BULGARIA

Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions

Project Proposal

Project Title	Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria
GEF Focal Area	Climate Change
Country Eligibility	FCCC ratified on March 16, 1995 Eligible under para 9 (b) of GEF Instrument
Total Project Cost	US$ 8,575,000
GEF Financing	US$ 2,575,000
Government Financing	US$ 3,011,000
Cofinancing	
Parallel Financing	US$ 900,000 from USAID; US$ 7,000 from PHARE;
Associated Project	PHARE 93 Programme for Conventional Energy
GEF Implementing Agency	UNDP
Executing Agency	Ministry of Environment/ Bulgarian Foundation for Energy Efficiency EnEffect
Estimated Starting Date	January 1997
Project Duration	5 years
GEF Preparation Costs	US$ 20,500

1. Background

Bulgaria is a country in transition from a controlled economy to a free market economy. This situation is creating unique and important opportunities for increased energy efficiency. By seizing these opportunities, Bulgaria will accelerate its recovery from its current economic recession and significantly decrease its future emissions of greenhouse gases (GHGs). This proposal will provide critical support for achieving these goals.

Bulgaria's gross consumption of primary energy was 976,628 terajoules in 1993. More than half of this energy was imported, creating a strong national interest in increased energy efficiency to reduce this outflow in capital, as almost all petroleum, natural gas and half the coal consumed are imported. The only significant domestic fossil fuel resource is coal, primarily a low-grade, high CO_2 lignite in the Maritza region. Other large energy sources are nuclear power, which provides about 37% of Bulgaria's electric power, and hydro-power,

which provides about 5%. For historical reasons, a large portion of Bulgarian's energy infrastructure, including major portions of its nuclear facilities, are aged and in need of major renovation or replacement.

Industry is the primary end-user of energy, consuming 47% of the nation's energy in 1993. Other end uses are residential, 34%; transportation, 8%; service, 7%; and agriculture, 4%. Industry's share has declined in recent years--from 55% in 1990. Meanwhile the residential sector's share has increased--from 23% in 1990.

Because of this aged energy infrastructure , the energy intensity of Bulgaria is more than twice as high as the average for the European Union: in 1991, Bulgarian energy intensity was 646 million tonnes of oil equivalent per million ECU, compared with 311 MTOE/MECU for the European Union. In recent years, Bulgaria has taken actions to create an environment that encourages energy efficiency, including measures to reduce and eliminate energy subsidies. To address this issue, Bulgaria has reached an agreement with the World Bank to increase the price of electricity in three steps to reach 3.5 cents (U.S. $) by September 1996. The first step was taken in September 1995, the second step was taken in April 1996, and the next step will be taken in August, 1996.

In the field of energy efficiency, MOE is coordinating its activities with the Committee on Energy (COE), the Ministry of Industry, and the Ministry of Territorial Development and Construction. The COE is the ministerial-level body responsible for Bulgaria's energy policies. On the legislative front, a fund for energy efficiency was established at the COE. In 1993, the COE issued, and later updated, an energy charter, which embeds energy efficiency into the basic energy policy of the country. Administrative actions have established national energy efficiency standards and norms that are applicable to new buildings. Under the COE, a network of energy efficiency inspection offices has been established in each of Bulgaria's nine regions. Draft legislation strengthening energy efficiency and supply programs is now pending before the National Assembly. A comprehensive energy strategy, which emphasizes energy efficiency, was submitted by the Council of Ministers to the National Assembly and is under discussion. A new sub-commission, specified for energy efficiency, was established within the organizational structure of the National Assembly.

Bulgaria also has actively pursued international support to achieve its energy and environmental goals. Bulgaria also has received important support from the PHARE, THERMIE, JOULE II, and SAVE programs, the U.S. AID programs, the Netherlands's Novem program, JICA (from Japan), ADEME (France), UN-ECE, UNDP, and other foreign and international programs.

2. Context

The UN/FCCC was signed at the Rio Summit in 1992, and was ratified on 16 March 1995 by the Bulgarian National Assembly. The Ministry of the Environment (MOE) is responsible for developing, coordinating and implementing Bulgaria's obligations under the UN/FCCC. The first National Communication, required by the UN/FCCC, has been officially introduced by the Bulgarian Government in February, 1996. The Demonstration Zone project is included in Part 4 of the National Communication as one of the important measures for GHG emissions reduction. The Bulgarian Government has embraced energy efficiency, not only for its economic benefits, but also as a primary strategy for reducing its future GHG emissions and meeting its obligations under the United Nation's Framework Convention on Climate Change

(UN/FCCC). In 1988, the country's base year under the UN/FCCC, fully 86% of its GHG emissions came from CO2 emissions largely from energy sources. Bulgaria received support from the U.S. Country Studies Program, which is assisting Bulgaria in studies required by the UN/FCCC. The studies of GHG emissions, vulnerability and adaptation to climate change, and mitigation of GHG emissions are being used to develop the Action Plan required by the UN/FCCC and in the design of energy efficiency strategies contained in this proposal.

Achieving these energy and environmental goals will require a basic institutional and behavioral transformation because of the under-valuing of energy resources in the past. To help achieve this change, this proposal concentrates its efforts on one municipality, the City of Gabrovo, making it a laboratory for energy efficiency measures and transferring the lessons learned there rapidly throughout the country. With a population of 77,000, Gabrovo is typical of the medium-sized cities found throughout Bulgaria. Gabrovo is both a city and the administrative center of a municipality, the term used for the surrounding area. Bulgaria is divided into 254 municipalities, which are the principal political authorities below the national government. This city has been selected because of the demonstrated commitment of its leaders to energy efficiency, because of its representative nature, and because of the key role--based on their administrative and financial authority--that municipalities can play as agents of change.

3. Program Objectives

The objective of Bulgaria's Demonstration Zone (DZ) proposal is to overcome barriers to increased energy efficiency and to the associated reductions in GHG emissions. The major barriers include:

- Limited experience in incorporating energy efficiency considerations into private and public decision-making;
- Little experience in developing and implementing energy efficiency programs;
- Uncertainty regarding the energy- and economic-savings that can be expected from different energy products and programs;
- An undeveloped infrastructure, including the institutions and individuals needed to deliver the technical, managerial, and financial services required by an energy-efficient society.

The objective is to eliminate these barriers through focused, practical subprojects that show how the barriers can be overcome. The objective is national in scope, because the barriers are national. The national government and national enterprises, institutions and non-governmental organisations are partners in the project. Because of financial and human resource limitations, the demonstrations themselves are local in nature. However, the national partners are committed to the rapid dissemination of the lessons learned throughout the country.

4. Project Description

The project is organised into three elements: 1) National Capacity Building, 2) Supporting Demonstrations, and 3) Project Management. *(See Figure 1)*

The Capacity Building activities are the heart of the project. All other activities are designed to strengthen them. The first Capacity Building activity focuses on municipalities as the critical political and socio-economic unit for bringing about change in Bulgaria. The role of Gabrovo is to serve as a test case for designing and realising a national program. The second activity addresses the pervasive need for training and education. The third activity - and in

many ways the most essential - examines the financing challenge, including a review of the resources available and what Bulgaria and municipalities must do to attract these resources.

The Supporting Demonstrations are designed to support these National Capacity Building activities by providing real, hands-on experience so that energy-saving, cost-saving, and GHG-reducing projects are not just theoretical ideas, but are shown to be actually achievable. The demonstrations are designed to be implemented, and evaluated in a very public manner, giving high visibility to the results achieved. The demonstrations will be "win-win" examples that show the benefits of the Capacity Building changes.

The Project Management activity also is designed to achieve this national Capacity Building goal. At the outset, the Management plan provides for input from experienced, international energy efficiency managers. The plan also gives a high priority to training in-country energy managers who can take over the direction of this project and, in the future, lead a growing number of energy efficiency projects that are inspired by this pioneering effort.

NATIONAL CAPACITY BUILDING ACTIVITIES

Subproject 1. USING MUNICIPALITIES TO DISSEMINATE ENERGY EFFICIENCY

(Total cost US$ 1,230,000; requested GEF funding US$ 413,000)

Objectives

- To develop and implement a municipal network to disseminate information on energy efficiency at the municipal level;
- To create an Energy and Environment Office (EEO) within Municipal Administration to develop and implement programs for energy efficiency and environmental protection;
- To coordinate the activities at the EEOs with national, regional, and network activities;
- To transfer the experiences gained from the energy efficiency demonstration projects in Gabrovo to municipalities throughout Bulgaria.

Description

A municipal energy network will be built with the purpose to disseminate information on energy efficiency at the municipal level. The network will serve as the focal point for municipal networking throughout Bulgaria, through newsletters, email and conferences/workshops. The 10 municipalities with which US AID is currently working (include. Gabrovo) will be the first members of the Network. The Network will be expanded to 20 additional municipalities by the end of the fifth year. Although project activities will be focused in Gabrovo, the Network will serve as the vehicle for disseminating project results to other municipalities to stimulate similar activities there.

The focal point of the Network will be the Demonstration Zone Support Office (DZSO) which will be established and located administratively within EnEffect in Sofia. The DZ Support Office will transmit the experience obtained in Gabrovo to the national government. It will coordinate the Network activities with the nine new regional energy centres, under the direction of the COE, and with the PHARE program that is supporting the development of

energy programs in two of the new regional centres: Lovech (which includes Gabrovo) and Haskovo.

The Demonstration Zone Support Office will support the creation of Energy and Environment Office (EEO) within the Municipal Administration initially in Gabrovo and then in the other municipalities of the Network. The EEOs will be mechanisms for developing and implementing model energy efficiency activities and will take the lead in municipal capacity building and dissemination activities; training and education activities *(See Subproject 2)*, and financing activities *(See Subproject 3)*. The EEOs will identify energy- and cost-saving opportunities in municipal operations. These activities will fill a gap in the existing national institutional network on energy efficiency and the environment.

The Gabrovo EEO, working with the Support Office and other municipalities, will prepare a model energy policy and model energy legislation for a Bulgarian municipality. The model policy and legislation will review the existing policy and legislation at both the municipal and national level that affect the realisation of energy efficient and environmental goals. The review will include an examination of the policies and legislation affecting municipalities in other countries. Based upon this review, a draft proposal for model policies and legislation will be prepared. The draft will include a description of the anticipated costs and benefits of the model proposals. The draft will be circulated for comment to other Bulgarian municipalities, to national organisations, and to those leading similar efforts in other countries. The comments will be used to prepare a revised document that will be used to encourage local energy efficiency reforms.

This project provides for institution building at the local and regional level, achieving common benefits from the development of CO_2 emission abatement programs. The local government in Gabrovo has already embraced energy efficiency as a strategic target and has appointed experts on energy efficiency and the environment in the municipal administration. This unique leadership for Bulgaria will be promoted and disseminated in other municipalities.

Transaction Barriers

- Gaps in municipal policies and legislation in the areas of energy efficiency and the mitigation of GHG emissions.
- Lack of capacity and institutional background in managing local and regional energy efficiency and environmental programs.
- Insufficiently developed network for coordination of energy efficiency and environmental experiences among municipalities.

Outcomes

- In the first year, a Support Office will be created in Sofia and an EEO in Gabrovo. Working together, they will develop the technical and institutional capability to design, obtain financing, implement, administer, and evaluate municipal programs.
- The expansion of EEOs to 10 municipalities by the end of the third year and to 20 additional municipalities by the end of the fifth year. The creation of a municipal energy network to disseminate information from the lessons learned in Gabrovo and to establish the prerequisites for initiating activities in new EEOs.
- The development of better technical and institutional capability within Bulgarian municipalities, supported by guidelines and training material, model statutes, and training

programs.

•. The creation of a workable network will tie together activities at the national, regional, and municipal levels.

Subproject 2. TRAINING AND EDUCATION

(Total cost: US$ 657,000; requested GEF funding US$ 327,000)

Objectives

•. To identify the training needs at the municipal level, including the needs of municipal employees, local architects and engineers, and industry and institutional energy managers.

•. To developing training materials to meet these education and training needs.

•. To conduct training programs using these materials, evaluate the results, and revise the programs to improve their effectiveness.

•. To develop and implement a program for advanced training to support development of private sector energy services and financing capabilities.

Description

The DZ Support Office will assess the training needs at the municipal level through discussions with the EEOs and through a review of local training activities in other Central and Eastern European (CEE) countries. A training program that addresses these needs will be developed. As examples, training programs will be developed on how to conduct energy audits to identify cost-effective energy retrofit measures, how to evaluate the energy savings and environmental benefits realized from retrofit projects, and in other planning, management, and finance areas. The Energy Performance Contracting Mechanism, stimulated under subproject 3, will be used in advanced training for ESCOs and general training for customers, financial institutions, NEK distribution branches, and municipalities to increase their understanding of performance contracting. After being tested and evaluated in Gabrovo, the training programs will be extended to other municipalities. *(related to subprojects 5, 6).*

The DZ Support Office also will develop a program to promote increased public awareness of energy efficiency and environmental subjects at the municipal level, including the promotion of public awareness of the DZ projects. The Support Office will inventory national and international information sources and provide the most useful materials to the Gabrovo and other EEOs. The activity will be carried out in cooperation with national and municipal education and library agencies. The material will include information on energy-saving products and practices, periodical exhibitions with awards and labels for "green" and energy efficient technologies, products and material produced in Bulgaria, information on national and international workshops, and reviews of top achievements in these fields. A newsletter will be used to exchange information and create enthusiasm among the growing network of municipal participants in energy efficiency programs.

Transaction Barriers

•. Lack of trained personnel to design, conduct, implement, and evaluate energy efficiency and environmental programs.

•. Lack of information and education about energy efficiency and environmental

programs, their benefits, and how they can be achieved.

Outcomes

- Qualified experts to perform energy audits on residential, public/commercial and industrial facilities and other energy-saving and environmental activities.
- Production of training programs and manuals on: energy management techniques, energy audits, low cost measures in residential, public/commercial and industrial sectors; design guidelines for new energy efficient residential and service buildings; and case studies from successful projects in Gabrovo, other Bulgarian municipalities, and from international experience *(related to the demonstration subprojects).*
- Improvement in public awareness, interest, and support for energy efficiency and environmental programs through exhibitions, conferences, seminars, and workshops.

Subproject 3. OVERCOMING FINANCIAL BARRIERS

(project cost US$423,000; requested GEF funding US$ 255,000)

Objectives

- Develop business infrastructure and market conditions for environmental and energy efficiency actions;
- Develop and examine in the demonstration subprojects cost recovery mechanisms for energy efficiency measures;
- Assist businesses interested in joint ventures between Bulgarian and foreign companies in the field of energy efficiency and GHG emission reduction, including energy saving companies (ESCOs), energy performance contracting (EPC), and Activities Implemented Jointly (AIJ) and Climate Technology Initiative (CTI) agreements.

Description

The project will focus on municipal and budgetary benefits and financial opportunities for energy efficiency. Evaluation of costs and savings, including revenue impacts and tariff issues and developing and examining cost recovery mechanisms for the demonstration energy efficiency measures will be done. Financing problems, identified in the demonstration projects, will be analyzed and alternative decisions proposed. Financial mechanisms will be developed and tested. The goal is to provide for financial sustainability of energy efficiency projects. Financing alternatives will be looked for in:

- Establishment of a national energy tax to capitalise the National Energy Efficiency Fund;
- Retainment of the subsidies to amortise the loan/investment;
- Influence the mechanism for subsidising energy prices and introducing demand side incentive programs;
- Strengthen municipal fiscal autonomy to tax and/or issue debt;
- A national loan backed by the EBRD;
- Privatize the entity/operation and direct bill;

- Seed the National Energy Efficiency Fund from other sources, for example the World Bank;
- others.

Illustrative energy performance contracting (EPC) mechanisms will be stimulated in parallel with the demonstration subprojects and used to demonstrate the mechanisms and financial returns of performance contracting. Model contracts will be developed to serve as the basis for further demonstration projects that use independently financed performance contracting.

The awareness of business opportunities in the field of energy efficiency is very limited at the municipal and national level. The business, industry, and financial sectors are not familiar with the potential of the field. The number of joint ventures with western countries is limited. To overcome this barrier, this project will actively promote awareness of these business opportunities, assist Bulgarian enterprises develop Western-style business plans, work with officials in Gabrovo and other municipalities to create attractive business environments, and provide workshops and clearinghouse functions.

The Support Office will prepare a guidebook for municipalities seeking to encourage investments in energy saving products and services. The guidebook will describe the role of joint ventures, ESCOs, EPC, AIJ and CTI programs, and other financial mechanisms. A workshop using this information will be pilot tested in Gabrovo, revised, and presented to other municipalities. A clearinghouse will be created to bring potential borrowers and lenders together. The clearinghouse will provide current information on the lending requirements and interests of available financing sources. Enterprises seeking funds for energy efficiency investments will be able to obtain this information and advice on different financing options and how to meet their requirements. The demonstrations will be used as case studies for this process.

Drawing on the information from the above activities, the Support Office will work with Gabrovo and other municipalities to prepare a draft report, "Model Policies and Legislation for Municipalities Seeking Energy Efficiency Investments". *(The report will be a companion to the report, prepared under Subproject 1, which addresses issues other than financing.)* The report will review existing regulations and practices that affect the business climate for energy efficiency in municipalities, such as taxation and fees, budget regulations, liability, security, labour practices, and other conditions that are important to potential investors. As part of this report, recommendations for creating legal conditions for using new sources of financing, including energy taxes, user fees, energy efficiency funds, and municipal guarantees, will be directed to the national legal framework.

Transaction Barriers

- Due to the state monopoly in the past on the production, transfer and distribution of energy, there is very limited experience with the application of market mechanisms to achieve energy efficiency and environmental objectives.
- Due to the underpricing of energy in the past, there is little understanding of the potential for increased energy efficiency, including a shortage of information about new energy saving technologies.

•. Business knowledge and experience regarding financing mechanisms is lacking, particularly on foreign resources, such as joint ventures, ESCOs, and international financial institutions and a lack of experience in developing bankable projects for energy efficiency.

•. There is little understanding of the municipal environment required to attract investments, including legislative and regulatory measures, taxation and fee structures, utility infrastructure requirements, and labor and social expectations.

Outcomes

•. Production of a financing alternative packages designed to meet the requirements of the business and industry community at the municipal level, including financing options, such as AIJ and CTI, which are designed to reduce GHG emissions. Training programs using these materials.

•. A Clearinghouse that proactively brings together municipal entrepreneurs with national and international funding sources.

•. A stronger local market for energy efficient services and products created by new financing options and a more inviting legislative and regulatory environment;

•. Recommendations for creating legal background for stimulating energy efficiency investments.

SUPPORTING DEMONSTRATIONS

These demonstration projects have been designed to provide experience in achieving energy savings and in reducing GHG emissions. The criteria used to select and design the demonstrations include: 1) Significant potential for energy savings and/or GHG reductions; 2) Widespread applicability throughout Bulgaria; 3) Cost-effectiveness when replicated widely; 4) Minimal risk through a reliance on proven technologies; 5) The achieving of additional social benefits; and 6) Coordination with on-going projects of other programs--PHARE, US AID, Novem, etc.

Subproject 4. ENERGY EFFICIENCY IMPROVEMENT OF CITY STREET LIGHTING SYSTEMS

(total cost: US$ 1,233,000; proposed GEF funding US$ 246,000)

Objectives

•. To evaluate the potential for energy conservation in traditional street lighting systems in Bulgarian cities.

•. To reduce energy consumption for street lighting in Gabrovo.

•. To demonstrate the use of energy efficient and environmentally friendly street lights.

•. To demonstrate the use of time clocks to optimize energy use.

•. To disseminate the results to other municipalities.

Description

The street lighting system in Gabrovo, as in other Bulgarian cities, is inefficient. The Gabrovo system uses sodium and mercury vapor bulbs ranging in output from 125 to 400 Watts. The total installed capacity for the city is 3,035 Kw. No automatic day/night controls are used in the city street lighting system. A considerable potential exists for both demand and consumption reduction through the replacement with high efficiency sodium lamps, time clocks and automatic control system, and the redesigning of the street lighting system to eliminate over-lit and under-lit areas. In the relighting project, the City of Gabrovo will be divided into different zones to test different relighting approaches and lighting products. The project will be designed to attract both Western and Bulgarian lamp and fixture manufacturers and suppliers to participate in demonstrating their products and approaches in different zones. The project will be designed to encourage the use of top-level technology and quality control applications. The results will be disseminated to other cities, which will be encouraged to consider street lighting retrofit projects. Street lighting consumed 313 gigawatt hours of electricity in Bulgaria in 1994, making this an attractive target.

The city street lighting subproject is attractive because the savings are very predictable, municipalities are viewed as a low risk, and the new lights are a highly visible statement to citizens of the city's commitment to ending the waste of energy and financial resources. The subproject can be replicated in cities throughout Bulgaria. Because of the direct participation of the City, this subproject will be closely coordinated with subproject 3, which will be used to identify the optimal method of financing the new city street lights.

Transaction Barriers

- The initial cost of energy efficient lamps, fixtures, and time clocks are high, compared with current replacement practices.
- The information on the different lighting products available and their potential for reducing electricity costs is limited and not widely available.
- Because of low electricity costs in the past, there has little historic demand for energy efficient lighting components in the country.

Outcome

- Reduction of electricity consumption and an associated reduction in GHG emissions.
- Documentation of the monetary savings from street lighting, which will increase the demand for energy efficient lamps for both Bulgarian and foreign manufacturers.
- A case study that can be used to promote similar projects in other cities.

Subproject 5. ENERGY EFFICIENCY RENOVATION OF DISTRICT HEATING AND HEATING END USE

(total cost US$ 2,535,000, requested GEF funding US$ 295,000)

Objectives

- To reduce the energy losses in the heat generation system, transmission facilities and end uses and achieve an associated reduction in GHG emissions.

- To im the comfort and living conditions of end users.
- To develop a useable billing and metering system to enable the heating companies to charge for heat according a formula based on the actual consumption of the user.
- To train in-country experts on implementing progressive methods of planning, management and renovation of existing district heating systems and heating end uses.
- To disseminate the lessons learned in Gabrovo to other district heating systems.

Description

The state-owned co-generation station consists of six coal/fuel oil fired boilers and steam and steam-to-water heat exchanges that provide heat to the Gabrovo district heating system. The electricity produced is fed into the national electrical grid. Due to old equipment and worn up facilities, the overall efficiency of the district heating system is low, a condition found in similar state- and municipality-owned district heating systems in Bulgaria and other CEE countries. The project will perform a comprehensive energy audit of the district heating plant, the distribution grid, and a representative sample of end user customers to quantify the thermal losses in different stages of the system and identify the optimal mix of technical and managerial measures to improve its overall efficiency and achieve the associated reduction in GHG emissions. A feasibility/pre-investment study will define the existing potential for improving efficiency of the system and the priority steps in the renovation process.

In the past, consumers were billed for heat on the basis of the cubic meters of area heated. This not only provides an inaccurate surrogate measure of consumption, but it also provides no incentive either for the heat distribution company or the consumers to conserve heat. Investments in energy efficiency were discouraged. Over the recent past, district heating companies have allowed for consumers to install meters, and some consumers have done so. However, the link between the meter reading and billing is not always observed as there is no clear formula for the heat tariff. In Gabrovo, some buildings have meters, but their efforts at conservation are not adequately rewarded. District heating companies are still heavily subsidized. A prerequisite for their privatization will be a consumption-based metering system. As part of this demonstration element, a detailed study of consumption-based metering and a detailed formula for a heat tariff will be developed and applied.

The highest priority measures will be implemented and their energy- and GHG reduction benefits carefully monitored. Based upon this study and the results of the initial phase of improvements, a comprehensive renovation plan will be prepared that identifies the measures that would be taken based on cost-effectiveness alone and the incremental measures that would achieve additional GHG emission reductions and their associated costs and benefits. A significant part of the project will be to build the management and planning capacity to implement optimal plans based on economic and incremental GHG emission-reduction criteria. The lessons learned in Gabrovo will be disseminated in other municipalities where similar district heating systems are in use and to local industrial heating stations.

Transaction Barriers

- Subsidized energy prices do not motivate end users to save energy. As Bulgaria is being required to pay world prices for energy imports, the heat tariffs are being raised. However, the lack of connection between consumers bills and actual consumption provides little incentive to use heat efficiently.

- To date, there has been limited use of heat metering and there has been no virtually no application of consumption-based metering throughout the district-heating systems. This reduces incentives to energy conservation on the part of both consumers and heat producers.

- Difficulties in measuring the thermal losses in different stages of the heat-delivery system because of a lack of metering, make it impossible to prioritize investments or to quantify the cost of improved efficiencies and the incremental cost of investing in additional GHG emissions reductions.

- The shortage of experience in the managing and operating district heating systems under market conditions, has led to a lack of familiarity with modern technologies and a lack of experience in fund raising for energy efficiency improvements.

Outcome

- A feasibility/pre-investment study on the overall renovation of the Gabrovo district heating system that identifies cost-based improvements and the incremental actions that could produce additional reductions in GHG emissions.

- The demonstration of the highest priority energy-saving measures to provide realistic experience in the renovation of the existing district heating system in Gabrovo to add credibility to the estimates in the study.

- The introduction of a system of metering and billing based upon actual consumption so that end-users pay for the heat utilized thereby creating to use thermal energy efficiently.

- The creation of trained experts capable of providing efficient planning, management and financing of district heating systems, including the conduct of model preventative maintenance programs.

- The production of guides and tutorials for achieving energy efficiency and GHG emission reductions, including: (a) manual for energy and environmental planning and (b) manual for efficiency operation and the in-country dissemination of the lessons learned in Gabrovo.

Subproject 6. RETROFIT OF EXISTING BUILDINGS TO REDUCE ENERGY USE

(total cost US .1,719,000; requested GEF funding US$ 261,000)

Objectives

- To provide training of key governmental and municipal experts to develop programs for the retrofitting of existing buildings *(in connection with subproject 2)*.

- To train experts able to perform energy audits of the existing buildings and to evaluate the energy saving potential of measures and technologies *(in connection with subproject 2)*.

- To develop and implement a series of technical and managerial measures to reduce the energy consumption in typical groups of existing residential and service buildings to demonstrate the energy and environmental benefits of such projects.

- To assess and demonstrate the potential to use renewable energy sources in retrofitting of existing buildings in Bulgaria.

- To disseminate the knowledge and experience accumulated in Gabrovo to other municipalities, use the demonstrations as a background for a national program for retrofitting of buildings, and stimulate the demand for energy efficiency products.

Description

Existing buildings in Gabrovo and throughout Bulgaria fail to meet the thermal performance required by current energy costs and environmental standards. Large energy losses occur through building envelopes due to air leakage and insufficient insulation. As a rule, heating systems are not metered, making it impossible to use heating bills to encourage savings or to quantify the benefits of retrofit measures. Under these conditions, the management and control of buildings are neglected. The resulting physical degradation of buildings increases their energy waste and unnecessary GHG emissions.

The project will be coordinated with Subproject 2, which will train building energy efficiency specialists. Using these experts, energy audits and retrofit projects will be undertaken at the following four typical building types: (a) hospitals (the regional hospital in Gabrovo), (b) schools (a secondary school in Gabrovo), (c) residences (a multi-story apartment building) and (d) industrial buildings. The hospital retrofit project will be coordinated with the U.S. AID hospital retrofit project to develop an audit and retrofit approach applicable to hospitals throughout the country. A secondary school will be selected, which is representative of school buildings found throughout the country, so that the audit and retrofit approach can be duplicated easily in other schools. An industrial building will be selected that has electric equipment, processing, and lighting energy uses that are similar to those found in industrial buildings throughout Bulgaria.

The assessments will identify the measures to increase the heating and other end-use energy efficiency of the buildings, based on both a local cost-recovery criteria and an incremental, global benefit criteria that would produce additional GHG emission reductions and the use of renewable energy measures. The demonstration project will implement some or all of these improvements, carefully monitoring the resulting costs and benefits of both the baseline and incremental improvements.

The demonstrations are an important method of educating people and influencing public opinion. An emphasis will be placed on changing the behaviour of owners and occupants of the buildings. For example, in the hospital retrofit demonstration, a computerized energy management system will be installed for optimal control of energy use. In the school automatic heating controls will be introduced that are tuned to the teaching schedule. A system of attractive incentives and entertaining school aids will be developed to encourage teachers and pupils to save energy. For the inhabitants of the residential buildings, guidelines for no-cost and low-cost measures to save energy will be elaborated and disseminated to other municipalities.

To ensure that the building retrofit can be duplicated rapidly throughout Bulgaria, the project will be coordinated with Subproject 3 on financing. Through this coordination, different innovative financing alternatives will be considered, including the creation of an Energy Efficiency Fund financed by dedicated local taxes or an international financial institution; a loan guarantee approach with paybacks tied to energy savings; the use of energy service companies (ESCOs); or joint ventures formed by local and foreign companies providing energy-saving products and services.

Transaction Barriers

•. Difficulty in estimating energy use due to insufficient metering and the difficulty in estimating the expected energy savings of retrofit measures.

•. The past subsidies for energy prices, which failed to motivate end users to save energy and the difficulty faced in eliminating subsidies--although progress is being made--during a period of economic recession.

•. The lack of experience in the management and maintenance of buildings to eliminate energy waste, including the lack of information on measures to reduce energy use and a lack of information on financing energy efficiency improvements.

Outcome

•. A series of model examples of retrofitted typical existing residential and non-residential buildings, including measured information on the costs and benefits of both baseline and incremental measures.

•. A demonstration of the benefit of a system of incentives to save energy targeted to different building managers and occupants, including housing.

•. A set of guides and tutorials for energy efficiency and environmental management for typical building types and the in-country dissemination of this information to other municipalities throughout Bulgaria.

PROJECT MANAGEMENT

(total cost US$ 653,000; requested GEF funding US$ 653,000)

The successful implementation will require the strengthening of EnEffect with the training of existing staff and recruiting of additional staff, as needed, to ensure a small, dedicated management team. A Chief Project Manager (CPM) will have overall responsibility for the management of the program, including the DZ Support Office located administratively within EnEffect, the demonstration and dissemination activities. The CPM will provide overall leadership and oversight of the project to ensure budget, schedule, and goals accomplished. He is the lead for the policy activity to translate the lessons learned to national policy recommendations. The CPM will be supported by a Business Manager and a secretary. A foreign consultant will provide assistance to the project manager during the first 2 years of the project.

The CPM will draw up Terms of Reference for the staff and supporting contracts that cover the overall work plan. The management philosophy will be to keep the management team small through the maximum use of contracts that tap the capabilities of existing programs so that the DZ Program is seen as enhancing existing efforts and not duplicating current activities. All contracts will be awarded competitively on the basis of merit. Management consultants, with extensive experience in managing large energy projects with an emphasis on quantifiable results, will be appointed to draw up detailed work programs for each project. A National Capacity Building Coordinator will be responsible for coordinating all National Capacity Building activities; a Demonstration Coordinator will be responsible for coordinating the demonstration activities. A financial/economic analyst will be responsible for providing

financial and economic analysis and business planning support to all elements of the project and play the lead in subproject 3.

Within each project, the work program will be expected to achieve explicit targets for the replication of project. The contracts with international consultants will provide for the training of local personnel in order to build a self-sustaining capacity to run the Program.

The CPM will focus his/her efforts on obtaining concrete, replicable results. The project managers and contractors will be hired on performance-based agreements in order to achieve this goal.

5. Institutional Framework and Project Implementation

The CPM and DZ Support Office staff will be located within the Bulgarian Foundation for Energy Efficiency (EnEffect), which will be the executing agency for the program, under the auspices of the Ministry of Environment and the Sofia office of the United Nations Development Program. Funding Partners will meet in a Financing Sub-Group where they will be informed of project progress by the CPM and will make overall project management decisions.

A National Steering Group will be established to oversee the whole project and will include representatives from institutions such as the Ministry of Environment, Ministry of Industry, Ministry of Finance, Committee on Energy, NEK, Bulgarian Academy of Sciences, Technical University, Association of Energy Engineers - Bulgarian chapter, Federation of the Technical and Scientific Unions etc. Local representatives of UNDP, European Union, US AID, EBRD, World Bank will be potential members of the National Steering Group too.

The Gabrovo municipality will have a local Steering Group to ensure local management and involvement. This is expected to be made up of representatives from the municipality, local industry, trade unions. To help guide the demonstrations and disseminate the results, each of the demonstration projects will have an advisory committee made up of technical experts and technology transfer specialists.

6. Consultative and Participatory Processes

In 1992, EnEffect initiated a discussion with the Bulgarian Government and municipalities to assess their interest in the DZ program. After receiving a positive response, EnEffect contacted five municipalities, which had shown an interest in the program, and selected Gabrovo because of the demonstrated commitment of its municipal leaders. EnEffect submitted an initial proposal for selecting Gabrovo as an energy efficiency demonstration zone at a 1992 meeting in Rome of the EE-2000 Program of the UN ECE. After receiving additional guidance, EnEffect prepared and resubmitted a revised proposal to the UN ECE Secretariat.

In 1994, funds were granted by the GEF as a project preparation facility for the preparation of energy efficiency strategies in Central and Eastern European Countries. Additional preparatory work for the demonstration zone was undertaken by EnEffect together with the Municipality of Gabrovo, including consultations with governmental and non-

governmental institutions.

The preparation of a revised, final project proposal was initiated in June 1995 with GEF funding through the UN ECE. Preliminary consultations with potential project participants and funding sources were carried out by EnEffect. Letters of support from these contacts were received During the preparatory process, valuable technical assistance and technical reviews were provided by a number of local and international institutions. The Bulgarian Ministry of the Environment, the Ministry of Industry and the Committee for Energy assisted EnEffect in defining the scope and goals of the proposal. Major contributions were provided by international organizations and programs, including the UN ECE Energy Efficiency 2000, UNDP/GEF, Battelle/Pacific Northwest National Laboratory (USA), the U.S. Department of Energy, and Novem (The Netherlands). The instructions on project preparation and methodologies for evaluation of incremental costs, provided by GEF technical experts, served as practical guides during the preparatory process.

A national meeting was organised by the Ministry of Environment, the UNDP country office, and the Bulgarian Foundation for Energy Efficiency EnEffect on January 19, 1996 in Sofia. Participants from Bulgarian governmental and non-governmental institutions, and from international organisations, foreign missions and companies discussed the project and agreed upon a memorandum of its support.(See attached Memorandum).

A donors' meeting was held on the 19th of March, 1996. The meeting was organised by the Ministry of Environment and the Bulgarian Foundation for Energy Efficiency EnEffect. The meeting was attended by responsible officials of embassies and international organisations representatives located in Bulgaria. The goal of the meeting was to provoke donors' interest in supporting the project and show the possibilities for co-operation.(see attached minutes from the meeting).

7. Monitoring and Evaluation

Monitoring and evaluation will be performed by expert teams, based on the guidance from the Steering Committee and according to the UNDP rules and the requirements of GEF and other funding institutions. A M&E task will be an integral part of each project. M&E will be carried out independently for the intent and purpose of providing constructive feedback to improve subsequent implementation efforts. Overall reviews of the entire program will be made after the first 18 month and after the end of the project. A budget line of US$ 50,000 is included to cover these activities.

8. Sustainability of Project Benefits

Financial Sustainability

The project is expected to be sustainable beyond the initial phase of the GEF support primarily because it will be providing a commercial service for which, once successfully demonstrated, there will be a continuing demand. The industries and expertise created with project support will be able to market their services to potential clients both within and outside

the initially demonstration zones.

Energy prices in Bulgaria are being raised toward world market levels. With more that 50% of the country's energy imported, this pressure is continuing. These high prices are making it financially attractive for a growing number of organizations to implement energy management and energy conservation investment programs. The project aims to significantly improve the capacity of Bulgarian organizations to undertake sustainable energy efficiency programs, as well as to make significant reductions in GHG emissions.

The project is intended to work for financial sustainability itself by focusing on overcoming the financial barriers by different types of activities and introducing working financial mechanisms.

Funding Partners Activities

Bilateral and multilateral donor activities in energy efficiency measures started in Bulgaria in early 90s. In 1992 the U.S. Government supported the establishment of the Bulgarian Foundation for Energy Efficiency EnEffect and contracted its activities through US AID for the first three years. Demonstration projects were applied for the cities of Plovdiv, Gabrovo and Stara Zagora. In 1996 US AID starts a new energy efficiency project for Bulgaria, Municipal Energy Efficiency Initiative. It is planned to be realised in close cooperation with the GEF project for Gabrovo as parallel financing. This project will focus on expanding the role of private companies in the delivery of energy efficiency services at the municipal level, by providing training, demonstration projects and equipment. This work expands upon previous USAID-sponsored work at the municipal level, and supports Bulgaria's UNDP/GEF efforts.

In 1992 Directorate General XVII (Research) of the Commission of the European Union established an Energy Centre in Bulgaria whose activities are directed mainly at increasing the efficiency of the supply side. This Centre will support the GEF project by some in-kind activities. The PHARE 93 Programme for Conventional Energy established an Energy Project Implementation Unit within the Committee of Energy. The Programme has 3 major components: a project for evaluation of the Bulgarian renewable energy sources, a project on regional energy concepts, and a project on demonstration of energy efficiency in buildings. Although in different phases of advance, the GEF proposal was coordinated as much as possible with the PHARE programme, and mainly with the Regional Energy Concept/ Regional Energy Centre for Pilot Region I - Lovetch, and the Demonstration project for energy efficiency in buildings. Further co-operation of activities is agreed upon.

The European Bank for Reconstruction and Development (EBRD) is in a process of preparing a delivery mechanism for financing energy efficiency projects in Bulgaria. It is expected that a specified credit line, possibly with an ESCO, will be established. Representatives of the bank have been informed about the Demonstration Zone proposal who have assessed these projects as acceptable for future possible financing by the bank.

The Japanese Agency for International Cooperation (JICA), in cooperation with the Bulgarian Ministry of Industry, is working for increasing the energy efficiency in industrial enterprises, concerning mainly industrial technologies. JICA has equipped an Energy Efficiency Center to the Ministry of Industry which made a number of audits over the last years. The Agency supports the GEF project. The embassy of Japan expressed readiness to coordinate JICA's on-going program through UNDP and in due time will determine the amount of funds for parallel financing of the Demonstration Zone proposal.

The National Environmental Fund was established in 1992. The assets of the Fund may be spent for state assignments related to environmental protection, participation in joint environmental actions in the municipalities, lump sum allocations to individual municipalities for implementation of environmental activities, maintaining and upgrading of the system of monitoring and control on environmental protection, etc. The Regulations on Collection, Disbursement and Control of the Assets of Environmental Funds define the procedures for applying to the Fund. Financing can be achieved as a grant , as a loan, as low interest loans et. A letter of support from the Ministry of the Environment as manager of the Fund states that the project complies with the priorities for allocation of funding from the Fund.

Incentive and regulatory system

Bulgarian COE is the state body responsible for the energy sector, including energy efficiency. The Committee elaborated a draft of an Energy Efficiency Act which is in process of passing through National Assembly. Its principal objective is to create a legal framework for a national energy conservation policy. Some provisions under this law will be beneficial to this project.

Regulations for the establishment of a National Energy Efficiency Fund were adopted. No real input has been provided into the fund until now. It is expected that the fund will start working after the Energy Efficiency Act is adopted. The principles applied to the fund's disbursement will be preferential. During the 5 years of the project, the fund will start working and can be used for its funding.

9. Rationale for GEF Support

This program is fully consistent with the guidance of the GEF Operational Programme #5: Removing Implementation Barriers to Energy Conservation and Energy Efficiency) and the subsequent Operational Programme being formulated by the GEF secretariat. Projects 1-3 are particularly relevant on Energy Conservation and Energy Efficiency. Projects 4-6 are particularly relevant to Technology Transfer.

The GEF contribution requested is $US 2,575,000. The funds are primarily devoted to the enhancement of the Governmental effort in favour of energy efficiency with particular emphasis on capacity building to overcome technical, economic, and managerial barriers and to create self-supporting activities. The program will create greater energy efficiency and facilitate measurable reductions of GHG emissions. The program is a national priority within the context of the National Environmental Strategy. The institutional and technological assistance provided by the program will be an important step toward creating an attractive climate for future investments in the Bulgarian economy. The program itself will lead to investment in energy efficiency projects by other institutions. However, at this time, the GEF funds are needed to catalyze the project and to pay the foreign exchange costs in the technical assistance and demonstration portion of the project. The GEF funds are largely devoted to staffing and foreign exchange costs for technical assistance and demonstration components of the project.

A similar investment for global benefits cannot be justified in the current economic context by the Government of Bulgaria. Through the GEF funding, combined with the Governmental and donor involvement, Bulgaria will benefit from lower energy intensity, and improved environmental conditions--including a substantial contribution to the implementation

of the FCCC. The proposed program also meets the following development criteria, in addition to falling within the global environmental protection area. The program:

- Contributes to human welfare through sustainable development;
- Is innovative and internationally replicable;
- Is financially sustainable after initial GEF support with the involvement of local financial institutions and other donors;
- Gives new dynamic and environmental dimension to on-going Bulgarian activities;
- Develops institutional capability and trains personnel;
- Has a firm scientific and technical basis;
- Fits within the context of existing national, regional, and municipal programs;
- Involves local participation and collaboration;
- Includes studies that will lead to a better understanding of energy use patterns in Bulgaria;
- Will have quantifiable results within the project timetable.

10. Incremental Costs

In the absence of GEF support, the Bulgarian Ministry of Environment's programme would continue much as they have in the past three years. The Ministry would not support the kind of capacity building activities outlined in this proposal in the absence of GEF funding. The widespread dissemination of practical energy efficiency to Bulgarian energy users would occur at a much slower rate without these activities.

However, the Government would continue to strive to meet its obligations under the FCCC and rising energy prices would apply pressure for increased energy efficiency, although the effect would be spotty and inconsistent, particularly at the municipality level, without the comprehensive effort embodied in this proposal. The participation in energy efficiency programs at the local government level, which is critical to "grassroots" reform, would not be financed by the Bulgarian government acting alone. Dissemination of energy-saving and environment-protecting technologies throughout the country would occur, but only very slowly.

Further details concerning incremental costs issues associated with the each subproject are shown in Annex 1 (the Incremental cost annex). From this, it is clear that there are two categories of incremental costs to be supported by the proposal:

- costs to remove the transaction barriers (components 1 to 6);
- zero baseline costs specific to the purpose of the project management locally executed (component 7).

11. Issues, Actions and Risks

The proposal has been conformed with the specific conditions in Bulgaria and answers the acute needs of the country in the period of transition to a market economy. The projects included in the program are oriented to overcoming the existing barriers to energy efficiency and energy conservation. The most important barriers have been identified in the description of each subproject. Besides there are potential risks of general character whose preliminary knowledge is a necessary condition for the successful program implementation. The most essential potential risk is the continuing economic stagnation in the country which is especially hard in industry. This is the main reason to focus the efforts in the communal sector of a municipality mainly. The ongoing state subsidies for the energy sector are one of the most essential barriers. If the barriers are not attacked in the right way they may cause difficulties in the program implementation. The objectives described in the proposal and the actions and measure foreseen in the projects take into consideration the current situation in the country and try to avoid to a great extent the most crucial risks in the country.

12. Project Financing and Budget

The indicative total cost of the project is US$ 8,575,000 (Tables 1, 2 and 3). The contribution of the central and local governments of Bulgaria is estimated at US$ 2,478,000. US$ 1,000,000 of them can be allocated as direct support for the demonstration projects by the National Environmental Fund after passing the legal procedures posed by its regulations. US$ 533,000 will be put into the District Heating demo-projects by the host company which is state owned. Bulgarian contribution is directed mainly into the demonstrations (US$ 647,000 for energy efficiency street lighting, US$ 1,033,000 for district heating systems and US$ 616,000 for retrofitting of buildings).

A commitment of US$ 850,000 from US AID and part of the network equipment is expected by parallel financing of some of the activities included in the project. Distribution of this funding among the different components can be revised after finalizing US AID plans.

Requested GEF funding is directed mainly to the capacity building activities. Some technical assistance under GEF funding for the engineering studies within the supporting demonstrations is envisaged. A small stimulating financial support in the initial stage of the demonstrations will provide for the successful start of the project.

Within the project management activities the preliminary agreements for financing will be finally settled and new funding sources and mechanisms can be found. GEF support for the project is expected to stimulate other donors' and credit institutions' funding for these activities.

13. Response to Technical Review

The most serious point raised by the technical reviewer deals with the importance of installing heat meters and developing a scientific formula for heat tariffs. In his experience, this represents a critical barrier to the implementation of greater efficiency in district heating systems throughout former centrally-planned economies. With serious attention paid to the heat metering component, he did not feel that such systems could be improved.

Since receiving the reviewers comments, the section of the proposal dealing with district heating has been rewritten to reflect a strengthened emphasis on metering, tariffs and the development of a consumption-based billing system. In addition, a separate element has been added under subproject 5 dealing with district heating renovation to place greater emphasis on the importance of providing technical assistance to remove this barrier.

TABLE 1

INDICATIVE GEF BUDGET

INCLUDING INCREMENTAL COST SUMMARY

/US$,000s /

COMPONENT	Staff Costs	Training Costs	Equipment Costs	Travel Costs	Demonstration costs	TOTAL COSTS	Transaction Barriers to Implementation	Likely Incremental Costs	Replication/Dissemination
1. USING MUNICIPALITIES TO DISSEMINATE ENERGY EFFICIENCY							Gaps in municipal policies and legislation; Lack of capacity and institutional background ; Insufficiently developed network	Positive	Creation of a network of Energy Efficiency and Environment Offices in 30 cities in the country for dissemination of information
Total Funds Needed	940	45	174	71	-	1,230			
Requested from GEF	247	30	93	43	-	413			
2. TRAINING AND EDUCATION							Lack of trained personnel; Lack of information and education about energy efficiency	Positive	Production of replicable training programs and manuals, exhibitions, conferences, seminars, workshops
Total Funds Needed	198	241	89	129		657			
Requested from GEF	162	75	27	63	-	327			
3. OVERCOMING FINANCIAL BARRIERS							Limited experience with the application of market mechanisms; Shortage of information and understanding of the potential for energy efficiency; lack of business knowledge	Positive	Production of replicable financing alternative packages and a guidebook; creating more inviting legislative and regulatory environment; training programs
Total Funds Needed	225	82	66	50	-	423			
Requested from GEF	179	30	16	30	-	255			
4. ENERGY EFFICIENCY IMPROVEMENT OF CITY STREET LIGHTING SYSTEMS							High initial costs, lack of business information, lack of financial mechanisms.	Negative with initial information and demonstration costs	Information strategy and formulation of financing schemes for replication
Total Funds Needed	141	30	30	37	955	1,233			
Requested from GEF	105	30	14	37	60	246			
5. ENERGY EFFICIENCY RENOVATION OF DISTRICT HEATING & HEATING END-USE							Lack of incentives; lack of metering; shortage of management experience in market conditions.	Negative with initial demonstration and training costs	Dissemination of project results; production of guides and tutorials; trained experts; introduction of system of incentives to end-users
.. Total Funds Needed	186	30	37	48	2,234	2,535			
Requested from GEF	141	30	16	48	60	295			

COMPONENT	Staff Costs	Training Costs	Equip-ment Costs	Travel Costs	Demons tration costs	TOTAL COSTS	Transaction Barriers to Implementation	Likely Incre-mental Costs	Replication/Dissemination
6. RETROFIT OF EXISTING BUILDINGS TO REDUCE ENERGY USE							Insufficient metering, lack of incentives; lack of management experience; lack of information on the potential of energy conservation in buildings; lack of financial schemes.	Negative with initial learning and demonstration costs	Dissemination of a series of model examples, guides and tutorials, a system of incentives to building managers and occupants
Total Funds Needed	187	49	137	79	1,267	1,719			
Requested from GEF	106	30	16	49	60	261			
7. PROJECT MANAGEMENT								Positive	Highly skilled staff to assess replication potential, to co-ordinate with other programs and projects, to raise funds, to create prerequisites for permanent activities for energy conservation
Total Funds Needed	373	40	145	95	-	653			
Requested from GEF	373	40	145	95	-	653			
SUB-TOTAL:	2,250	517	678	509	4,496	8,450			
MONITORING						50			
SUPPORT COSTS (3% of GEF Contribution)						75			
TOTAL PROJECT BUDGET:						8,575			
TOTAL GEF REQUEST:						2,575			

Figures are in US$ 000s

Figures represent budgetary totals for the entire 5-year period

TABLE 3

ENERGY EFFICIENCY DEMONSTRATION ZONE THE CITY OF GABROVO

INDICATIVE BUDGET - Contribution GEF, Bulgaria and Other Donors and Ongoing Activities

/US$,000s /

Component Task	GEF	Bulgaria	Cost sharing		Parallel Financing				Total 1 (GEF project)	Ongoing activities related to this project		Total 2 (ongoing activities)	Grand Total (1 + 2)
			NEF	Other*	USAID	PHARE	EBRD	JICA		PHARE			
1. Using Municipalities to Disseminate Energy Efficiency	413	642			175				1,230	2,425.5		2,425.5	3,655.5
2. Training and Education	327	63			267				657	593.5		593.5	1,250.5
3. Overcoming Financial Barriers	255	10			158				423				423
4. Energy Efficiency Improvement of City Street Lighting Systems	246	447	200	340					1,233				1,233
5. Energy Efficiency Renovation of District Heating & Heating End-Use	295	533	500			7	1,200*		2,535	534.6		534.6	3,069.6
6. Retrofit of Existing Buildings to Reduce Energy Use	261	316	300	42	300	200**		300***	1,719	2,381.4		2,381.4	4,100.4
7. Program Management and Coordination	653								653				653
8. Monitoring and Evaluation	50								50				50
9. Support, Administrative Costs	75								75				75
GRAND TOTAL:	2,575	2,011	1,000	382	900	207	1,200	300	8,575	5,935		5,935	14,510

* the figure is indicative; preliminary discussions were held;

** the figure is indicative; application for PHARE will be done;

*** the figure is indicative; preliminary negotiations for retrofit of an industrial building are under way.

TABLE 2

ENERGY EFFICIENCY DEMONSTRATION ZONE THE CITY OF GABROVO

INDICATIVE BUDGET - Contribution GEF, Bulgaria and Other Donors

/US$,000s /

Component Task	GEF	Bulgarian Host Part	Cost Sharing		Parallel Financing				Total
			NEF	Other in-country*	USAID	PHARE	EBRD	JICA	
1. Using Municipalities to Disseminate Energy Efficiency	413	642			175				1,230
2. Training and Education	327	63			267				657
3. Overcoming Financial Barriers	255	10			158				423
4. Energy Efficiency Improvement of City Street Lighting Systems	246	447	200	340					1,233
5. Energy Efficiency Renovation of District Heating & Heating End-Use	295	533	500			7	1,200*		2,535
6. Retrofit of Existing Buildings to Reduce Energy Use	261	316	300	42	300	200**		300***	1,719
Sub-Total:	1,797	2,011	1,000	382	900	207	1,200	300	7,791
7. Program Management and Coordination	653								653
8. Monitoring and Evaluation	50								50
9. Support, Administrative Costs	75								75
GRAND TOTAL:	2,575	2,011	1,000	382	900	207	1,200	300	8,575

* the figure is indicative; preliminary discussions were held;

** the figure is indicative; application for PHARE will be done;

*** the figure is indicative; preliminary negotiations for retrofit of an industrial building are under way.

Annex I: Incremental Costs

1. Broad Developmental Goals

The developmental goal being pursued is the provision of energy services to the country of Bulgaria. As a party to the UN FCCC, Bulgaria is interested in finding ways to ensure the provision of adequate energy services with a reduction in greenhouse gas emissions. The first communication of Bulgaria to the Conference of Parties to the FCCC placed a heavy emphasis on increasing the efficiency with which energy is utilized as a way to reduce GHG emissions without damaging the national standard of living.

2. Baseline:

To date, the Bulgarian energy sector has adopted a traditional supply-side approach--increasing the level of energy services available to the country through increasing supplies. In the absence of this project, some national and bilateral efforts to catalyze increased work on energy efficiency will be undertaken, but it will not be as systematic, comprehensive and effective as what is proposed under this project. EnEffect will continue with a small programme and several bilateral donors will also provide small grants for specific demonstrations. The money available through national energy taxes may or may not be funneled into energy efficiency investments.

The baseline for each subproject is discussed below.

3. Global Environmental Objective:

The global environmental objective being pursued is enhanced energy efficiency and the resulting reduction in GHG emissions. In the case of this project, there is a fertile ground for energy efficiency investments which is not being pursued further because of the existence of specific barriers to the implementation of these energy efficiency activities.

4. Global Benefits

The following sections summarize estimation of global benefits for specific energy efficiency demonstration subprojects. A few points require clarification in order to understand these calculations. In the case of the Bulgarian electricity system, virtually the entire base-load of the system is supplied by nuclear power plants. The peak load is provided either by hydro-electricity or thermal plants, depending upon the seasonal availability of the hydro. According to the Bulgarian energy commission and in accordance with the first communication to the Conference of Parties, electricity conservation reduces electricity derived from thermal sources. The GHG content of electricity saved, therefore, is taken as 0.00144 t CO2/kWh. For primary energy sources,

the GHG content is taken as 3.1 t CO2/t heavy fuel oil; 3.0 t CO2/t diesel; and 0.6 t CO2/t lignite.

5. GEF Alternatives, Incremental Costs, and Global Benefits:

The project proposed for Bulgaria is designed to remove a number of specific barriers to enhanced energy efficiency investments and programmes. It is intended to implement a number of national-level activities designed to increased the capacity of Bulgarian nationals and institutions to carry out technical and financial work on energy efficiency. It also seeks to carry out demonstrations, incorporating demonstrations of cost-recovery and potential financing, in the areas of improved municipal street lighting, district heating renovation, and improved thermal performance of older buildings. Each project component is discussed below, including a detailed incremental cost matrix for each demonstration component.

Subproject 1: Using Municipalities to Disseminate Energy Efficiency

Under the baseline situation, there are several barriers to the widespread dissemination of energy efficiency techniques relevant to the Bulgaria's regional headquarters which are mostly small and medium sized cities. These barriers can be identified as inappropriate municipal policies and legislation, no institutional capacity to manage energy at the local level, and no existing networks for the dissemination of information about energy efficiency initiatives.

The project aims to remove these barriers through developing a municipal network of energy efficiency officers based in the municipal administrations, first of Gabrovo and then, of other cities. The salaries of these officers will be paid by the municipality, but these costs should be compensated for by the energy savings resulting from the activities initiated. The experiences gained in Gabrovo will then be transferred throughout the network, which has been developed with support from US-AID. The network will then serve as the key to information sharing with respect to these activities.

The total cost of this project activity designed to remove these legal, institutional, and information barriers is US$ 1,230,000 million. Of this total, US$413,000 is being requested from GEF. The rest of the funding for this activity will be from Bulgarian sources and US-AID (Table 2).

Subproject 2 Training and Education

At present, while there are many potentially profitable energy efficiency investments in Bulgaria, personnel at the local level do not have the experience of working on energy efficiency programmes, nor do they have received sufficient training to identify, evaluate, and finance energy efficiency projects. The necessary material to train these local professionals and technicians does not now exist in Bulgaria. Therefore, there is a barrier with respect to both limited human capacity to implement energy conservation projects at the local level and inadequate training materials to facilitate the implementation of these projects.

Under the project, this second subproject will address the training needs of the people at the municipal level who will be involved in energy conservation programmes. The project will first identify existing training needs, evaluate existing training materials available in other languages, and tailor these materials into a training package. This package will then be used for training in Gabrovo before being transferred for use in other Bulgarian cities.

The cost of overcoming this shortage of trained personnel and limited training material is estimated at US$423,000. GEF is being requested to pay US$255,000 of this total. The remainder of the funding is being provided by Bulgarian sources and US-AID parallel projects (Table 2).

Subproject 3: Overcoming Financial Barriers

In the past, Bulgaria's economy was a state-operated monopolistic system where prices were fixed at a lower than world-market level and municipalities and firms received subsidies for their costs. As a result, there is no tradition or experience of financing energy-related activities and no experience of market mechanisms. This barrier even shapes the flow of information about potential cost reductions available through energy conservation. Business information about energy conservation and information about municipal investments are very limited.

The purpose of this innovative component is to facilitate wider financing of energy conservation efforts. This will include the development of a financing alternatives package focused on identifying options for business and industry at the municipal level. This information about financing options will also be developed into training packages which can be used in other contexts to inform interested business and municipal leaders about options to finance energy efficiency. It will also address directly the legal, policy, and institutional needs for a more active financing of energy efficiency investments.

The cost of undertaking this subproject aimed at limited information and familiarity with financing is US$423,000. Of this total, GEF is requested to provide US$255,000, and the remainder is being contributed by US-AID and Bulgarian sources (Table 2).

Subproject 4: Energy Efficiency Improvement of City Street Lighting Systems

Traditional, relatively inefficient (and somewhat ineffective) street lighting is found through much of Bulgaria. In a market situation, the municipality would have the incentive to deploy the more efficient lighting and timing systems found throughout much of the rest of Europe. To date, these systems have not been deployed, partly due to the inability of municipalities to finance these improvements, partly due to the limited information about how to implement these retrofits, and partly due to the fact that the street lighting is the responsibility not of the municipality but of the electric utility. This element will help to overcome these barriers and provide a model demonstration which can serve as a guide to other cities.

The incremental costs for this subproject are summarized in Table I-1. Under the baseline, Gabrovo would replace the old sodium and mercury vapor lamps as they fail. At present, the bulbs frequently do not get replaced. The costs for this path of action come to about US$395,300. The costs of replacing all street lamps, installing net telecontrol systems, and installing electronic control systems comes to US$995,000. At economic price levels of US$0.052/kWh, there would be annual net savings to the municipality of approximately US$377,780 per year compared to the baseline. Over a six-year project lifetime and with a 10% discount rate, the incremental costs of the activity are negative, estimated at US$(-)622,260. When compared to the baseline situation, this subproject will result in the reduction of CO2 emissions by 10,462 tonnes/year. Over the course of six years, these emissions total 52,308 tonnes of CO2. There will also be a reduction in sulfur emissions as an indirect result of this component, but no economic value is assigned to this environmental benefit.

To overcome the barriers to implementation, GEF is being asked to provide US$246,000. The additional funding will be obtained from Bulgarian sources. As part of Subproject 3, financing modalities for the implementation of these street lighting retrofits will be developed for application in other cities.

TABLE L1

Energy Efficiency Demonstration Zone - the City of Gabrovo, Bulgaria

DEMONSTRATION PROJECT: ENERGY EFFICIENCY IMPROVEMENT OF CITY STREET LIGHTING SYSTEM

	Total Costs	Domestic Benefits (Services provided)	Global Benefits (tons CO_2 equivalent)
BASELINE: • Replacement of burnt out luminaries with the same ones; • Full load of the installed capacity to achieve service according to the norms.	US $2,425,510	• Keeping the system working and satisfying the needs of the city in compliance with the norms; • Increase in energy consumption compared to the current situation by 6,035,000 kWh/per year.	Increase of CO_2 emissions by 8,690 t/year from current situation
ALTERNATIVE INTERVENTION: • Replacement of the existing luminaries with more efficient ones; • Introduction of net telecontrol; • Installation of electronic control system for night and semi-night duty cycle.	US $1,803,251	• Reduction of the installed capacity; • Reduction of energy consumption by 7,265,000 kWh/year compared to the baseline; • Reduction of running costs; • Improvement of services.	Reduction of CO_2 emissions by 10,462 t/year compared to baseline situation and 1,772 t/year compared to the current situation.
INCREMENTAL: (alternative-baseline)	US $ (622,260)		Reduction of CO_2 emissions by 10,462 t/year or 52,000t over 6 years compared to the baseline situation.

Subproject 5: Renovation of District Heating and End-Use System

At present, most of the district heating networks throughout Bulgaria are poorly operated and maintained because they rely upon outdated technology, the systems are heavily subsidized, and the users have no incentives to conserve. They also make limited use of metering: bills are currently based upon the cubic meters heated which is not an adequate measure consumption. This subproject will make limited, but carefully identified interventions in a district heating network in Gabrovo, to show how the system can be made more efficient, and more effective at a lower cost. It will also address issues relating to metering, tariffs, and consumption-based billing.

Under the baseline, the costs would entail the annual repair and reconstruction of the Heat Generating Plant and the replacement of worn-out steam mains. The total costs of these activities over the life of the project come to US$786,500. Under the project being proposed, a number of measures would be undertaken simultaneously in the heat generation system, the transmission and distribution system, and the end-user system. The total present value of these interventions comes to US$2,234,000. The gross incremental costs of this intervention are therefore, US$1,447,500. Given the value of the potential energy savings estimated at US$401,035 per year, the net incremental costs are estimated as being negative US$ (-)526,153. Compared to the baseline situation, there will be a reduction of CO2 emissions by 11,355 tonnes/year through the implementation of this subproject, or nearly 50,000 tonnes over the lifetime of this project. In addition to these global benefits, there will be additional benefits in the form of reduced sulfur emissions. There is no economic value assigned to these additional benefits.

GEF support is requested for US$295,000 as the necessary component to carry out the technical assistance work to prepare for the actual investment. Additional funds will be obtained from Bulgarian sources and an EBRD credit.

TABLE I.2

Energy Efficiency Demonstration Zone - the City of Gabrovo, Bulgaria

DEMONSTRATION PROJECT: ENERGY EFFICIENCY RENOVATION OF DISTRICT HEATING AND HEATING END-USE

	Total Costs	Domestic Benefits (Services provided)	Global Benefits (tons CO_2 equivalent)
BASELINE: Annual repair and reconstruction of the Heat Generating Plant; • Repair and replacement of existing steam mains which are obsolete and worn out.	US $664,000 US $122,500 Total US $786,500	• Keeping the system working and satisfying the needs of the city; • Preventing increase in losses; • Keeping the fuel consumption at the current level.	Keeping the level of CO_2 emissions at 0.614 t/Gcal (100,400 t/year)
ALTERNATIVE INTERVENTION: 1. Measures in Heat Generation: • Steam boilers 1,2,3 and 4 tune up; • Reconstruction of heating surfaces of steam generators 1 and 2 (coal-fired); • Reconstruction of the steam condensing yard. 2. Measures in Heat Transportation. • Repair and replacement of	US $110,000 US $409,000 US $ 22,000 Subtotal: US $ 541,000 US $330,000	• Increasing the production capacity of the system; • Reduction of heat requirements by 4220 Gcal/yr in Heat Generation; 7586 Gcal/yr in Heat Transport; 4250 Gcal/yr in Demand side. Value = US $ 401,035/year	Reduction of CO_2 emissions by 5596.9 t/year compared to baseline situation

are obsolete or worn out; Renovation of the heat transportation networks by using pre-installed pipes (1,900m)	US $700,000 Subtotal US $1,030,000		
3. Distribution Measures; • Fitting programme control values at the sub-stations; • Development of heat tariff structure to use in consumption-based billing system; • Installation of heat meters in new and existing sub-stations, a total of 180; • Replacement of old, worn out sub-stations with new modern ones, equipped with a heat meter and thermal control; • Replacement of single-speed heavy-duty pumps, which have been in operation for 8 to12 years, with new 2- or 3-speed pumps, a total of 150.	US $147,000 US$ 50,000 US$126,000 US $246,000 US $94,000 Subtotal US $663,000 Total US $2,234,000		
GROSS INCREMENTAL COST MINUS VALUE ENERGY SAVINGS - NET INCREMENTAL COST (alternative-baseline)	US $1,447,500 US $1,973,653 (US $526,153)		Reduction of CO_2 emissions by 11,355 t/year compared to the baseline situation.

ofit of Existing Buildings to Reduce Energy Use

standards and codes have been established for new construction and gs, Bulgarian building stock is relatively old and inefficient in energy there is a need to demonstrate the potential energy and economic ling retrofits. This element will provide technical assistance to conomic potential of building retrofits using one hospital, one school, esidence, and one industrial building.

l cost table (Table I-3), the case of the hospital has been taken as -AID is supporting the hospital demonstration). The baseline costs intaining the current system at adequate performance levels for a total 00. The alternative will involve retrofitting the building for a total of r 10 years (at 10% discount rate), the energy savings are estimated at per year. The gross incremental costs come to US$387,800 and the sts come to US$(-) 156,976. As energy prices continue to rise to world ofits to the building last longer than tex years, the economic effects of much greater than those analyzed in the proposal. When compared to on, this subproject will result in a reduction of CO2 emissions by 1743 tio enefits will involve a reduction of sulfur emissions and he comfort of building inhabitants.

quested for US$261,000 which will cover technical assistance costs to plans and to share the results with other cities. Additional support for ected from Bulgarian sources, US-AID, PHARE, and possibly JICA.

	• Substantial reduction of heat losses; • Improvement of services.	
US $ 2,700 US $ 4,000		
1 and 2 and technical set-up of burner; • Installation of steam meters; • Delivery and installation of a pipe bundle for counter-jet aggregates;		

• Automation installation works; • Building envelope measures; • Measures in the interior installations; • Automation.	US $ 2,000 US $ 272,100 US $ 17,000		
	US $ 70,000 Total US $560,800		
GROSS INCREMENTAL COST MINUS VALUE ENERGY SAVINGS - NET INCREMENTAL COST (alternative-baseline)	US $387,800 US $544,776 (US $156,976)		Reduction of CO_2 emissions by 1,743.7 t/year compared to the baseline situation.

ANNEX II

Translation from Bulgarian

Republic of Bulgaria
Ministry of Environment
1000 Sofia, 67, Gladstone str.; Tel. 359 2 87 61 51; 359 2 80 04 25; Fax 359 2 52 16 34

Mr. FABRIZIO OSSELLA
Resident Representative
of the UNDP
Sofia

February 1, 1996

Dear Mr. Ossella,

The Ministry of Environment presents to your attention a Program proposal for GHG reduction through Energy Efficiency ("Energy Efficiency Demonstration Zone in the City of Gabrovo"). The program is an element of the national program following the obligations of the Republic of Bulgaria according to the Framework Convention on Climate Change. It is defined as one of the priorities for cofinancing with the Global Environment Facility.

The Ministry of Environment is a state body for elaboration and implementation of policy for environment conservation and environmentally friendly utilization of natural resources. It represents the Republic of Bulgaria in international colaboration and co-ordinates the Republic's obligations on international conventions and agreements in the field of environment protection and global climate.

The UN Framework Convention on Climate Change was signed by the President of the Republic of Bulgaria in 1992 in Rio de Janeiro and was ratified by the Bulgarian Parliament on March 16, 1995. A National communication has been elaborated according to article 12 of the Convention and it is undergoing co-ordination. The official submittal to the Secretariat is forthcoming. At the same time specific programs and projects are being developed aiming to contribute to the actual GHG reduction.

Energy generation, industry and automobile transport are the basic sources of emissions that pollute environment. This makes measures for their reduction extremely important. The measures will be implemented through specific projects for direct investments using economic instruments for energy efficient production and consumption. The project "Demonstration zone for Energy Efficiency - Gabrovo" is

expected to contribute significantly for the discovery of specific approaches for efficient energy consumption and to the respective restriction of environment pollution. It plans to replicate the results on national scale. The project will be realized with the active participation of the local authorities and public. It is in complete agreement with the priority trends of the ministry strategy for environment protection. That's why the project has been supported by it from the very beginning.

The project "Demonstration zone for Energy Efficiency - Gabrovo" has been supported by the Presidency, the Ministry of Foreign Affairs, the Committee of Energy, the Ministry of Industry, the Ministry of Regional Development and Construction. It has been co-ordinated with programs of the European Union (PHARE, JOUL II, Dave, etc.), programs of the USAID, the Netheland's program GREENEnergy, etc. On January 19, 1996 a national meeting was held in Sofia where a support of the government, of experts and of the public was expressed.

The proposal for GHG reduction through Energy Efficiency ("Energy Efficiency Demonstration Zone in the City of Gabrovo") has been elaborated according to the requirements of the Global Environment Facility which is a serious base to expect the approval of its managerial bodies.

The proposal has been elaborated by the Bulgarian Foundation for Energy Efficiency in collaboration with the Ministry of Environment, the municipal authorities in Gabrovo, institutions and companies on the territory of the municipality that are concerned and Bulgarian and foreign experts. The Bulgarian Foundation for Energy Efficiency EnEffect is a non-governmental, not-for-profit organization that actively works in the field of energy conservation and environment protection. It has a wide network of local and international contacts. The Ministry of Environment has successfully organized several joint events with the foundation. Having in mind the engagements of EnEffect with the proposal preparation, its close contacts with the Gabrovo municipality administration and experts and the international relations, we would like to recommend you the Bulgarian Foundation for Energy Efficiency as a local executing agency for the project.

Mr. Ossella, would you please accept the materials for the Program proposal for GHG reduction through Energy Efficiency ("Energy Efficiency Demonstration Zone in the City of Gabrovo") for submittal to the UNDP Headquarters in New York and to assist in their presentation to the Technical and Political Committees of the Global Environment Facility secretariat. We hope that our desire to participate in world

programs for prevention of global climate change and preservation of planet's life will be estimated and our efforts will meet the corresponding support.

I hope to be kept informed about the procedure for the project proposal submittal.

Sincerely

Minister

важно е, че той ще се осъществи с активното участие на местната власт и общественост. Проектът е в пълно съответствие с приоритетните направления на стратегията за опазване на околната среда, следвана от Министерството, поради което е подкрепен от него още в началния етап на неговата подготовка.

Проектът за Демонстрационна зона за енергийна ефективност в град Габрово има подкрепата на Президентството, на Министерството на външните работи, Комитета по енергетика, Министерството на промишлеността, Министерството на териториалното развитие и строителството. Проектът е координиран с програмите на Европейския съюз (ФАР, ДЖУЛ II, СЕЙВ и др.), на Американската агенция за международно развитие, на японската агенция ДЖАЙКА, с холандската програма ГРИЙНЕнерджи и др. На 19 януари 1996 г. в София се проведе национално съвещание, на което бе изразена правителствена, експертна и обществена подкрепа на проекта.

Предложението за Програма за намаляване на емисиите на парникови газове чрез енергийна ефективност (Демонстрационна зона за енергийна ефективност - град Габрово) е разработено в съответствие с изискванията на Глобалния екологичен фонд и има сериозни основания да се надява на одобрението на неговите управляващи органи.

Предложението е разработено от Българската фондация за енергийна ефективност ЕнЕфект в сътрудничество с Министерството на околната среда, общинската администрация на Габрово, заинтересованите институции и фирми на територията на общината и със съдействието на български и чуждестранни експерти. Българската фондация за енергийна ефективност е неправителствена организация с нестопанска цел, която активно работи в областта на енергоспестяването и опазването на околната среда. Тя осъществява дейността си на основата на широка мрежа от вътрешни и международни контакти. Министерството на околната среда успешно осъществява съвместни инициативи с фондацията. Като имаме предвид ангажираността на ЕнЕфект с подготовката на предложението, тесните контакти с администрацията и експертите в община Габрово и създадените международни контакти, Ви препоръчваме Българската фондация за енергийна ефективност да изпълнява ролята на местна агенция за администриране на проекта.

Г-н Осела, моля да приемете материалите по предложението за Програма за намаляване на емисиите на парникови газове чрез енергийна ефективност (Демонстрационна зона за енергийна ефективност - град Габрово) и да ги внесете за разглеждане в Главната квартира на ООН в Ню Йорк, както и да съдействате за представянето им в Техническия и Политическия комитет на Глобалния екологичен фонд. Надяваме се, че нашето желание да участваме в световните програми за предотвратяване на промените в климата и опазване живота на планетата ще бъдат оценени по достойнство и нашите усилия ще получат съответната подкрепа.

Надяваме се, че ще ни информирате за процедирането на представеното проектно предложение.

С уважение

Йончо Пеловски
Зам.-министър

Република България
МИНИСТЕРСТВО НА ОКОЛНАТА СРЕДА
1000 София, ул. Гладстон 67, факс 359 2 / 80-04-25, 52-16-34, тел. 87-61-51

Министерство ... Вх. № 99-00-683 София ... 12 ... 02 ... 96 г.

ДО
г-н ФАБРИЦИО ОСЕЛА
Представител
на Програмата за развитие на
Организацията на обединените нации
София

1.02.1996 г.

Уважаеми г-н Осела,

Министерството на околната среда Ви представя Предложение за Програма за намаляване на емисиите на парникови газове чрез енергийна ефективност (Демонстрационна зона за енергийна ефективност - град Габрово). Програмата е елемент от националната програма за изпълнение на задълженията на Република България, произтичащи от Рамковата конвенция на ООН по изменение на климата и е определена като един от приоритетите за съвместно финансиране с Глобалния екологичен фонд (GEF).

Министерството на околната среда е държавен орган за разработване и провеждане на политика по опазване на околната среда и екологосъобразно използване на природните ресурси. То представлява Република България в международното сътрудничество и координира изпълнението на задълженията ни по международните конвенции и спогодби в областта на опазването на околната среда и климата на планетата.

Рамковата конвенция на ООН по изменение на климата бе подписана от президента на Република България през 1992 г. в Рио де Жанейро и ратифицирана от Парламента на 16 март 1995 г. Разработен е и е в процес на съгласуване Националният доклад, изискван по чл. 12 на Конвенцията. Предстои неговото официално внасяне в Секретариата. Същевременно се разработват конкретни програми и проекти, които ще допринесат за реално намаляване на емисиите на парникови газове.

Енергопроизводството, промишлеността и автомобилният транспорт са основни източници на емисии на вещества, оказващи вредно въздействие върху околната среда, поради което особено важно значение имат мерките, насочени към намаляване на замърсяването на въздуха от тези източници. Тези мерки следва да се осъществяват чрез изпълнение на конкретни проекти за преки инвестиции и прилагане на икономически инструменти за повишаване на енергийната ефективност на производството и потреблението. Проектът за Демонстрационна зона за енергийна ефективност - град Габрово ще има важен принос за намиране и демонстриране на конкретни подходи за повишаване на ефективността на енергопотреблението и съответно ограничаване на замърсяването на околната среда с възможностите и програмата си за многократно умножаване на постигнатите ефекти в национален мащаб. Особено

ANNEX III

List of Supporting Letters Available upon Request

31/1/96	Simeon Bozhanov, Counselor to the President of the Republic of Bulgaria on environmental issues
12/2/96	Y. Pelovski, Vice Minister, Ministry of Environment
1/2/96	Maya Dobreva, Head, Foreign Economic Policy Department, Republic of Bulgaria, Ministry of Foreign Affairs
12/2/96	Roumen Ovcharov, Vice-President, Committee of Energy
2/2/96	Ministry of Regional Development and Construction of Republic of Bulgaria
31/1/96	Nikolai Dachev, Mayor of the Gabrovo Municipality
14/3/96	John Tennant, USAID Representative
6/2/96	Robert Russo, Electrotek Concepts Inc
1/2/96	Th.F.M. Verkerk, Novem

May 23, 1996

Richard Hosier
UNDP/GEF
New York, New York.
cc: Annie Roncerel

Dear Dick,

Thank you for giving me the opportunity to review the Bulgaria energy efficiency project proposal. The proposal seems to have been well thought through and deserves to be supported. I have noted the few areas where the proposal could be strengthened, but these are small improvements, which do not change the basic thrust and rationale for GEF support of the proposal.

If you have any questions or comments, please do not hesitate to contact me.

Sincerely,

Jayant Sathaye

REVIEW
BULGARIA: ENERGY EFFICIENCY STRATEGY TO MITIGATE GREENHOUSE GAS EMISSIONS

1. RELEVANCE TO GEF

The project is clearly relevant to the global warming area of GEF. It will improve the efficiency of energy supply and use in Bulgaria, through enhancing the technical capacity of municipal governments, and providing information and financing opportunities for projects in the country. GEF funding will be also be used for three demonstration projects: improved street lighting, district heating and buildings in the service sector. Implementation of the project will reduce carbon dioxide emissions from reduced fossil fuel and electricity consumption in the three sectors.

2. OBJECTIVES OF THE PROJECT

The project objectives are well stated and the specific objectives are clear. The project's basic objective is to improve the efficiency of energy use in Bulgaria. This will be achieved through improving the capacity of municipal governments for energy efficiency improvements, by providing financing opportunities and through demonstrations in three sectors: district heating, street lighting and building energy use. These objectives are worth pursuing, since Bulgaria's central planners had neglected improving energy efficiency throughout the energy sector. The potential for negative cost improvements is large and the proposal documents the many barriers to these improvements, which would be overcome through activities implemented as part of this project.

3. APPROPRIATENESS OF THE PROJECT APPROACH

The project approach takes into consideration stake-holder interests and is not centrally driven. Thus it has the potential to be implemented better and faster with broad acceptance among all the participants. One barrier that the project needs to address more carefully is the lack of metering at the customer level. Most energy supply, natural gas and steam/hot water from district heating, is not metered at the point of delivery. This is a major disincentive to more efficient energy use. The project notes this as a barrier without focusing on approaches to overcoming it. It is important that the approach incorporate ways to address this issue.

4. ACTIVITIES

The activities noted in the proposal are appropriate for the implementation of the proposed project. Please see the approach section above, where activities should be created to address the

issue of customer-level metering and pricing of energy.

5. COUNTRIES

The proposal is for Bulgaria so no other countries are involved. Successful demonstration of the concept in Bulgaria would be useful to help spread the innovative approaches to most Former Soviet Union and Eastern European countries.

6. OMISSIONS IN BACKGROUND DISCUSSIONS

The background section is well documented. One issue that requires some clarification is the type of fuel that is used for peak power generation. The proposal notes that it is a mix of hydro and fossil fuel. The background section should include information on the types of fuels used, and the fraction of peak-power generation that is fossil-fuel based in a typical year.

A second topic has to do with the economic value of electricity, which is noted, elsewhere in the proposal, to be US $0.052/kWh. Since the avoided electricity is on-peak, it is necessary to use the on-peak marginal cost of generation. Most likely this will be higher than the presumably average value noted above, which should lead to higher economic savings than estimated in the proposal.

The proposal uses a surprisingly low value for the carbon content of lignite. An explanation of this low value would be useful.

7. INSTITUTIONAL ARRANGEMENTS

The proposal makes note of many institutions which will either provide baseline funding or will play a role in project implementation. While the proposed institutions seem appropriate to implement the project, a more thorough evaluation should be done at the project document stage. Also, letters of support for the baseline funding should be required prior to project implementation.

8. FUNDING

The proposal calls for $8.575 million total funding. GEF share of this will be $2.575 million with baseline funding provided by the Bulgarian government, US AID and PHARE. It is difficult to determine the GEF share of the project funding without seeing the detailed explanation of why GEF funds, rather than government funds, are needed. The proposal needs to provide this information in order to justify the share of GEF funds.

The incremental cost estimates show negative costs for each of three demonstration projects. A better approach to the estimation would have been to distinguish between fuel savings and capacity deferment brought about by the energy efficiency project. The results, I believe, would still show negative costs for each project, although the savings amounts would be different.

9. INNOVATIVE FEATURES

The project approach incorporates several innovative features. It will provide funds for three programs that are clearly innovative and have not been implemented in Bulgaria. In addition, the funds will be used for evaluating and implementing innovative financing packages to promote energy efficiency in the country.

END