personnel and an interest in efficiency improvement or plant reliability can be selected and trained.

The responsibilities of this central group would generally be to:

- Coordinate the collection of performance related data from the stations in the areas of reliability and efficiency.
- Keep the PEEGT advised on the performance level in the areas of reliability and efficiency and advise stations on areas of concern through regular review and analysis of station data.

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- Provide expert advice on efficiency related problems and recommend programs to improve station performance.
- Carry out specialized testing to determine equipment deficiencies and help identify root causes for performance problems.
- Advise on the impact of maintenance management at Banias and help implement the process at other stations.

5.1.2 The consultants (Consultants 1, 2 and 3) will work with the Power Generation Directorate of the PEEGT or his delegate to select the team leader first and in cooperation with the team leader and PEEGT management, advise on completion of the team selection.

5.1.3 The consultants (Consultants 1, 2 and 3) should review the capability of the selected team and establish a training plan to bring the skill levels in power plant performance improvement to required levels. *High level training* is needed and it is expected that a system of expert level teaching and working with external utilities as indicated in activity 5.5.2 would be required. The plan should consider a system of continuous improvement to ensure that the team can continue to keep up with changes in the field. Involvement of team members in available organizations, annual conferences, etc., that deal with power plant performance improvement should be supported by the PEEGT. This project should sponsor attendance of the team leader to an international conference in 1999 and in 2000.

5.1.4 The consultants (Consultants 1, 2 and 3) will work with the Central Team during the first one to two month period of operation to guide the set up and implementation of initial work programs. The consultants 1 & 2 should return to site for about a two-week period in the latter part of 2001 and in the year 2002 to review results and provide redirection if necessary. Sometime during the second month after the team has been established, at least one representative of the team shall, together with the Director of Power Generation Directorate, travel to all key power stations in Syria and provide an overview of the team's responsibilities and capabilities to its senior management, and solicit and document feedback.

Output 5.2 Adequate and Fully Operational Equipment Available to Central Team

Procure equipment and provide an appropriate storage, calibration and repair facility (repair workshop) to enable the central team to carry out specialized testing for the power stations within the PEEGT prior to the end of 2000. A suggestion of the type, quantity and cost of such equipment is provided in Annex 3. It is preferable that the workshop facility be located in close proximity to the central team.

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This equipment is of a more specialized and sophisticated nature than the on-line instrumentation equipment that was supplied under the tasks supporting Objective 3. This equipment is meant to perform specialized testing, make highly accurate measurements to pinpoint problems and in some instances to audit the performance and accuracy of the day-to-day monitoring equipment. It would not be cost effective to install permanent instrumentation to monitor all necessary facets of equipment performance nor to maintain the high level of accuracy often needed to investigate areas of performance deterioration effectively.

The Energy Efficiency consultant (Consultant 1) will be the responsible party for the activities to support Output 5.2.

Activities for Output 5.2

5.2.1 The EE consultant (Consultant 1), with advice from the maintenance consultant (Consultant 2), will review instrumentation needs, and prepare technical specifications for purchase. For efficiency performance requirements, these should be based on the parameters needed for performance Acceptance Test measurements with quality standards based on acceptable measurement codes (ASME, AINSI, etc.). For the equipment needed specific to the maintenance requirements such as non-destructive test equipment, the consultant will review the current equipment available and recommend basic minimal equipment requirements associated with the Baniyas units 1 to 4.

5.2.2 Keeping UNDP and GoS guidelines in mind, and acting under the supervision of UNDP and the GoS, Consultants 1 & 2 will work with GoS and UNDP to ensure that the adequate and sufficient equipment is procured to the project. Procurement itself will be undertaken by GoS and UNDP. It is, however, highly advisable that the Consultants are intricately involved in the process. The equipment specified will be sufficient to accurately verify equipment performance (the performance of the equipment installed during rehabilitation). It is normally the case that when major rehabilitation programs take place, establishing improvement in performance as a function of the of the equipment rehabilitated is part of the rehabilitation program, and in such cases the level of improvement is guaranteed. It is common practice for the manufacturer to carry out their own guarantee tests with a company (in this case Baniyas Power Plant) witness. However, there would be training and possibly other cost benefits if the equipment performance testing is carried out using the equipment supplied as part of this project. This could be accomplished under a number of options:

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- 1) The PEEGT could take on the responsibility to carry out the guarantee tests on their own using equipment purchased as part of this project with advice and guidance from an external consultant.
- 2) The equipment purchased under this project could be chosen to match as close as possible that intended to be used by any consultants or manufacturers carrying out the guarantee tests as part of rehabilitation. The PEEGT would monitor closely the use of the equipment and the guarantee tests.
- 3) As part of the rehabilitation project, guarantee testing could include transfer of knowledge and equipment by consultants or manufacturers employed to carry out these tests. In this case the cost of the equipment and some incremental training costs would be borne by this project.

The project consultants (Consultants 1, 2 & 3) would, together with the MoE, need to select the appropriate option after detailed discussions with the rehabilitation project. Option (3) would, likely be the best from the standpoint of maximizing the training of PEEGT personnel, but presents some coordination and scheduling difficulties.

5.2.3. The consultants (Consultant 1 & 2) should provide a document detailing the requirements including size, equipment needs, other requirements for a workshop facility to accommodate the needs of the Central Team. The workshop will be used for storage, minor repair and calibration of test equipment. The requirements will be provided to the MOE and the MOE will provide an appropriate facility and standard office equipment to support such work such as a computer, office furniture, access to photocopying equipment shelves, workbenches, etc.

Output 5.3 An Operational System of Reliability Indices

Implement a system of reliability indices to help monitor reliability performance in the PEEGT along with a support system in Baniyas for providing the necessary data for units 1 to 4. A common system used by other utilities to provide a broad base for comparison of Baniyas performance (benchmarking) should be considered a priority. The system should be in place by the end of 2000.

The Maintenance consultant (Consultant 2) will be the responsible party for activities to support output 5.3.

Activities to Support Output 5.3

5.3.1 The consultant (Consultant 2) will select a system of standardized reliability definitions common to other utilities. The PEEGT needs to be consulted on selection.

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Consistency with standardized reliability reporting such as that used by associations like the Canadian Electrical Association (CEA) would be a benefit to help benchmark equipment performance.

5.3.2 The consultant (Consultant 2) will establish a fully functional process within the framework of the overall MMS as required for reporting overall reliability performance of the station. Specifically, this would include specifying hardware, designation of staff requirements, reporting formats and other needs as required. The consultant will initiate and oversee implementation in the Banias station.

5.3.3 The consultant will provide training programs suitable to ensure adequate learning of plant personnel and the head office team reliability engineer to carry out the reporting process outlined in 4.3.3.

Output 5.4 Capable Trainers and Training Modules on Power Plant Performance Exist

Training module(s) and capable trainers for conducting performance training on improving power plant performance and the associated benefits related to maintenance and plant efficiency. The modules will be incorporated into the regular training program that is currently being set up for all power plant personnel at the new training center at Jandar. Timing of preparation of this task should tie into the current completion schedule of the Jandar facility currently planned for 1998.

In most cases, operations and maintenance staff can make a significant contribution to improved maintenance and reliability through the way they carry out their regular work activities. Tasks such as looking for steam leaks, improving operating practices, choosing replacement parts that enhance component efficiency are some examples.

Often all the focus and knowledge of efficiency and reliability issues are left with a handful of efficiency experts. While these experts are needed, and of course it would be impossible to train all operations and maintenance personnel to be experts, some general level of knowledge must be incorporated into the regular training requirements of operations and maintenance staff. This training would increase focus on energy efficiency and provide some skills and knowledge that would be useful in helping this group recognize areas where they can contribute to performance improvement. The training would be of a very general nature and would be directed at a level for staff working with tools (maintenance and instrument mechanics), operators, and their direct supervisors.

The responsible parties to support Output 5.4 are the Energy Efficiency consultant (Consultant 1) for activity 5.4.1, the Training consultants (Consultant 3.1 & 3.2) for 5.4.2 and the PEEGT for 5.4.3.

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Activities for Output 5.4

- 5.4.1 Consultants to engage a Training Consultant with expertise in the area of performance and maintenance training.
- 5.4.2 The Training consultant will prepare modules, select trainers from the PEEGT, and recommend and arrange for suitable training.
- 5.4.3 Selected trainers with advice from the Training consultant will lay out a schedule and deliver this training at the Baniyas station to all personnel associated with operations and maintenance.

Output 5.5 Thorough Review of EPS Section Undertaken

Documented review of the status of success of the Efficiency and Performance Section (Central Team) by the end of projects third year.

The responsible party for activities to support 5.5 will be the PEEGT.

Activities for Output 5.5

- 5.5.1. The Efficiency and Performance Section shall provide a document providing details and substantiation of their contribution to improving efficiency and sustaining a high reliability level at Baniyas. The document will be submitted to the MOE, Project Coordinating Committee and the UNDP/Syria.

SECTION E

Section E: INPUTS

1. Government of Syria Inputs

The Government of the Syrian Arab Republic (GoS) will assign or transfer to the project the staff listed below. Such staff will be suitably qualified and experienced. The GoS will be responsible for financing the payment of salaries and allowances commensurate with current policies and future policies that may from time to time be decided by the GoS. The GoS is also responsible for providing the office space, including utilities, for the staff.

Personnel In-Kind

Position Title
Project Administration and Coordination
Deputy Minister, MOE
Syrian Energy Services Center
General Director
Director, Energy Services
Engineers (4)
Director, Information and Training Services
Technical Writer
Training Specialist
Director, Finance and Analysis
Financial Analyst
Energy Planner
Policy Analyst
Director, Administration
Accountant/Contract Officer
Bookkeeper
Efficiency and Performance Section, PEEGT
Engineers (6)
Total Cost /Year: \$ 75,000
Total Life of Project: \$300,000

Facilities In-Kind

The GOS will be responsible for providing the office space required for the project staff to perform their duties. Facilities to be provided include six office units, each of which has two rooms and a bathroom, on the eighth floor of a building located at Dar Al-Mouhandeseen, Maisaloon St., in the center of Damascus. The total floor area is 525 square meters. This contribution includes the annual cost of services for the offices, plus office furniture and three computers.

SECTION E

2. UNDP Inputs (Objective 2)

UNDP/TRAC is providing a total of \$685,000 in direct funding for Objective 2. Personnel costs including travel total \$519,010. Expenses listed below total approximately \$99,440 and include local travel, training, equipment and other miscellaneous costs.

Personnel

Position Title	Work Months	Total Salary Costs	Travel Cost	Total Cost With Travel
<i>International Consultants</i>				
Document Preparation Specialist	1	\$17,000	\$ 4,350	\$21,350
DSM and Resource Planning Expert	8	\$131,000	\$34,800	\$170,800
EE Promotion/Focus Group Expert	2	\$29,110	\$7,449	\$36,559
International EE Engineering Expert	2	\$34,000	\$8,700	\$42,700
International Equipment Standards Expert	2	\$25,500	\$ 6,525	\$32,025
International EE Policy Expert	2	\$34,000	\$8,700	\$42,700
<i>National Consultants</i>				
Data Research Specialist	14	\$ 28,000	-	\$ 28,000
Total	31	303,610	\$70,524	\$374,134

Subcontracts

Subcontracts	Months	Cost (\$)		
		Labor	Travel	Total
Advertising Firm	8	16,000	-	16,000
Consumer Research Firm	6	12,000	-	12,000
Total	14	\$28,000		\$28,000

SECTION E

Equipment, Training and Other Expenses

The following equipment, training and other expenses will be paid for by UNDP funds on Objective 2.

Item	Total Cost (\$)
Audit Equipment for DSM Pilot Program	124,854
DSM Software	10,000
End-use Metering Equipment	20,000
Promotion Material	30,000
Hotline Expenses	5,000
In Service Training	9,000
Travel (domestic)	1,750
Per Diem (other)	1,050
Publicity	19,000
Communications	2,734
GEF/RBAS Tripartite Review	15,000
Mid-Term Evaluation	12,000
Total	\$250,388

Total Costs without UNDESA Costs

The subtotal of costs without UNDESA costs (personnel, subcontracts, equipment, training, and other expenses) is \$652,522.

SECTION E

Total Costs without UNDESA Costs

Item	Cost (\$)
Personnel	374,134
Subcontracts	28,000
Equipment, training, etc.	250,388
Total Costs	652,522

Support Services & Sundries

UN DESA will receive support US \$32,478 for execution of Objective 2. These costs will be incurred in exchange for administrative and other costs associated with the retention of international consultants.

As shown below, the costs for Objective 2 will be divided between UNDP/TRAC costs (\$505,000 comprised of \$472,522 personnel and equipment costs plus \$32,478 UNDESA costs) and UNDP/EAP costs of \$180,000. UNDP/TRAC costs consist of costs for international and regional consultants and a portion of costs for audit and instrumentation equipment needed for the DSM pilot project. The remaining costs for national staff and consultants and for other equipment and expenses fall within the jurisdiction of UNDP/EAP.

Allocation of Total Costs Including UNDESA

UNDP Authority	Direct Costs	UNDESA Support Costs	Total Cost US \$
UNDP/TRAC	472,522	32,478	505,000
UNDP/EAP	180,000	-	180,000
Total	652,522	32,478	685,000

SECTION E

3. GEF Inputs (Demand Side - Objective 1)

GEF will provide a total of \$1.67 million on Objective 1 (excluding cost of full time local project staff and support costs). This total assumes \$402,000 in reimbursements through training fees and contract revenue. Of the \$2.04 million that will be initially expended, approximately \$1.72million will be used to fund personnel and associated travel. The remaining \$293,310 will be used to cover equipment, training, and other costs.

Personnel

Position Title	Work Months	Costs (U.S. \$)		
		Total Salary Costs	Travel Cost	Total Cost with Travel
International Consultants				
Lead International Consultant	3.5	87,500	31,220	118,720
International Project Finance	1	17,000	4,350	21,350
International Energy Efficiency Engineering Expert	4	68,000	17,400	85,400
International Training	7	119,000	30,450	149,450
International ESCO/Energy Services Bus. Plan	2	25,500	6,525	32,025
Subtotal International Consultants	22	402,000	111,695	513,695
International or Regional				
Boiler Efficiency Expert	6.5	26,000	24,375	50,375
Steam System Expert	6.5	26,000	24,375	50,375
Motor Efficiency Expert	14	56,000	52,500	108,500
Subtotal International or Regional	27	108,000	101,250	209,250
National Consultants (Cost Sharing between GEF and GoS)				
Engineer/Audit Contractors, QSP Program	96	99,093	-	99,093
Engineer/Audit Contractors, IEP Program	48	49,546	-	49,546

SECTION E

Engineer/Audit Contractors, Boiler/Furnace Efficiency.	48	49,546	-	49,546
Engineer/Audit Contractors, Steam System	48	49,546	-	49,546
Engineer/Audit Contractors, Motors	24	24,773	-	24,773
Engineer/Audit Contractors, Power Factors	48	49,546	-	49,546
Subtotal Regional Consultants	312	322,051		322,051
Total	361	832,051	212,945	1,044,996

Subcontracts

Subcontracts	Months	Cost		
		Labor	Travel	Total
Advertising Firm	4	\$ 8,000	-	\$ 8,000
Consumer Research Firm	4	\$ 8,000	-	\$ 8,000
Total	8	\$16,000		\$16,000

Administrative Support Costs (Allocated)

The following costs for administrative support are allocated to Objective 1. These administrative personnel shall also support other GEF-funded Objectives 3-5

Personnel	Months	Cost		
		Labor	Travel	Total
Secretary to Administrative Project Director	18	3,630	-	3,630
Accountant	18	3,630	-	3,630
Total	8	7,260	-	7,260

SECTION E

Equipment, Training, and Other Expenses

The following equipment, training, and other expenses for Objective 1 will be paid for by GEF funds:

Item	Total Cost (US \$)
<i>Objective 1 Specific Costs</i>	
Audit Equipment	160,910
Computers, printers, etc.	6,000
In-Service Training	23,691
Group Training	2,450
Travel (domestic)	6,300
Per Diem (national)	6,050
Printing Expenses	20,000
<i>Subtotal Objective 1 Specific Costs</i>	<i>225,401</i>
<i>Allocated Costs</i>	
Study Tours	250,000
Communications	3,600
Vehicles	26,471
Operation & Maintenance of Vehicles	1,374
GEF/RBAS Tripartite Review Costs	7,563
Mid-Term Evaluation	3,782
<i>Subtotal Allocated Costs</i>	<i>292,790</i>
TOTAL COSTS	518,191

As shown above, costs for certain items have been allocated to Objective 1. These costs will be shared with the other GEF-supported Objectives 3-5. These allocated costs include costs for study tours, which will also have benefits for Objective 2.

SECTION E

Subtotal Costs with UNDESA and UNDP Support

Total Costs without UNDESA/UNDP

Item	Cost (\$)
Personnel:	1,044,996
Administrative Support	7,260
Subcontracts	16,000
Equipment, training, etc.	518,191
Total Costs	1,568,448

UNDESA and UNDP Support Costs

A total of \$83,553 of costs will be incurred for UNDESA and UNDP support:

- UNDESA execution costs of \$51,370 will be used for the search, retention, monitoring, and other support needed for international consultants. UNDESA costs are equal to 10% of these costs
- UNDP support costs of \$32,183 will be needed for the administration of all other costs. UNDP support costs are equal to 3% of these costs.

With the addition of these costs, the total cost for Objective 1 is \$1,670,000.

4. GEF Inputs (Supply Side, Objectives 3-5)

GEF will provide a total of \$2.4 million on Objectives 3-5. Of this total, \$845,000 (excluding cost of full time local project staff and support costs) will be for personnel and associated travel costs. Approximately \$1.5 will be used for the purchase of equipment, training, domestic travel, incentive program funds and a mid-term review.

SECTION E

Personnel

Position Title	Work Months	Costs (U.S. \$)		
		Total Salary Costs	Travel Costs	Total Cost with Travel
International Consultants				
International Reliability & Maintenance Expert (Consultant 2)	7	91,000	34,450	121,450
International Efficiency Performance & Monitoring Expert (Consultant 1)	8	104,000	34,800	138,800
Training Consultant(s) - Consultants (2 &3)	3	39,000	13,050	52,050
Training Consultant, Test Equipment	4	76,000	17,400	93,400
Project Preparation, Supply Side	1	13,000	5,960	1
Subtotal International Consultants	23	323,000	101,660	424,660
National Project Personnel				
Project Administrative Director	48	57,600	-	57,600
Utility Trainer	25	30,000	-	30,000
Subtotal National Personnel	73	87,600	-	87,600
Total	103	410,600	101,660	512,260

Administrative Support Costs (Allocated)

The following costs for administrative support are allocated to Objective 3-5. These administrative personnel shall also support other GEF-funded Objective 1.

Personnel	Months	Cost		
		Labor	Travel	Total
Secretary to Administrative Project Director	30	5,970	-	5,970
Accountant	30	5,970	-	5,970
Total	60	11,940	-	11,940

SECTION E

Equipment, Training and Other Expenses

GEF funds will provide for the following equipment, training, and other expenses on Objectives 3-5:

Item	Total Cost
<i>Objective 3-5 Specific Costs</i>	
MMS System	\$395,000
EMS System	\$522,000
Performance & Test Team Equipment	361,592
Group Training	\$ 50,000
In-Service Training	\$ 30,000
Travel (domestic)	\$ 2,000
Per Diem (other)	\$ 2,000
Incentive Program Funds	\$100,000
<i>Subtotal Direct Objective 3-5 Costs</i>	<i>1,462,592</i>
<i>Allocated Cost</i>	
Study Tours	250,000
Vehicles	43,530
Operation and Maintenance of Vehicles	2,260
GEF/RBAS Tripartite Review Costs	12,437
Mid - Term Evaluation and Tri-Partite Review	6,219
<i>Subtotal Allocated Costs</i>	<i>314,446</i>
Total	\$1,777,036

As shown above, costs for certain items have been allocated to Objectives 3-5. These costs will be shared with the other GEF-supported objective, Objective 1. These allocated costs include costs for study tours, which will also have benefits for Objective 2.

SECTION E

Subtotal Costs with UNDESA and UNDP Support

Total Costs without UNDESA/UNDP

Item	Cost (\$)
Personnel:	512,260
Administrative Support	11,940
Equipment, training, etc.	1,777,038
Total Costs	2,301,236

UNDESA and UNDP Support Costs

A total of \$98,763 of costs will be incurred for UNDESA and UNDP support:

- UNDESA execution costs of \$42,466 will be used for the search, retention, monitoring, and other support needed for international consultants. UNDESA costs are equal to 10% of these costs
- UNDP support costs of \$56,297 will be needed for the administration of all other costs. UNDP support costs are equal to 3% of these costs.

With the addition of these costs, the total cost for Objective 1 is \$2,400,000.

5. Project Management and Support Services (All objectives)

Support

UN DESA will receive support service costs of \$126,314 for the execution of Budget Lines 11.51 to 11.60 of the budget covering GEF and UNDP inputs (\$32,478 for Objective 2 and \$93,836 for Objectives 1 and Objectives 3-5) of Section J. The precise allocation of these costs among two objectives is described above. This money will be used to support the search, retention, and oversight of international consultants.

The UNDP/Syria will receive \$88,480 to support the execution of all budget lines under Objectives 1 and 3-5 other than international consultants (\$32,183 for Objective 1 and 56,297 for Objectives 3-5)

SECTION E

Management

A full time ***National Project Director*** will manage the day to day implementation of the project. The NPD will work for 48 months and will receive \$ 57,600 in remuneration. A secretary and an accountant (96 months - \$19,200) will assist the NPD in his work. As described above these costs are allocated to Objectives 3-5. However, the National Project Director will direct and serve all GEF and UNDP funded objectives.

SECTION F

F. RISKS

Energy efficiency projects face a number of risks. In general, supply side efficiency projects face fewer risks and are more easily implemented than demand side projects. This is because supply side projects usually are carried out within a single organizational entity such as national electric utility, whereas demand side projects usually require the voluntary action of many end users to achieve their results. Where voluntary actions are not possible, regulatory actions may be required, which are often difficult to implement.

This UNDP/GEF project faces both supply side and demand side risks. These will be discussed separately below. However, in addition to these specific risks, there exist risks with the overall project itself. The most critical of these risks are:

Lack of government support - This project will not achieve the results predicted unless the Government of Syria, and specifically the Ministry of Electricity, fully support both the goals of the project as well as the day-to-day implementation and administration of the project. The risk of lack of government support appears very low at this time given the strong support the project development has received to date from the MOE and particularly the Deputy Minister of Electricity. In addition, all of the government officials contacted during the development of this project document expressed strong support for the goals of the project and offered their full cooperation. This risk has been further mitigated in the design of the project through the creation of the Project Coordinating Committee with representation from the affected ministries and other relevant parties on the committee. Reducing the risk of lack of support has also been engineered into the design of each program within the overall project, by including key stakeholders at each level in the program design and implementation, thus hopefully engendering their full support.

Lack of coordination - The lack of overall coordination could result in key stakeholders not being informed of program plans and later slowing progress; mis-timing of critical events that need to be properly orchestrated, such as the high level launch of the National Energy Efficiency Program; and many other possibilities. This risk has been addressed both by the creation of the Project Coordinating Committee, as mentioned above, but also by the establishment of a Project Administrative Director. This person will be responsible for monitoring the progress of both the supply side and demand side programs to assure their coordination, and feeding information up to the Deputy Minister and Project Coordinating Committee for action.

Supply Side Project Risks

The key risks to the EMS/MMS project are:

Risks associated with Baniyas Plant rehabilitation - The UNDP/GEF EMS/MMS project is incremental to the rehabilitation of the Baniyas power plant. If this rehabilitation does not occur for any reason, the EMS/MMS project cannot be implemented. This risk is deemed very low as the government is fully committed to rehabilitating the plant and has set aside the funds to do so.

SECTION F

More probable risks are that the timing of the rehabilitation does not mesh with the UNDP/GEF project or that the two are insufficiently coordinated. With regard to the former, the timing of the two projects seems to be reasonably well matched, with the project beginning in mid 1998 and the Baniyas rehabilitation beginning in late 1999. Lack of coordination is more probable given the complexity of plant rehab. This risk will be mitigated through close contact with the Baniyas plant management, the prime contractor for plant rehab, the PEEGT staff and the UNDP/GEF consultants. Regular meetings should be held among representatives of these groups to assure coordination and avoid duplication of effort or equipment.

Need for PEEGT support - The supply side project calls for the creation of a central team to work with the Baniyas staff and the consultants to help implement the project and then to transfer this technology to other plants. This aspect of the project is important to the realization of the full benefits of the project, but is dependent upon the support of the PEEGT Technical Affairs branch for the creation of the three-person Efficiency and Performance Section (Central Team). Preliminary discussions with the PEEGT, however, indicate that there is strong support for the creation of this unit, thus this is deemed a low risk.

Demand Side Project Risks

The demand side project risks are perhaps more numerous than those on the supply side, but these risks have been experienced by many energy efficiency efforts around the world and thus are known, can be anticipated and dealt with. The most critical of these risks in this project are:

Insufficient access to public sector industries and data - Syria's unique geopolitical situation necessitates a high degree of concern over security. Some of this concern may extend to energy use and production information in public sector industrial facilities. If this data is not available to SESC engineers, they will be unable to provide detailed advice and feasibility studies to improve plant efficiency. This risk has been mitigated through the design of the Quick Savings Program (QSP) as the first service program of the Center. The QSP is a brief, non-intrusive program that will achieve immediate savings and give a chance for the plant staff and managers to become familiar with this new service capability. The QSP is designed to build confidence and trust within the plant staff and management that the SESC is dedicated to helping them improve their plant efficiency and has no other purpose. Reluctance to provide information may be further mitigated by President Al-Assad, or other high level official, when the NEEP is officially launched in the first year. This launch will include public policy statements regarding the need for Syria to assure its security and economic growth by using its energy resources efficiently and wisely. It may also include mandatory requirements for public sector industrial plants and facilities over a certain size to have energy audits conducted by the SESC, thus making the provision of the necessary plant data a public regulation.

Paucity of qualified local engineers - The project anticipates the SESC contracting out to local engineers to implement many of the efficiency services, once the SESC staff are fully trained in that service themselves. However, there may be an insufficient number of qualified engineers to

SECTION F

supply all the positions envisioned in the project plan. This risk has been mitigated, first, by checking that, in fact, skilled consulting engineers are available locally. A limited number of qualified independent engineers exist in Damascus and others cities where the project envisions work. Second, the local engineers will be invited to participate in the various training programs so that they can gain the necessary skills needed to provide the services. Third, engineers from government owned industries will be seconded to be trained in energy audits and the specialized services to be offered by the SESC. When these engineers return to their plants, these should also be an important asset in assisting their plant improve its own energy efficiency.

Inability to gain Presidential endorsement for the SESC and NEEP - It is important to the success of the project that there be a reasonably high level of public awareness and support. This can be achieved most cost effectively if the highest levels of Government endorsement and support is achieved for the effort. The higher the level of the public figure endorsing the effort, the more successful the program will be. For example, if the officials or legislators involved are willing to take a strong stand on the importance of conserving the country's resources to the extent that they is willing to issue certain mandatory policies, such as mandatory energy audits of industry, or the adoption of efficiency standards, then the program will move ahead swiftly. Even official endorsement without mandatory measures will help considerably in gaining acceptance of the programs from industry and the Syrian people.. The possibility that there would be no high level endorsement is viewed as extremely low given the level of interest already expressed in this program.

Lack of attractive financing - The ability to finance the projects that are identified by the SESC is critical to achieving the energy savings and emissions reduction goals of the project. The risk of lack of financing has been addressed through discussions with the Ministry of Economy whereby a special line of credit has been agreed to for projects certified as technically and economically feasible by the SESC. There is some additional risk that although the financing is available, the terms are not sufficiently attractive to get the industries to borrow to finance their efficiency projects. This risk can be mitigated by only bringing to financing those projects with a short payback period, say, under two years (i.e., a 50% simple return on investment). If even this proves difficult, it may be necessary to negotiate more attractive terms with the Ministry of Economy.

Reluctance to adopt energy efficiency policies - The adoption of energy efficiency policies will involve change, even if the result is positive for all concerned, and many people are reluctant to change their ways of doing things. For example, even though the government could save much money and energy by adopting life cycle costing techniques in government procurement, governments the world over have been slow to change their procurement policies to this new method. Similarly, many governments have been slow to adopt energy efficiency as part of their basic specifications in procurement. These are relatively simple measures. The adoption of energy efficiency standards for appliances and equipment will meet even more resistance. These risks have been anticipated by designing within the SESC the policy analysis capability to quantify the benefits to the country resulting from these measures in order to obtain support for

SECTION F

their implementation at the highest levels necessary. In addition, the public awareness campaign, hopefully with Presidential endorsement, the information dissemination and hotline, and the DSM assessment and program design are all included to help can public support for the efficiency programs and services and thereby reduce political resistance to the adoption of energy efficiency policies. Nonetheless, this risk cannot be reduced to zero, and the government may wish to promulgate those policies which have the greatest public support before tackling the more difficult ones.

SECTION G

G. PRIOR OBLIGATIONS AND PREREQUISITES

The prior obligations of the Government of the Syrian Arab Republic to the project are as follows:

- Agreement to create a Syrian Energy Service Center and to provide office space, furniture and 15 professional staff persons for the SESC, including a full-time qualified General Director of the Center
- Agreement that the SESC will be an independent unit within the Ministry of Electricity, with a General Director reporting directly to the Minister, through the Deputy Minister
- Agreement to establish a line of credit at banks for financing energy efficiency projects that are certified as to their technical and economic feasibility by the SESC
- Agreement that the public industries will second qualified engineers to the SESC to be trained in energy efficiency and carry out energy audits and other energy efficiency services on behalf of the SESC
- Agreement to rehabilitate Baniyas Power Station units 1 and 2 beginning in the year 2000 and to install an EMS and MMS system in the plant as a part of this rehabilitation

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

Prerequisites of the project are listed as follows:

- Availability of the space, furniture and staff for the SESC, and designation of a General Director
- Designation of the head of the Efficiency and Performance section within the Power Generation Directorate in PEEGT.
- Two Separate bank accounts (one is LS and one is US\$) are provided for the receipt and disbursement of funds.

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

SECTION H

H. PROJECT REVIEW, REPORTING, AND EVALUATION

Project Monitoring

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

Tripartite Reviews

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

Mid-term Review

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

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

Reporting

The National Project Director will prepare and submit to the UNDP Country Office for examination three months prior to each TPR meeting, a Project Performance Evaluation Report (PPER). Additional Annual Project Reports (APRs) may be requested during the project. All reports will be produced in the English language and will be translated to Arabic upon the request of the Government of Syria.

SECTION I

I. LEGAL CONTEXT

This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of the Syrian Arab Republic and UNDP. For the purposes of this agreement, the host country implementing agency will be the Government cooperating agency mentioned in the agreement.

The following amendments may be made to the original Project Document, even if they are signed only by the UNDP Resident Representative, provided the latter is assumed that all other signatories of the Project Document have no objections to the amendments:

- Revisions in, or additions to, any of the Annexes of the Project Document.
- Revisions which do not result in a major changes in the project's immediate objectives or outputs, and which are attributable to a reordering of the activities or inputs in order to improve the realization of the objectives or the outputs.
- Necessary yearly revisions are made to reorganize the provision of already scheduled inputs, to reflect an increase in the cost of expert services or other services due to inflation.

SECTION J

J. BUDGET

20 SUBCONTRACTS

GEF PROJECT BUDGET: OBJECTIVE 2, UNDP INPUTS: \$685,000

5-1

STP/96/G31/A/1G/99

PROJECT NUMBER:

PROJECT TITLE:

SOURCE OF FUNDS:

EXECUTING AGENT:

Syria: Supply-Side Efficiency and Energy Conversion, Objective 2:

UNDP/TRAC and UNDP/EAP

Government of Syria: Ministry of Electricity

BUDGET LINE DESCRIPTION LINE	PROJECT TOTAL	YEAR 1	YEAR 2	YEAR 3	YEAR 4
	Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST
10 PROJECT PERSONNEL					
21 Advertising	8.0	2.0	2.0	2.0	2.0
22 Consumer Research	6.0	1.5	1.5	1.5	1.5
29 Component total	14	3.5	4	4	4
30 TRAINING					
33.00 In-Service Training	9,000	2,250	2,250	2,250	2,250
33.10 Study tours	0	0	0	0	0
39 Component total	9,000	2,250	2,250	2,250	2,250
40 EQUIPMENT & SUPPLIES					
45 Local Procur: Supplies, Computers, Vehicles	0	0	0	0	0
45.99 Subtotal	0	0	0	0	0
46 International procurement	20,000	5,000	5,000	5,000	5,000
46.01 End-Use Metering Equipment	10,000	2,500	2,500	2,500	2,500
46.02 DSM Software	124,854	124,854	0	0	0
46.03 DSM Audit Instrumentation Equipment	154,854	132,354	7,500	7,500	7,500
46.99 Subtotal	154,854	132,354	7,500	7,500	7,500
49 Component total	154,854	132,354	7,500	7,500	7,500
50 MISCELLANEOUS					
54 Other	5,000	1,250	1,250	1,250	1,250
54.01 Hotline Expenses	2,734	684	684	684	684
54.02 Communications	30,000	7,500	7,500	7,500	7,500
54.03 promotional material	19,000	4,750	4,750	4,750	4,750
55.04 Publicity	56,734	14,184	14,184	14,184	14,184
54.99 Subtotal	56,734	14,184	14,184	14,184	14,184

UNDP Funded

J-1 GEF PROJECT BUDGET: OBJECTIVE 2, UNDP INPUTS: \$685,000

SYR/96/G31/A/1G/99

PROJECT NUMBER:
PROJECT TITLE:
SOURCE OF FUNDS:
EXECUTING AGENT:

Syria: Supply-Side Efficiency and Energy Conversion, Objective 2:
UNDP/TRAC and UNDP/EAP
Government of Syria: Ministry of Electricity

BUDGET LINE DESCRIPTION
LINE

BUDGET LINE DESCRIPTION LINE	PROJECT TOTAL		YEAR 1		YEAR 2		YEAR 3		YEAR 4	
	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST
10 PROJECT PERSONNEL										
59 Component total		56,734		14,184		14,184		14,184		14,184
90.00 PROJECT SUBTOTAL	44	652,522	10	234,655	12	163,238	13	173,955	9	80,674
93.00 UN DESA Support Service Cost		32,478		4,649		11,443		12,543		3,843
99 Grand Total	48	685,000		239,304		174,682		186,498		84,517
999 UNDP/OPEC Input		685,000								
Net Surplus/(Shortage)		0								

<A> To be made up by in-kind contributions of the GOS Ministry of Planning

 Not including travel specifically associated with international or national consultants.

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SYR/96/G31/A/1G/99

Syria: Supply-Side Efficiency and Energy Conversion, Objective 2:
UNDP/TRAC and UNDP/EAP
Government of Syria: Ministry of Electricity

Government of Syria: Ministry of Electricity

[illegible]



SYR/96/G31/A/1G/99
 Syria: Supply-Side Efficiency and Energy Conversion, Objective 2:
 UNDP/TRAC and UNDP/EAP
 Government of Syria: Ministry of Electricity

BUDGET LINE DESCRIPTION LINE		PROJECT TOTAL	YEAR 1	YEAR 2	YEAR 3	YEAR 4
		Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST
10 PROJECT PERSONNEL		-	-	-	-	-
17.99 Subtotal		16 373,134	3 71,588	5 124,185	6 135,181	2 42,180
19 Component total						
20 SUBCONTRACTS						
21 Advertising						
22 Consumer Research						
29 Component total						
30 TRAINING						
33.00 In-Service Training						
33.10 Study Tours						
39 Component total						
40 EQUIPMENT & SUPPLIES						
45 Local Procur: Supplies, Computers, Vehicles						
45.99 Subtotal						
46 International procurement						
46.01 End-Use Metering Equipment						
46.02 DSM Software						
46.02 DSM Pilot Program Auditing Equipment		99,388	124,854			
46.99 Subtotal						
49 Component total		99,388	124,854			
50 MISCELLANEOUS						

GEF PROJECT BUDGET: OBJECTIVE 2, UNDP/TRAC INPUTS: \$505,000

PROJECT NUMBER : STR/96/G31/A/1G/99
 PROJECT TITLE : Syria: Supply-Side Efficiency and Energy Conversion, Objective 2:
 SOURCE OF FUNDS: UNDP/TRAC and UNDP/EAP
 EXECUTING AGENT: Government of Syria: Ministry of Electricity

JDGET LINE DESCRIPTION LINE	PROJECT TOTAL		YEAR 1		YEAR 2		YEAR 3		YEAR 4	
	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST
10 PROJECT PERSONNEL										
54 Other										
54.01 Hotline Expenses										
54.02 Communications										
54.03 promotional material										
55.04 Publicity										
54.99 Subtotal										
59 Component total										
90.00 PROJECT SUBTOTAL	16	472,522	3	196,442	5	124,185	6	135,181	2	42,180
93.00 UN DESA Support Service Cost		32,478		4,649		11,443		12,543		3,843
99 Grand Total	48	505,000		201,090		135,628		147,724		46,023
999 UNDP/OPEC Input		505,000								
Net Surplus/(Shortage)		0								

<A> To be made up by in-kind contributions of the GOS Ministry of Planning
 Not including travel specifically associated with international or national consultants.

b) GEF PROJECT BUDGET: OBJECTIVE 2, UNDP/EAP INPUTS: \$180,000

PROJECT NUMBER: SYR/96/G31/A/1G/99
 PROJECT TITLE: Syria: Supply-Side Efficiency and Energy Conversion, Objective 2:
 SOURCE OF FUNDS: UNDP/TRAC and UNDP/EAP
 EXECUTING AGENT: Government of Syria: Ministry of Electricity

Judget Line Description Line	PROJECT TOTAL	YEAR 1		YEAR 2		YEAR 3		YEAR 4	
		Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST
10 PROJECT PERSONNEL									
11 International personnel									
11.51 Document Preparation Specialist	-	0	-	0	0	-	0	-	0
11.52 International Resource Planning	-	0	-	0	0	-	0	-	0
11.53 International Focus Group Expert	-	0	-	0	0	-	0	-	0
11.54 Int'l Energy Effic. Eng. Expert	-	0	-	0	0	-	0	-	0
11.55 International A/C Standards Expert	-	0	-	0	0	-	0	-	0
11.56 International EE Policy Expert	-	0	-	0	0	-	0	-	0
11.99 Subtotal International Consultants (UN DESA Executed)	-	0	-	0	0	-	0	-	0
13 Administrative Support									
13.01 Executive Assistant	<A>	-	0	0	0	0	0	0	0
13.02 Administrative Support	<A>	0	0	0	0	0	0	0	0
13.99 Subtotal	-	0	-	0	0	-	0	-	0
15.00 Travel									
15.01 Travel Cost (local)	0	1,750	-	175	0	700	0	525	0
15.02 Per Diem (local)	-	1,050	-	105	0	420	0	315	0
15.99 Subtotal	-	2,800	-	280	1,120	840	560	210	210
16 Mission costs									
16.01 GEF/RBAS Tripartite Review Cost	0	0	-	0	0	0	0	0	0
16.02 Mid-term Evaluation	0	0	-	0	0.0	0	0	0	0
16.99 Subtotal	0	0	-	0	0.0	0	0	0	0
17 National Professional Staff									
17.01 National Staff: Not Applicable									
17.50 National Consultants:									
17.51 Data Research Specialist	<A>								
	14.0	28,000	3.5	7,000	3.5	7,000	3.5	7,000	7,000

BYR/96/G31/A/1G/99

PROJECT NUMBER :
PROJECT TITLE :
SOURCE OF FUNDS :
EXECUTING AGENT :

SYRIA: Supply-Side Efficiency and Energy Conversion, Objective 2:
UNDP/TRAC and UNDP/EAP
Government of Syria: Ministry of Electricity

[illegible]

b) GEF PROJECT BUDGET: OBJECTIVE 2, UNDP/EAP INPUTS: \$180,000

PROJECT NUMBER :
PROJECT TITLE :
SOURCE OF FUNDS :
EXECUTING AGENT :

SYR/96/G31/A/1G/99
Syria: Supply-Side Efficiency and Energy Conversion, Objective 2:
UNDP/TRAC and UNDP/EAP
Government of Syria: Ministry of Electricity

BUDGET LINE DESCRIPTION
LINE

BUDGET LINE DESCRIPTION LINE	PROJECT TOTAL		YEAR 1		YEAR 2		YEAR 3		YEAR 4	
	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST
10 PROJECT PERSONNEL										
54 Other										
54.01 Hotline Expenses		5,000	-	1,250	0	1,250	0	1,250	0	1,250
54.02 Communications		2,734	-	684	0	684	0	684	0	684
54.03 promotional material		30,000	-	7,500	0	7,500	0	7,500	0	7,500
55.04 Publicity		19,000	-	4,750	0	4,750	0	4,750	0	4,750
54.99 Subtotal		56,734		14,184		14,184		14,184		14,184
59 Component total		56,734		14,184		14,184		14,184		14,184
90.00 PROJECT SUBTOTAL	28	180,000	7	38,214	7	39,054	7	38,774	7	38,494
93.00 UN DESA Support Service Cost		0		0		0		0		0
99 Grand Total	48	180,000		38,214		39,054		38,774		38,494
999 UNDP/OPEC Input		180,000								
Net Surplus/(Shortage)		0								

<A> To be made up by in-kind contributions of the GOS Ministry of Planning

 Not including travel specifically associated with international or national consultants.

GEF PROJECT BUDGET: OBJECTIVES 1 AND 3-5, GEF INPUTS: \$4,070,000

PROJECT NUMBER : SYR/96/G31/A/1/G/99
 PROJECT TITLE : Syria: Supply-Side Efficiency and Energy Conversion, Objective 1 and 3-5
 SOURCE OF FUNDS : UNDP/GEF
 EXECUTING AGENT : Government of Syria: Ministry of Electricity

BUDGET LINE DESCRIPTION LINE	PROJECT TOTAL (1998-2001)		YEAR 1 1998		YEAR 2 1999		YEAR 3 2000		YEAR 4 2001	
	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST
10 Project Personnel										
11 International personnel										
Demand Side										
11.51 Lead International Consultant	3.5	118,720	1.0	33,920	1.0	33,920	1.0	33,920	0.5	16,960
11.52 Int'l Industrial Energy Effic. & Audits	5.0	106,750	2.0	42,700	1.5	32,025	1.0	21,350	0.5	10,675
11.53 International Project Finance	1.0	21,350	-	0	1.0	21,350	-	0	-	0
11.54 Int'l Energy Effic. Eng. Expert	4.0	85,400	2.0	42,700	1.6	34,160	0.4	8,540	-	0
11.55 International Training	7.0	149,450	2.8	59,780	2.1	44,835	1.4	29,890	0.7	14,945
11.56 Int'l ESCO/Energy Services Bus. Plan	1.5	32,025	0.4	8,006	0.4	8,006	0.4	8,006	0.4	8,006
Subtotal Demand-Side (DESA Execution)	22.0	513,695	8.2	187,106	7.6	174,296	4.2	101,706	2.1	50,586
Supply Side										
11.57 Int'l Reliability & Maintenance Expert	7.0	121,450	-	0	-	0	4.7	80,967	2.3	40,483
11.58 Int'l Performance & Monitoring Expert	8.0	138,800	-	0	-	0	5.3	92,533	2.7	46,267
11.59 Training Consultant	3.0	52,050	-	0	-	0	2.0	34,700	1.0	17,350
11.60 Training Consultant, Test Equipment	4.0	93,400	-	0	-	0	2.7	62,267	1.3	31,133
11.61 Project Preparation, Supply Side	1.0	18,960	-	0	-	0	0.7	12,640	0.3	6,320
Subtotal Demand-Side (DESA Execution)	23.0	424,660	-	0	-	0	15.3	283,107	7.7	141,553
Subtotal International Consultants	45.0	938,355	8.2	187,106	7.6	174,296	19.5	384,813	9.7	192,140
Regional Consultants										
11.62 Boiler Efficiency Expert	6.5	50,375	6.5	50,375	-	0	-	0	-	0
11.63 Steam System Expert	6.5	50,375	4.6	35,263	2.0	15,113	-	0	-	0
11.64 Motor Efficiency Expert	14.0	108,500	7.0	54,250	4.2	32,550	2.8	21,700	-	0
Subtotal Demand-Side	27.0	209,250	18.1	139,888	6.2	47,663	2.8	21,700	-	0
Supply Side: No Regional										
Subtotal Regional Consultants	27.0	209,250	18.1	139,888	6.2	47,663	2.8	21,700	-	0
11.99 Total International, Regional Consultants	72.0	1,147,605	26.2	326,994	13.7	221,959	22.3	406,513	9.7	192,140
13 Administrative Support										
13.01 Secretary to Administrative Project Director	48.00	9,600	4.5	908	4.5	908	12	3,892	12	3,892
13.51 Accountant	48.00	9,600	4.5	908	4.5	908	12	3,892	12	3,892
13.99 Subtotal	96.0	19,200	9.1	1,815	9.1	1,815	24.0	7,785	24.0	7,785
15.00 Travel										
15.01 Travel Cost, Demand Side		6,300		1,575		1,575		1,575		1,575
15.02 Travel Cost, Supply Side		2,000		0		0		1,000		1,000
15.03 Per Diem, Demand Side		6,050		1,513		1,513		1,513		1,513
15.04 Per Diem, Supply Side		2,000		0		0		1,000		1,000
15.99 Subtotal Travel		16,350		3,088		3,088		5,088		5,088

GEF Funded

SEE PROJECT BUDGET: OBJECTIVES 1 AND 3-5, GEF INPUTS: \$4,070,000

SVR/06/G31/A/1/G/99
 Syria: Supply-Side Efficiency and Energy Conversion, Objective 1 and 3-5
 UNDP/GEF
 Government of Syria: Ministry of Electricity

BUDGET LINE DESCRIPTION LINE	PROJECT TOTAL (1998-2001) Wk Mos. \$ COST		YEAR 1 1998 Wk Mos. \$ COST		YEAR 2 1999 Wk Mos. \$ COST		YEAR 3 2000 Wk Mos. \$ COST		YEAR 4 2001 Wk Mos. \$ COST	
	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST	Wk Mos.	\$ COST
16 Mission costs										
16.01 GEF/RBAS Tripartite Review Cost		20,000		1,891		1,891		14,328		1,891
16.02 Mid-term Evaluation		10,000		0		1,891		5,000		3,109
16.99 Subtotal		30,000		1,891		3,782		19,328		5,000
17 National Professional Staff										
17.01 National Staff: Supply Side Only										
17.01 National Project Director	<A>	57,600	-	0	-	0	24.0	28,800	24.0	28,800
17.51 Utility Trainer	25	30,000	-	0	-	0	12.5	15,000	12.5	15,000
National Consultants: Demand Side Only										
17.52 Engineer/Audit Contractors, QSP Program	96	99,093	48.0	49,546	38.4	39,637	9.6	9,909	-	0
17.53 Engineer/Audit Contractors, IEP Program	48	49,546	19.2	19,819	19.2	19,819	9.6	9,909	-	0
17.54 Eng/Audit Contractors, Boiler/Furnace Eff.	48	49,546	9.6	9,909	19.2	19,819	14.4	14,864	4.8	4,955
17.55 Engineer/Audit Contractors, Steam Syst.	48	49,546	4.8	4,955	19.2	19,819	9.6	9,909	14.4	14,864
17.56 Engineer/Audit Contractors, Motors	24	24,773	-	0	9.6	9,909	7.2	7,432	7.2	7,432
17.57 Engineer/Audit Contractors, Power Factors	48	49,546	-	0	19.2	19,819	19.2	19,819	9.6	9,909
Subtotal Consultants, Demand Side	312	322,051	81.6	84,229	124.8	128,821	69.6	71,842	36.0	37,160
17.99 Subtotal National Staff & Consultants	385	409,651	82	84,229	125	128,821	106	115,642	73	80,960
19 Component total	553	1,622,806	117	418,016	148	359,463	152	554,355	106	290,972
20.00 SUBCONTRACTS										
21 Advertising Firm	4.0	8,000	1.0	2,000	1.0	2,000	1.0	2,000	1.0	2,000
22 Consumer Research Firm	4.0	8,000	1.0	2,000	1.0	2,000	1.0	2,000	1.0	2,000
29 Component total	8.0	16,000	2.0	4,000	2	4,000	2	4,000	2	4,000
30.00 TRAINING										
32.01 Group Training, Supply Side		50,000		0		0		25,000		25,000
32.01 Group Training, Demand Side		2,450		980		980		490		0
32.03 In Service Training, Supply Side		30,000		0		0		15,000		15,000
33.04 In Service Training, Demand Side		23,682		9,477		9,477		4,738		0
33.11 Study Tours, Objective 1		250,000		62,500		62,500		62,500		62,500
33.12 Study Tours, Objective 5		250,000		0		0		125,000		125,000
39 TRAINING SUBTOTAL		606,142		72,957		72,957		232,728		227,500

40.00 EQUIPMENT & SUPPLIES (Details in Section E)

40 00 EQUIPMENT & SUPPLIES (Details in Section E)

GEF Funded

J-2 GEF PROJECT BUDGET: OBJECTIVES 1 AND 3-5, GEF INPUTS: \$4,070,000

PROJECT NUMBER : SYR/96/G31/A/1G/99
 PROJECT TITLE : Syria: Supply-Side Efficiency and Energy Conversion, Objective 1 and 3-5
 SOURCE OF FUNDS : UNDP/GEF
 EXECUTING AGENT : Government of Syria: Ministry of Electricity

BUDGET LINE DESCRIPTION LINE	YEAR 1 1998		YEAR 2 1999		YEAR 3 2000		YEAR 4 2001	
	PROJECT TOTAL (1998-2001) Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST	Wk Mos. \$ COST
45 Local Procurement: Demand-Side								
45.01 Computers, printers, etc.	6,000	4,200	1,800	0	0	0	0	0
45.02 Vehicles	70,000	70,000	0	0	0	0	0	0
45.99 Subtotal, Local Procurement	76,000	74,200	1,800	0	0	0	0	0
46 International procurement								
46.01 Audit Equipment, Demand Side	160,910	112,637	48,273	0	0	0	0	0
International procure: Supply Side								
46.02 MMS System	395,000	0	0	0	355,500	39,500	0	0
46.03 EMS System	522,000	0	0	0	469,800	52,200	0	0
46.04 Performance & Test Team Equipment	361,592	0	0	0	325,433	36,159	0	0
Subtotal Int'l Procure: Supply	1,278,592	0	0	0	1,150,733	127,859	0	0
46.99 Subtotal	1,439,502	112,637	48,273	0	1,150,733	127,859	0	0
49 EQUIPMENT & SUPPLIES SUBTOTAL	1,515,502	186,837	50,073	0	1,150,733	127,859	0	0
50 MISCELLANEOUS								
51.01 Operation and Maintenance of vehicles	3,634	344	344	1,473	1,473	1,473	1,473	1,473
51.02 Communications, Demand Side	3,600	900	900	900	900	900	900	900
51.03 Incentive Program Funds, Supply Side	100,000	0	0	0	50,000	50,000	50,000	50,000
51.04 Printing, Demand Side	20,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
51.99 Subtotal	127,234	6,244	6,244	6,244	57,373	57,373	57,373	57,373
54.01 Project Support Service Cost	88,480	15,028	9,553	48,431	48,431	15,467	15,467	15,467
59 MISCELLANEOUS SUBTOTAL	127,234	21,272	15,797	105,805	105,805	72,840	72,840	72,840
90.00 GEF SUBTOTAL	3,887,684	703,082	502,290	2,047,621	2,047,621	723,171	723,171	723,171
93.00 UN DESA Support Service Cost	93,836	18,711	17,430	38,481	38,481	19,214	19,214	19,214
99 Total with UNDESA Support Costs	4,070,000	721,792	519,720	2,086,103	2,086,103	742,385	742,385	742,385
999 GEF Input	4,070,000							
Net Surplus/ (Shortage)	0							

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

 Not including travel specifically associated with international or national consultants.