GLOBAL ENVIRONMENT FACILITY

MOHAMED T. EL-ASHRY
CHIEF EXECUTIVE OFFICER
AND CHAIRMAN

December 3, 1997

Dear Council Member:

UNDP as the Implementing Agency for the project entitled *Republic of Bulgaria: Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions Energy Efficiency Demonstration Zone in the City of Gabrovo*, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with UNDP procedures.

Over the next four weeks, the Secretariat will be reviewing the project document to ascertain that it is consistent with the proposal included in the work program approved by the Council in October 1996, and with GEF policies and procedures. The Secretariat will also ascertain whether the proposed level of GEF financing is appropriate in light of the project's objectives.

If by December 31, 1997, I have not received requests from at least four Council Members to have the proposed project reviewed at a Council meeting because in the Member's view the project is not consistent with the Instrument or GEF policies and procedures, I will complete the Secretariat's assessment with a view to endorsing the proposed project document.

Sincerely,

Mohamed T. El-Ashry
Chief Executive Officer and
Chairman

Attachment:
Republic of Bulgaria: Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions Energy Efficiency Demonstration Zone in the City of Gabrovo

cc: Alternates, Implementing Agencies, STAP

GEF SECRETARIAT, 1818 H STREET NW, WASHINGTON, DC 20433 USA
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United Nations Development Programme
GLOBAL ENVIRONMENT FACILITY (GEF)

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G E F SECRETARIAT

19 November, 1997

Dear Mr. El-Ashry,

Subject: **BUL/96/G31/A/1G/99 - Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria**

I am pleased to enclose the project entitled ***"Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria"*** approved by the GEF Executive Council in October 1996.

As per paragraph 29 and 30 of the GEF Project Cycle, we are submitting this project to you for circulation to the Executive Council Members for comments and, subsequently, for your final endorsement.

Thank you in advance for expediting the review and approval of this project.

Yours sincerely,

Emma Torres
Officer in Charge and
Deputy Executive Coordinator

Mr. Mohamed El-Ashry
Chief Executive Officer
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UNITED NATIONS DEVELOPMENT PROGRAMME

Project of the Government of the Republic of Bulgaria

Project number: BUL/96/G31/A/1G/99

Project title: Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions. Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria

Estimated start date: January 1998

Estimated end date: December 2002

Executing agent: Ministry of Environment and Water Resources through the Bulgarian Foundation for Energy Efficiency EnEffect

Implementing agent: The Bulgarian Foundation for Energy Efficiency EnEffect

Project site: Bulgaria

Summary of GEF/UNDP and cost-sharing inputs
[as per attached budgets]

GEF	US$ 2,428,000
Preparatory Assistance	US$ 147,000
Government or third party cost sharing	Nil
GEF total funding	US$ 2,575,000
Parallel Financing USAID	US$ 900,000
Total:	US$ 3,475,000

Classification information

ACC/UNDP sector:	0500 Energy
ACC/UNDP subsector:	**0510 Energy** planning and conservation
DCAS sector and subsector:	
Government sector and subsector:	Environment Energy conservation
Primary areas of focus/sub-focus:	
Secondary areas of focus/sub-focus:	
Primary type of intervention:	
Secondary type of intervention:	
Primary target beneficiaries:	
Secondary target beneficiaries:	

Government inputs:

in kind	BGL 3,027,000,000
Parallel financing	US$ 2,256,000

LPAC approval date: 03 October 1997
BPAC approval date:
Program officer: Dafina Gercheva

Brief Description: The intent of the project is to introduce practices at the municipality level that overcome barriers to improved energy efficiency and reduced emissions of greenhouse gases (GHGs) and other environmental pollutants. The project is organized into two elements: 1) National Capacity Building; and 2) Supporting Demonstrations. The Capacity Building activities are the heart of the project. All other activities are designed to strengthen them. The Capacity Building activities focus on municipalities as the critical political and socio-economic unit for bringing about change in Bulgaria. They include municipal energy management, training and financing activities. Supporting Demonstrations in street lighting, district heating, and building retrofit projects show how Capacity Building can be applied to real projects. Project Management supports these efforts and the rapid diffusion of Capacity Building and Demonstrations to other municipalities, reaching at least 30 municipalities--a critical mass for ensuring that the reforms continue throughout the country after the project is concluded.

On behalf of:	Signature	Date	Name/title
The Government:			
Executing agency:			
UNDP:			

United Nations official exchange rate at the date of last signature of project document: $1.00 =_____leva

United Nations official exchange rate at the date of last signature of project document: $1.00 =_____leva

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A. CONTEXT

A1. Description of Subsector

1. The Republic of Bulgaria is a middle-sized country in Southeast Europe with a surface area of about 111,000 km2 and a population of about 8.5 million. Bulgaria is among the countries in transition from a centrally planned to a market economy. The transition has seen decline and major structural changes in the economy and as a consequence in the gross domestic product (GDP). Most noticeable changes occurred in the industrial sector, whose share of GDP has declined from more than 60% to less than 35%, and the service sector, whose share considerably increased from 22% in 1987 to over 50% in recent years.

2. The energy sector plays a key role in Bulgarian economic and social development. The past development pattern followed by Bulgaria has been highly energy intensive, creating an energy intensity per unit of GDP double that of West European countries. Bulgaria's gross consumption of primary energy in 1995 was 1,020,824 Terajoules (TJ). The largest sources were: coal, 313,757 TJ; petroleum, 339,982 TJ; natural gas, 191,941 TJ, and nuclear and hydroenergy, 229,198 TJ. The final energy consumption was 478,974 TJ, of which: industry, 52.2%; residential sector, 29.8%; service sector, 7.3%; transportation, 5.8%; and others, 4.9%.

3. The energy sector is the most important greenhouse gases (GHG) emission source in Bulgaria. The stationary combustion accounts for 64.2% of the total emissions. Relatively small in comparison with western countries is the mobile combustion share - 7.7%, followed by the emissions from industrial processes - 6.6%. CO_2 is the most important GHG in Bulgaria and 93.9% of its total emissions come from fossil fuel combustion.

4. Bulgaria depends heavily on energy imports, which provide about 65% of its energy needs. The only indigenous energy resource that is important to its economy is a low quality coal (1500 kcal/kg heat rate on average) with a high sulfur content (2%). In this situation, energy planning and conservation are critically important to Bulgaria's achievement of its development objectives.

5. Under central planning, energy prices were set artificially at levels well below their true costs. As a result, there was little incentive to use energy efficiently. A process of increase in energy prices was started in 1993 under the pressure of the real production costs and the decreased possibilities of the budget to subsidize them. The average electricity price increased from 2.15 to 74.64 Bulgarian leva (BGL)/kWh and the price of heat increased from 956 to 20,690 BGL/Gcal for a one year period since May 1996. Because of the high inflation rate and dramatic changes in exchange rate, the dollar equivalent of these prices show very smooth movement from 3.3 to 3.5 cents/kWh electricity and 22% decrease in heat prices. Further increases in energy

prices are expected, particularly for district heating, as the government moves toward its goal of market-based prices.

6. The historic lack of incentive and the severe economic depression in recent years have led to a serious deterioration in the performance of the energy-using infrastructure. A considerable part of the industry, residential, service, and transportation sectors are equipped with obsolete machines, devices, installations, and technologies. This situation provides for considerable energy conservation potential. The leaders of the national government and Gabrovo and other municipal authorities recognize these conditions and are committed to undertaking a comprehensive set of energy planning and conservation measures.

A2. Host Country Strategy

7. The Bulgarian commitment to energy planning and conservation is reflected in several government actions, including its participation in the United Nations Framework Convention on Climate Change (UNFCCC). Bulgaria signed the Convention in Rio de Janeiro in June 1992 and its Parliament ratified the Convention in March 1995. In compliance with the UNFCCC requirements, Bulgaria submitted its First National Communication to the Conference of the Parties in February 1996. In its Communication, Bulgaria pointed to the close connection between climate change and energy efficiency policies, saying: "As in many countries, in Bulgaria climate change policy and strategies are largely based on the national energy policy due to the high energy intensity of GDP and very high share of greenhouse emissions that originate from the energy sector."

8. The underlying principles of the country's energy strategy are consequently elaborated in the Energy Charter adopted in 1993 and the National Energy Strategy by 2020 adopted in 1995. The energy strategy is based on the rational use of indigenous and imported energy resources, existing energy units, and national scientific and labour potential. The legislation tools for achieving the objectives of the National Energy Strategy are under discussion in the Parliament and their adoption is expected.

9. The newly elected democratic government has expressed its commitment to establishing a workable administrative structure for implementing energy efficiency programmes. In 1992, the first democratic government of Bulgaria created a National Energy Efficiency Agency and a National Energy Efficiency Fund. The current government has declared its ambition to put these structures to work. (See paragraph 19 below)

10. The national environmental strategy is formulated in the Environment Protection Act adopted in 1991 and amended the following year. A Clean Air Act was adopted in early 1996. Although the environmental regulations address only levels of particulates, sulfur dioxide (SO_2) and nitrogen oxides (NO_x), and does not concern directly the major

GHGs - carbon dioxide (CO_2) and methane (CH_4), as well as precursors, it is expected the regulations will have positive impacts in suppressing GHG emissions as far as the regulation requirements can be met by increasing overall efficiency of stationary combustion process and by implementation of new technologies.

11. A National Environmental Fund was established in 1992. The assets of the Fund are 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. A good number of projects with positive environmental impacts have received financing from the Fund as a grant, as a loan, or as a low interest loan.

A3. Prior and On-going Assistance

12. Bulgaria has actively pursued international support to achieve its energy and environmental goals. Bilateral and multilateral donor activities started in the early 1990's. Bulgaria has been working in close co-operation with the UN ECE through the Energy Efficiency 2000 Programme. The demonstration zone of Gabrovo was established in co-operation through the EE 2000 Programme. The purpose of an Energy Efficiency Demonstration Zone is not only to demonstrate technologies, but also to demonstrate, on a local level, the institutional innovations, regulatory and legal changes, information dissemination, and other types of activities that are intended to remove barriers to market-based investments in greater energy efficiency. Once proven in the demonstration zone, they can be more easily and less costly replicated elsewhere.

13. In 1992 the Directorate General XVII 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 with in-kind activities. The PHARE 93 Programme for Conventional Energy established an Energy Project Implementation Unit within the Committee of Energy. The Programme has three 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. Bulgaria also has received important support from the THERMIE, JOULE II, and SAVE programmes, the Netherlands' Novem programme, ADEME (France), and other foreign and international European programmes.

14. 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 started a new energy efficiency project for Bulgaria, Municipal Energy Efficiency Initiative. It will work in close co-operation with the GEF project in Gabrovo as a source of 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.

15. Bulgaria received support from the U.S. Country Studies Programme, which is assisting Bulgaria in studies required by the UN/FCCC. Bulgaria was among the first round of countries participating in the U.S. Governmental Programme and the project was cosponsored by the U.S. Department of Energy.
The project was a first attempt to identify the key areas to address climate change problems and provided a consistent basis for further development of the national climate change policy. 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.

16. The Japanese Agency for International Co-operation (JICA), in co-operation with the Bulgarian Ministry of Industry, is working on increasing the energy efficiency in industry, focusing on industrial technologies. JICA has equipped an Energy Efficiency Centre to the Ministry of Industry which has audited a number of facilities over the last few years.

17. The World Bank has contracted with the Bulgarian Government an emergency loan for energy efficiency measures for heat meters in the existing district heating systems in Bulgarian cities. The European Bank for Reconstruction and Development (EBRD) is in a process of negotiating a loan for financing energy efficiency projects in the Sofia District Heating System.

A4. Institutional FrameWork for Subsector

18. The Ministry of the Environment and Water Resources (MOEWR) is responsible for developing, coordinating and implementing Bulgaria's obligations under the United Nation's Framework Convention on Climate Change (UN/FCCC). MOEWR has embraced energy efficiency as a primary strategy for reducing future GHG emissions and meeting the obligations under the UN/FCCC. In 1988, the country's base year under the UN/FCCC, fully 86% of its GHG emissions came from CO_2 emissions largely from energy sources. MOEWR has established good relationships with the municipal level and has institutionalized environmental protection within the structures of municipal authorities. The National Environmental Fund, operated by the MOEWR, has a municipal level analogue in the form of the Municipal Environmental Funds. In the field of energy efficiency, MOEWR is coordinating its activities with the Committee on Energy (COE), the Ministry of Industry, and the Ministry of Regional Development and Construction.

19. The Committee on Energy (COE) was recreated in May 1997, following the election of a reform government committed to the implementation of financial policies recommended by the International Monetary Fund. The COE is the ministerial-level body responsible for Bulgaria's energy policies, including energy production, transportation, and distribution, as well as rational energy use. COE develops and implements the regulatory basis for the energy sector, including energy efficiency. Draft legislation strengthening energy efficiency and supply programmes is now pending before the Parliament. On the legislative front, the new COE is committed to providing resources to the energy efficiency fund created earlier. COE develops programmes for energy consumption, the country energy balance, energy pricing methodologies, national and regional energy strategies and programmes. COE is the executing agency for the PHARE
project on conventional energy use. Two of the nine administrative regions in the country have established regional energy centers with the support of the PHARE project and under the guidance of the COE.

20. The Bulgarian Foundation for Energy Efficiency EnEffect is one of the few non-governmental organizations (NGOs), interested in activities to prevent climate change. It is an active participant in the elaboration, implementation, and promotion of projects related to the introduction of energy efficient technologies in the public sector, in households, and in the private sector. In cooperation with the UNECE, the UNDP, the MOEWR and COE, and the Gabrovo municipality, EnEffect has prepared the Demonstration Zone proposal and will have a substantial role as the instrument for implementing the objectives of its supporting institutions. (See paragraphs 38 and 39)

B. PROJECT JUSTIFICATION

B.1. Problems to be Addressed: the Present Situation

21. The problem to be addressed is the low level of energy efficiency throughout Bulgaria. The resulting economic impacts are severe -- impacts that have become highly visible as Bulgaria makes the transition from a centrally planned to a market economy. With about 65% of the energy used in the country imported -- now at international prices -- the economic drain is huge on an economy already suffering from a deep depression. The human impact is untenable, particularly when the energy is wasted. Currently, the costs for energy consumption account for a substantial portion of the income of the population and the revenue of public and business entities. The high energy component in the cost of manufactured goods reduces their competitiveness in the world market.

22. The environmental impacts of energy inefficiency are also severe, contributing to the unnecessary emission of sulfur oxides, nitrogen oxides, particulates, CO_2 and other combustion gases. The emissions adversely affect the health of Bulgaria's citizens, the conditions of its forests, agriculture and the ecosystems, and the useful life

of its man-made buildings and infrastructure. These environmental impacts have gained additional significance as the Bulgarian Government has embraced the global goal embodied in the United Nation's Framework Convention on Climate Change (UNFCCC). The Government has identified energy efficiency as its primary strategy for meeting its obligation under the UNFCCC to mitigate its emissions of greenhouse gases (GHGs).

23. Despite the energy, economic, and environmental benefits of energy efficiency in Bulgaria, little movement has been made to eliminate energy waste. Because of historic reasons, there is a limited societal capacity to increase energy efficiency. This limited capacity is evident both on the national and local levels. Achieving the energy and environmental goals will require a basic institutional and behavioral transformation. Gaps in policies and legislation in the area of energy efficiency and the lack of capacity and institutional background in managing local, regional, and national energy efficiency programmes have to be addressed. Due to the underpricing of energy in the past, there is little understanding of the potential for increased energy efficiency. Due to the state monopoly 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. Business knowledge and experience regarding financing mechanisms are lacking. The project is designed to build capacity in these areas, starting on the municipality level and spreading rapidly throughout the country to help overcome the national barriers to increased energy efficiency.

24. The capacity building activities are focused on Gabrovo and other municipalities because of the unique and important role that municipalities have in Bulgaria. The country's 254 municipalities are the principal political authorities below the national government. Municipalities exercise jurisdiction over a city; smaller, neighboring cities; villages and rural areas. Municipalities have elected governments and have local taxing, spending, and legislating authority. Municipalities are close to the people and to the day-to-day interactions where shifts in attitudes toward energy usage must start. These characteristics make municipalities potentially powerful and pervasive agents of change in Bulgaria. For this reason, the project design has focused on capacity building at the municipality level. 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. This city has been selected because of its representative nature, and because of the demonstrated commitment of its leaders to energy efficiency.

B.2. Expected End of Project Situation

25. Gabrovo is recognized as a "laboratory" of energy efficiency activities, not only in Bulgaria, but internationally. It has pilot tested capacity building and

demonstration projects. With support from international and national experts, the activities were designed, implemented, and evaluated in a very open and technically sound manner. Project successes were turned into case studies that are being used to replicate similar projects elsewhere. Not all projects achieved their objectives and they were candidly and carefully reviewed to find out what went wrong and what could be learned from the experience. Gabrovo has established its municipal Energy Efficiency Office and has developed a model set of municipal policies and regulations designed to minimize energy waste in its own operations; to serve as an example for its citizens and its service, industrial, and transportation sectors; and to provide an environment that encourages investments from firms providing energy services and manufacturing energy-saving products.

26. The Demonstration Zone Support Office has developed as an information, knowledge, and supporting center for municipal energy efficiency initiatives. A group of high quality professionals has been trained as trainers by international consultants and has developed capacity to disseminate knowledge through special workshops, manuals and guides in Gabrovo and other municipalities. The quality of the training materials and courses has been steadily improved, based upon the "feedback" from the participants.

27. Starting in Gabrovo, municipal Energy Efficiency Offices are established in 30 municipalities. A growing cadre of trained and educated professionals are supporting their activities. They can provide audits on how to identify the most attractive energy efficiency investments, how to implement projects successfully, how to operate and maintain energy-using equipment to ensure optimal performance, how to teach average citizens to use energy wisely. They are prepared to identify and develop municipal energy efficiency programmes and projects, and to influence the decision-making process in municipal operations.

28. Many of the obstacles that severely limited investments in energy efficiency at the start of the project have been removed in Gabrovo and a growing number of municipalities. While sources of financing were once rare, there now are a number of financing choices available--energy service companies (ESCOs), energy performance contracts, Activities Implemented Jointly, energy efficiency funds, and an increasing number of Bulgarian financial institutions that offer loans for energy-saving investments. The financing requirements of these resources are clearly communicated, so potential borrowers know what needs to be done to develop bankable projects.

29. As a consequence of these capacity building activities, the investments in energy-saving projects are increasing rapidly. The initial lighting, district heating, and building retrofit investments in Gabrovo have been completed, the projects evaluated, the design of retrofit projects improved, and the lessons learned are being used in replications of the projects in a growing network of municipalities. There is now a clearer understanding of what retrofit measures produce the greatest economic and environmental benefits, how to design and implement such projects, and how to train

the equipment operators to use the energy-saving equipment and facilities. Energy efficiency -- and the jobs and markets it produces -- has become a rapidly growing business in Bulgaria.

30. The capacity building activity and the resulting energy-saving projects they are producing have reached a self-sustaining level. The benefits of enlightened municipal policies, training and education, and financing of energy efficiency is receiving growing recognition which is expected to continue to grow after the end of the project. No further need for a UNDP-supported project is anticipated. After the completion of demonstration of project activities, future investments in these areas are expected to be self-sustaining.

31. For Subproject 4, dealing with improvement of street lighting, an examination of potential incremental costs has shown the activity to be profitable and cost-effective. 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 CO_2 emissions by 10,462 tonnes/year. Over the course of six years, these emissions total 52,308 tonnes of CO_2. 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.

32. **For Subproject 5, focusing on district heating renovations, the project activities** are expected to be profitable and self-sustaining following the removal of barriers through proposed project activities. The total costs of these renovations 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 CO_2 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.

33. **For Subproject 6, the post project activities are expected to be sustainable. In** the case of a hospital, the baseline costs involve merely maintaining the current system at adequate performance levels for a total of about US$173,000. The alternative will involve retrofitting the building for a total of US$560,800. Over 10 years (at 10%

discount rate), the energy savings are estimated at about US$111,900 per year. The gross incremental costs come to US$387,800 and the net incremental costs come to US$(-) 156,976. As energy prices continue to rise to world levels and the retrofits to the building last longer than ten years, the economic effects of the project will be much greater than those analyzed in the proposal. When compared to the baseline situation, this subproject will result in a reduction of CO_2 emissions by 1743 tonnes/year. Additional benefits will involve a reduction of sulfur emissions and improvements in the comfort of building inhabitants.

B.3. Target Beneficiaries

34. The direct beneficiaries are those affected immediately by the project--the municipal governments of Gabrovo and the growing network of municipalities. Providing them with knowledge, financial mechanisms, and support to better manage municipal services and facilities will strengthen their self-governance. Reduction of energy consumption will practically decrease the growing pressure of energy costs on municipal budgets. Direct beneficiaries are also the public utilities which receive financial and technical support for the implementation of projects beneficial both for their economic results, and for their image.

35. The project is also beneficial for those participating in the training and education programmes, those with new jobs in the growing business of energy efficiency, those who own the buildings and facilities that are retrofitted. Beneficiaries are also those who use these buildings and facilities, the people who use the streets that are relighted, eliminating underlit and overlit areas; whose district heating systems are modernized, revising the tariffs that otherwise would be levied and providing them with a way to control their costs by reducing their consumption; and those whose buildings are retrofitted, reducing their energy costs and increasing the health and comfort of their indoor environments.

36. Indirect beneficiaries are the policy makers on national level who will receive signals and assistance from the local level (bottom-up) to develop and implement a national energy efficiency policy, tools, and mechanisms for achieving the national goals of economic and environmental sustainability. The project will also support the government to meet its obligation under the UNFCCC to mitigate the emissions of greenhouse gases.

37. Important additional beneficiaries are those responsible for making energy planning decisions in the Bulgarian energy industries and in the government agencies that regulate them--key issues for this UNDP subsector. Because of the historical reasons described above, there is great uncertainty about the level of the future demand and consumption of electricity, heat, and other energy sources in Bulgaria. Forecasts based on the projection of past trends are of little value. It is necessary, instead, to estimate what the future demand and use will be once cost-effective energy efficiency

measures have been adopted. The project will provide actual data points on the results of energy efficiency investments. This information will help energy planners make more reliable forecasts of future energy demand and consumption. In this context, the term, "demand," is used to describe the amount of energy required by end users at any one time--an amount that will vary during the day and in different seasons of the year. The term, "consumption," is used to describe the total amount of an energy source used during the year. A reliable forecast of both demand and consumption is needed by energy planners; for example, in deciding whether new investments are needed in base-load, intermediate-load, or peak-load electricity generating plants. The metering of both demand and consumption, embedded in the energy efficiency projects, is an important component of the information useful to energy planners.

B.4. Project Strategy and Implementation Arrangements

Project strategy

38. The basic strategy is to be inclusive; that is, to include in some manner all the participants that will have a role in determining whether the project achieves its objectives. While the activities start in Gabrovo and are then extended rapidly to other municipalities, the relevant national ministries are also critical parties to the project. Because of the potential contributions from international and bilateral assistance programme, they also have important roles in the project. The inclusive approach means that additional attention will need to be given to coordinating the activities of municipal, national, and international participants. However, these efforts represent a sound investment in creating the structural institutional changes critical to achieving an enduring impact after the project is completed. As described below, this inclusive process also has been a feature of the preparation of the project, so that it reflects a shared vision of the future.

39. A second strategy is to focus the requested UNDP/GEF funding on the capacity building activities. It is possible with outside funding to undertake an energy saving project and prove that energy has been saved. However, if that is all that happens, the results are limited. The huge task facing Bulgaria cannot be met by a series of projects of this type. For this reason, the retrofit projects are not seen as an end in themselves, but as a means for testing and applying the capacity building strategies to provide the municipal setting, trained personnel, and financial environment to add a multiplying effect to the demonstrations.

40. A third strategy is to address national problems working on the local/municipal level. The municipality is the authority closest to the energy consumer and is consumer itself and has the best opportunities for reducing energy consumption, and hence GHG emissions. Municipalities in Bulgaria are the critical political and socio-economic units for bringing about change. Applying municipal approach in the project will bring about quicker practical results with the limited resources available. Associating municipalities

in a Municipal Energy Efficiency Network will increase their potential to influence national policies and actions.

Implementation arrangements

41. UNDP is the GEF Implementing Agency for this project and the project execution will comply with UNDP rules and procedures for national execution. The Bulgarian Foundation for Energy Efficiency EnEffect will be the executing agency of the project on behalf of the Ministry of the Environment and Water Resources. This choice is justified by the considerable and exclusive experience accumulated by Eneffect as a result of its efforts in the project identification, development, coordination, and approval process. EnEffect has been subcontracted to implement the main activities of the Preparatory Assistance Document, namely: preparation of a draft project document; training needs assessment and specification of training programmes; undertaking preliminary work related to the implementation of the project and selection of energy conservation measures; preparation of demonstration projects for application for funding following NEF and National Trust Eco Fund criteria; training of the local project management team. EnEffect has been entrusted by the municipal authorities in Gabrovo to work for the development of municipal energy efficiency strategy and programmes. It has also been entrusted as the Bulgarian partner with the implementation of the parallel funded activities by USAID.

42. The Bulgarian Foundation for Energy Efficiency EnEffect is a non-governmental not-for-profit organization that was founded in 1992 in Sofia. EnEffect was created with the objective of providing assistance for sustainable development and environmental protection through energy efficiency. The sponsors included the USAID, U.S. Department of Energy, U.S. Environmental Protection Agency, Battelle/Pacific Northwest National Laboratory, World Wildlife Fund, and C.S. Mott Foundation. The EnEffect staff includes persons with degrees and experience in architecture, engineering, economics, communications and management. EnEffect works on a contract basis with a good number of high level Bulgarian experts. EnEffect has prioratized its activities for promoting energy efficiency on local/municipal level and has developed successful partnerships with the municipal authorities in Gabrovo and other Bulgarian municipalities, as well as with other public, private, and non-governmental institutions.

43. A Project Steering Committee will be set up in order to provide policy input and functional guidance during the implementation of the Project. This Committee membership will comprise senior level representatives from UNDP, the Ministry of the Environment and Water Resources, Municipality of Gabrovo, Battelle/PNNL, Committee of Energy, and other key public and private institutions. EnEffect will report to the Committee on the implementation of the project activities. The Steering Committee will have regular meetings at the end of each quarter and will meet on a call-for basis when the executing agency requires it for overcoming major obstacles to

implementation. Funding partners will form a Financing Sub-Group, which will make overall project management decisions concerning funding arrangements.

44. 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, public and commercial associations, non-governmental organizations and others.

45. The executing and implementing agencies will have overall responsibility for the management of the project, along with the responsibility and accountability for the production of outputs, achievement of project objectives and for the use of allocated UNDP/GEF resources. The executing/implementing agency is fully responsible to the Government and UNDP for managing the project, for transforming inputs into outputs and for the project technical results. UNDP and the executing agency agree upon the appointment of an agency official who will act as National Director of the Project and who will assume responsibility for financial reporting to UNDP and will be accountable for the custody and proper use of UNDP funds provided for the project's implementation. The Project Director will take the lead for the policy activity on national level to translate the lessons learned to national policy recommendations. He will also provide synergy with other activities of the agency and liaison activities with national and international initiatives (SECI, PHARE, USAID, EE 2000, etc.) (see paragraphs 49 to 55 below). The executing agency will recruit a Project Coordinator who will carry out the operational day-to-day management of the project and who will assume the primary responsibility for all aspects of it. He will have overall responsibility for the execution of the project, including the Demonstration Zone Support Office located administratively within EnEffect, the demonstration and dissemination activities. The Project Coordinator will provide overall leadership and oversight of the project to ensure that the budget, schedule, and goals are accomplished. The Project Coordinator will focus his/her efforts on obtaining concrete, replicable results. A foreign consultant will provide assistance to the project management during the first 2 years of the project.

46. The successful implementation will require the strengthening of EnEffect and recruiting of additional staff, as needed, to ensure a small, dedicated team for the Demonstration Zone Support Office. The Project Coordinator 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 team small through the maximum use of contracts. All contracts will be awarded competitively on the basis of merit. A National Capacity Building Coordinator will be responsible for coordinating all 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 to all elements of the project and play the lead in the activities supporting output 1.3. Professionals, with extensive experience in managing respective projects with an emphasis on quantifiable results, will be appointed to implement the activities for achieving each output. The contracts with international

consultants will provide for the training of local personnel while doing the job in order to build a self-sustaining capacity to run the Programme.

B.5. Reasons for Assistance from GEF/UNDP

47. This programme 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.

48. The GEF contribution to the project is $US 2.575 million. 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 programme will create greater energy efficiency and facilitate measurable reductions of GHG emissions. The programme is a national priority within the context of the National Environmental Strategy. The institutional and technological assistance provided by the programme will be an important step toward creating an attractive climate for future investments in the Bulgarian economy. The programme 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 are largely devoted to staffing and foreign exchange costs for technical assistance and demonstration components of the project.

49. 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 programme also meets the following development criteria, in addition to falling within the global environmental protection area. The programme:

(a) Contributes to human welfare through sustainable development;
(b) Is innovative and internationally replicable;
(c) Is financially sustainable after initial GEF support with the involvement of local financial institutions and other donors;
(d) Gives new dynamic and environmental dimension to on-going Bulgarian activities;
(e) Develops institutional capability and trains personnel;
(f) Has a firm scientific and technical basis;
(g) Fits within the context of existing national, regional, and municipal programmes;
(h) Involves local participation and collaboration;

(i) Includes studies that will lead to a better understanding of energy use patterns in Bulgaria;
(j) Will have quantifiable results within the project timetable.

B.6. Special Considerations

50. The project represents a strategy to reduce GHG emissions by increased energy efficiency and aims at achieving global environmental benefits concerning climate change. It will also have a positive environmental impact in reduction of other pollutants as particulates, sulfur dioxide, nitrogen oxides, etc.
48. The proposed method of executing the project is an example of beneficial collaboration of governmental, non-governmental and international institutions for achieving strategic development and environmental objectives of the country in conditions of economic depression and social difficulties.

51. After being recommended as a model by the GEF Executive Council, the project was accepted as the pilot project for other Demonstration Zones throughout the greater Balkan area, included in the international activities under the Southeast European Cooperative Initiative (SECI). SECI was initiated in December 1996 to stimulate economic and environmental cooperation among the countries of Southeast Europe. The creation of an Energy Efficiency Demonstration Zones Network is among the six projects for initial action.

B.7. Co-ordination Arrangements

52. A process of restructuring of the district heating sector is going on in the country. It was provoked by the substantial decline in the financial status of the district heating companies. All of them show a negative profitability during the last years, mainly caused by the discrepancy between the production costs and the consumer prices. The Government initiated the development of special programmes for financial strengthening of these companies. These include a number of activities: market prices of the heat energy produced and a new system of subsidies, metering and new tariffs, privatization, and some investments for renovation of the assets of the companies. The demonstration project in the District Heating System in Gabrovo under the GEF project will be closely coordinated with the measures planned for implementation in the company under its strengthening programme.

53. International, national, and local organizations have identified district heating as a major target for reducing energy wastes and energy costs. Two large projects in this area
are being financed by the World Bank. An emergency loan from the World Bank is providing $12 million for the installation of heat meters in all the substations of Bulgaria's 21 district heating systems. Under this programme, 204 heat meters will be

installed in Gabrovo's district heating system. The primary focus of the international and national activities, including an EBRD project, is the Sofia district heating system, which serves 65% of the Bulgarian households that depend district systems for the space heating and hot water needs. The Gabrovo project will complement these activities by showing how the new heat meters and other, complementary measures can be used to improve the performance of the district heating systems in smaller Bulgarian cities.

54. As a support to the GEF project, U.S. AID initiated a project Municipal Energy Efficiency Initiative, which will be parallelly financed. The project is managed by the U.S. company Electrotek Concepts, Inc. EnEffect has been chosen as the local subcontractor for this project. This fact makes the coordination between the two projects easily achieved, much more that this is the second project Electrotek Concepts, Inc. is implementing in Bulgaria in cooperation with EnEffect.

55. The PHARE 93 Programme for Conventional Energy of the European Union has included a series of demonstration energy efficiency projects in Bulgaria and a project for Regional Energy Concept/ Regional Energy Centres. The demonstration projects are located in different cities of the country. The successful examples of them will be used during the implementation of the GEF project to develop a more reliable basis of practical results for preparing dissemination and training materials. Very important is the coordination of activities with the Regional Energy Centre in Lovetch, the region to which Gabrovo municipality belongs. The framework of this coordination has been already developed during the preparation phase of the project by EnEffect and the Regional Center management.

56. Bulgarian Climate Change Action Plan will be developed during the next two years. The GEF project will be closely coordinated with it through EnEffect's direct participation as a member of the Interagency Analysis Team for the development of the Plan. The GEF project is included in the First National Communication on Climate Change as one of the important projects to mitigate GHG emissions in the country. The Bulgarian Country Study to Address Climate Change has been used in the preparation of the GEF project as a source of information, as a methodology for assessment of the environmental impacts of energy conservation measures, and as criterion for the selection of the activities included in the project.

57. A new international programme for the creation of an Energy Efficiency Demonstration Zones Network has started in Southeast Europe. This programme is a part of a greater international initiative known as Southeast European Cooperative Initiative (SECI). The GEF project for the Energy Efficiency Demonstration Zone in the city of Gabrovo, Republic of Bulgaria will play the role of a pilot project for other demonstration zones in the region.

B.8. Counterpart Support Capacity

58. The Ministry of the Environment and Water Resources (MOEWR) is a cabinet-level department, given statutory responsibility for developing and implementing Bulgaria's policies and programmes in the broad range of environmental issues of critical importance to the present and future well-being of the nation's people and resources. The Bulgarian Government has given MOEWR the responsibility for meeting the nation's obligations as a signer of the UNFCCC. MOEWR has given this a high priority, not only because of the global impact of climate change policies, but also because by reducing GHG emissions, Bulgarian can also reduce other pollutants, such as SO_X, NO_X, and particulates. MOEWR recognizes that this Demonstration Zone project can be an important activity to meet its priorities. As a ministry, it has trained environmental experts who can provide valuable guidance to the project and it has the resources necessary to support it. The letter of commitment shows its intent to use this capacity to support the project.

59. The capacity of the Ministry of the Environment and Water Resources to provide the inputs and support to the project is built up in a series of international projects. To provide the necessary counterpart personnel is a prerequisite for the successful execution and implementation of the project. This project has a specific character and is placed in the field of interference between the environment and the energy sectors on local/municipal level. This is the reason for the accepted implementation arrangements and for charging the Bulgarian Foundation for Energy Efficiency, which has the personnel and the skills needed, with project execution and implementation on behalf of the Ministry. The Ministry will provide senior level representatives for participation in the activities of the Project Steering Group and the Financing Sub-Group to provide policy input and functional guidance during the implementation of the Project.

60. The capacity of the Ministry to provide for the financial contribution to the project is based on its prerogatives over the National Environmental Fund. The demonstrations included in the GEF project will be funded in compliance with the Regulations on Collection, Disbursement and Control of the Assets of the Fund. According to the Regulations, the assets of the Fund are collected from: charges for environmental pollution; sanctions, imposed by the Ministry of the Environment and Water Resources or its specialized units for damages to and pollution of the environment above the established limits; import taxes on used motor cars; receipts from the privatization of state enterprises; special-purpose amounts allotted from the state budget for environmental programmes; donations; interest on loans; miscellaneous. The assets of the Fund can be spent for: participation in joint environmental actions with ministries, state institutions and municipalities; no-interest or low-interest loans to companies for environmental constructions and equipment; grants, no-interest or low-interest loans to municipalities for environmental constructions and equipment; participation in joint environmental actions with non-governmental organizations A letter of commitment from the Ministry of the Environment and Water Resources as manager of the Fund states that the project complies with the priorities for allocation of funding from the Fund and financing will be delivered as joint participation to the demonstration projects in Gabrovo.

61. The local government in Gabrovo will provide monetary and non-monetary commitments of support to the project. It has already embraced energy efficiency as a strategic target and has appointed an expert on energy efficiency in the municipal administration, who will be entirely involved in the project implementation. The municipal authority is going to develop an Energy Efficiency Office within the municipal administration to support project activities and to sustain the results at the end of the project. A Local Steering Group will be established to ensure local management and involvement in the project. The Technical University in Gabrovo is a guarantee for the availability of high level technical professionals in the municipality. The management and technical personnel of the companies and public institutions involved in the project are highly qualified, ambitious, and with good understanding of the objectives of the project. The financial contribution of the municipal government in Gabrovo will be delivered as parallel financing. The Municipality will provide senior level representatives for participation in the activities of the Project Steering Group and the Financing Sub-Group. The municipal authorities will provide office facilities in Gabrovo for the project team.

62. The Committee of Energy is committed to supporting the project by providing consultancy to the project team and by apointing senior level representatives for participation in the activities of the Project Steering Group and the Financing Sub-Group. The Committee will support the project with providing heat-meters for the sub-stations in the DHS in Gabrovo as an in-kind contribution. The heat-meters will be procured with a loan from the World Bank guaranteed by the state. The Committee will also provide some of the investments in the Heat Generating Company, which is under its financial governance.

C. Development Objective

63. The **development objective** of Bulgaria's Demonstration Zone (DZ) project is to overcome barriers to increased energy efficiency and to the associated reductions in GHG emissions.

The major barriers include:

(a) Limited experience in incorporating energy efficiency considerations into private and public decision-making;

(b) Little experience in developing and implementing energy efficiency programmes;

(c) Uncertainty regarding the energy- and economic-savings that can be expected from different energy products and programmes;

(d) An undeveloped infrastructure, including the institutions and individuals needed to deliver the technical, managerial, and financial services required by an energy-efficient society.

D. Immediate Objectives, Outputs and Activities

D1. Immediate Objective 1. To establish sustainable energy policies and programmes, and enhance public awareness in municipalities.

Output 1.1. Energy efficiency considerations are incorporated into public/municipal programmes and strategies.

Activities

1.1.1. Developing and implementing a municipal network to disseminate information on energy efficiency and environmental protection at the municipal level through newsletters, internet and conferences/workshops.

1.1.2. Establishing a Demonstration Zone Support Office, located administratively within EnEffect in Sofia, to coordinate and support institutional and capacity building activities in energy efficiency on municipal level.

1.1.3. Creating Energy and Environment Offices (EEOs) within Gabrovo and other Municipal Administrations as mechanisms for identifying energy-saving opportunities in municipal operations, developing and implementing programmes for energy efficiency and environmental protection.

1.1.4. Preparing a model energy policy for Bulgarian municipalities (on the basis of a review and analysis of the existing policy and legislation at both the municipal and national levels that affect the realization of energy efficiency and environmental goals and including an examination of the policies and legislation affecting the municipalities in other countries).

1.1.5. Organizing conferences/workshops with the participation of representatives from the municipalities in the network, national organizations and institutions to discuss and revise the model municipal energy policy.

1.1.6. Developing guidelines and training programmes, and organizing conferences/workshops to disseminate the model energy policy document among municipalities to encourage local energy efficiency programmes.

1.1.7. Transmitting the experience obtained in Gabrovo to the national government and transferring the experiences gained from the energy efficiency demonstration projects in Gabrovo to municipalities throughout Bulgaria.

1.1.8. Reviewing national and international information sources and providing the most useful materials to the Gabrovo and other EEOs in cooperation with national and municipal education and library agencies.

Output 1.2. The capacity to identify, design, implement, and manage energy efficiency programmes and projects on the local level is strengthened.

Activities

1.2.1. Assessing the training needs at the municipal level and selecting training programmes.

1.2.2. Developing the framework of a training programme for strengthening the capacity to identify, design, implement, and manage energy efficiency programmes and projects on the local level.

1.2.3. Identifying and training a national core group of trainers.

1.2.4. Developing of training materials, guidelines and manuals, that are tailored to meet the training needs in Bulgaria.

1.2.5. Conducting training programmes for different expert and municipal managers groups, using the training materials developed, evaluating the results and implementing further modifications if required.

1.2.6. Developing and implementing a programme for advanced training to support development of private sector energy services and financing capabilities.

Output 1.3. Existing critical financial barriers to the implementation of energy efficiency projects are eliminated.

Activities

1.3.1. Developing and examining cost-recovery mechanisms in the energy efficiency demonstration subprojects.

1.3.2. Reviewing 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.

1.3.3. Developing recommendations for creating legal conditions for using new sources of financing, including energy taxes, user fees, energy efficiency funds, and municipal guarantees, and directing them to the respective ministries and the Parliament.

1.3.4. Producing financing alternative packages designed to meet the investment requirements of the business and industry community at the municipal level.

1.3.5. Preparing a guidebook for municipalities seeking to encourage investments in energy saving products and services.

1.3.6. Organising workshops to present the finance alternative packages and the guidebook for investments to municipalities.

1.3.7. Developing bankable projects for energy efficiency in municipalities in the network.

1.3.8. Actively promoting awareness of business opportunities in the field of energy efficiency and GHG emission reduction in municipalities in Bulgaria by preparing investment opportunity presentations for business meetings, specialized business periodicals, and other appropriate forms of dissemination.

1.3.9. Creating a clearinghouse to bring potential borrowers and lenders together; providing current information on the lending requirements and interests of available financing sources.

D2. Immediate Objective 2. To accelerate the undertaking of sustainable energy projects within municipalities by demonstrating their potential for energy and economic savings and for reductions in GHG emissions.

Output 2.1. Energy-efficient street lighting will be demonstrated in Gabrovo; the results will be evaluated and reported in a case study to other municipalities.

Activities

2.1.1. Performing a technical evaluation of the street lighting system in Gabrovo and preparing a plan for an energy efficiency street lighting project that includes the use of high efficiency sodium lamps, time clocks and automatic control systems and that eliminates over-lit and under-lit areas.

2.1.2. Implementing the plan through competitive tenders that provide an opportunity for both foreign and Bulgarian lamp and fixture manufacturers to demonstrate their products and approaches in different zones of the municipality.

2.1.3. Evaluating the project to determine the implementation costs, and energy and economic savings in operations, including any differences between the different project zones.

2.1.4. Evaluating the alternative approaches for financing street lighting projects, including but not limited to financing from the municipal budget, the use of ESCOs, and loans from different sources, and describing them in a financing guidebook.

2.1.5. Preparing a case study on the project describing the approach and the results and including recommendations for other municipalities that are interested in undertaking similar energy efficiency street lighting projects.

2.1.6. Conducting a workshop for representatives from other Bulgarian municipalities where the case study and financing guidebook will be presented, and energy-saving products are displayed. Providing training and management programmes to give individuals the information and skills they need to successfully develop and implement similar programmes (in cooperation with the activities under Output 1.2.).

2.1.7. Providing a clearinghouse activity, through the Demonstration Zone Support Office, for information on energy efficiency street lighting projects, updated information on new products and approaches; engineering, design, and evaluation providers; financing options; and the experiences of municipalities with street lighting projects.

Output 2.2. Progressive methods of planning, renovating and managing of existing district heating systems and heating end-uses will be demonstrated.

Activities

2.2.1. Performing an energy and environmental audit of the district heating system to quantify the losses in each stage of operations from receipt of primary energy to delivery of thermal energy to end use customers.

2.2.2. Performing a feasibility, pre-investment study, based on the audit, to identify investment opportunities to improve energy efficiency and/or reduce greenhouse gas emissions.

2.2.3. Preparing a plan for metering the thermal energy consumed by the customers of the district heating system, including the cost of equipment and related billing requirements. Developing a revised tariff structure with payments based on consumption and the full recovery of the cost of service.

2.2.4. Compiling an assessment of the financial resources available for district heating system investments, including the existing World Bank programme and its potential expansion in the future, other programmes of international finance institutions, energy service companies (ESCOs), and other public and private investment sources.

2.2.5. Developing an investment and financial plan for modernizing the Gabrovo district heating system and presenting it to those responsible for making the decisions on the future of the Gabrovo district heating system. Providing additional advisory information and analyses to the decision makers until a financial plan for the system is agreed upon and adopted.

2.2.6. Implementing the approved investments in improving the energy efficiency and reducing the emissions of greenhouse gases (GHG) and other environmental pollutants, giving special attention to documenting the effects of the investments.

2.2.7. Providing training and management programmes to the key personnel in the Gabrovo district heating system and the key groups of consumers to ensure that the full potential of the investment and modernization measures are realized (in cooperation with the activities under Output 1.2.).

2.2.8. Evaluating the project and preparing a case study report on the Gabrovo district heating modernization project to describe the approach, the results, and the lessons learned.

2.2.9. Using the case study report to transfer the Gabrovo experience in district heating modernization to other municipalities in Bulgaria and other Central European countries, including by organizing a special workshop.

Output 2.3. The energy-efficiency retrofit of typical Bulgarian buildings will be demonstrated in Gabrovo, including a school, hospital, multi-family apartment building, and an industrial buildings. The experience and lessons learned will be used to stimulate similar retrofit projects in other municipalities.

Activities

2.3.1. Undertaking energy audits of three representative typical buildings in Gabrovo to characterize current energy uses and identify energy efficiency and renewable energy measures that are cost-effective and reduce GHG emissions. Preparing plans for buildings retrofit.

2.3.2 Undertaking pilot retrofit projects in these three representative buildings including measures that are clearly cost effective and some marginal measures with good GHG reduction potential.

2.3.3. Carefully evaluating the pilot projects to determine their actual energy savings and environmental benefits to identify any problems and their solutions and to develop recommendations for future building retrofit projects. Preparing case studies on these initial projects that are used to guide future projects.

2.3.4. Providing additional training, financing, and project management courses to encourage the expansion of building retrofit activity from Gabrovo to the network of municipalities (in cooperation with the activities under Output 1.2.).

2.3.5. Coordinating the project with the activities under Output 1.3 on financing to ensure the duplication of the building retrofit activities throughout Bulgaria. Considering different innovative financing alternatives through this coordination, assessing the results and communicating them to other municipalities.

2.3.6. Using the demonstrations to inform people about the benefits of building retrofit projects, emphasizing the need to change the behavior of owners and occupants of buildings. Using a system of attractive incentives to encourage building occupants to use energy wisely, including guidelines for no-cost and low-cost measures.

E. INPUTS

64. UNDP Inputs

	Project Personnel	p/m	USD
11.97.	Short-term International Consultants	24	438,500
13.00.	Administrative Support Personnel	300	141,500
15.00.	Project Travel Expenses		46,400
16.00.	Mission Costs		30,000
17.00.	National Professionals	1,162	942,000
20.00.	Subcontracts:		
21.00.	Subcontract for implementing the street lighting energy efficiency project		24,000
22.00.	Subcontracts for implementing the investment plan for the DHS		45,000

23.00.	Subcontracts for the retrofit of a school building		35,000
24.00.	Subcontracts for the retrofit of an industrial building		5,000
25.00.	Subcontracts for the retrofit of a residential building		12,000
30.00.	Training		
32.00.	Group Training/Study Tours		142,500
33.00.	In-service Training		10,800
40.00.	Equipment		
45.01.	Expendable Equipment and Supplies		58,600
45.02.	Non-expendable Equipment		290,000
50.00.	Miscellaneous		
51.00.	Operation and Maintenance		67,700
52.00.	Reporting Costs		10,000
53.00.	Sundries		60,000
54.00.	Support Costs UNDP		69,000
	Total UNDP Input:		2,428,000
	Preparatory Assistance Document (real costs paid)		147,000
	Grand Total UNDP Input:		2,575,000

65. **Government Inputs (in-kind)**

1.	**Project Personnel - National Professionals**	**,000 Bulgarian Leva**
1.1.	Members of the Steering Committee from the Government	9,000
1.2.	Members of the Steering Group from Gabrovo Municipal Authorities	4,000
1.3.	Municipal Authorities' Participation in Network	

	meetings and activities	90,000
1.4.	Energy Efficiency Offices staff in Gabrovo and the other municipalities	1,900,000
1.5.	MOEWR, COE, MF, and other Government professional experts, providing consultancies and information to the project team	50,000
1.6.	Travel Expenses for participation in network meetings, activities and training	120,000
2.	**Support to the demonstration projects:**	
2.1.	The Committee of Energy will deliver heat meters to be installed within the project for the DHS. This input will be assured for within a World Bank's loan.	221,000
3.	**Training**	
3.1.	Salaries of trainees from municipalities	140,000
3.2.	Salaries of trainees from the National Electric Company Branch in Gabrovo and other municipalities, from the DHSs in Gabrovo and other municipalities, from the technical and managerial staff in public buildings in Gabrovo and other municipalities	80,000
4.	**Miscellaneous**	
4.1.	Municipality of Gabrovo will provide working facilities for the project staff and experts during their missions in Gabrovo	6,000
4.2.	Municipality of Gabrovo will provide premises for the Energy Efficiency Office, operation and maintenance of equipment.	22,000
4.3.	Municipality of Gabrovo will provide premises for meetings and training activities.	5,000
4.4.	Municipalities will provide premises for the Energy Efficiency Offices, including office equipment (phones, faxes), operation and maintenance of equipment.	360,000
4.5.	Municipalities will provide premises for meetings and training activities	20,000

	Total Government Input (in-kind):	**3,027,000**
66.	**Government Inputs (parallel financing)**	
1.	**Support to the demonstration projects:**	**USD**
1.1.	The MOEWR will cover part of the cost of the street lighting energy efficiency project from the National Environmental Fund.	200,000
1.2.	The MOEWR will cover part of the cost of the energy efficiency project for the DHS from the National Environmental Fund.	815,000
1.3.	The Government will cover part of the cost of the street lighting energy efficiency project from the National Eco Trust Fund.	190,000
1.4.	The Government will cover part of the cost of the energy efficiency project for the DHS from the National Eco Trust Fund.	500,000
1.5.	The National Electric Company will cover part of the cost of the street lighting energy efficiency project through its branch in Gabrovo	50,000
1.6.	Gabrovo municipality will cover part of the cost of the street lighting energy efficiency project	180,000
1.7.	The Committee of Energy will cover part of the cost of the investment project for the DHS.	304,000
1.8.	Gabrovo municipality will cover part of the cost of the retrofit of the school building.	14,000
1.9.	The Municipal Transportation Company in Gabrovo will cover part of the cost of the retrofit of the industrial building.	3,000
	Total Government Inputs (parallel financing)	**2,256,000**

F. RISKS

67. The first type of risks addressed in the project formulation stage were the frequent political changes and the economic problems facing Bulgaria in the process of its transition from a centrally controlled to a market economy. The project strategy was designed to minimize this risk by the broad inclusion of all interested parties, by the focus on actions at the municipality level, by the focus on capacity building, and by the requirement of cost-sharing to ensure a shared commitment to the project's success.

(See Section B.4.) The success of this approach is shown by the fact that even though Bulgaria experienced a political crisis and hyperinflation in late 1996 and early 1997, the counterpart organizations have maintained a continued commitment to move forward with the project.

68. Turning to less severe risks, that still could cause a disruption to the project and require adjustments, the first risk to consider is that the project would not receive all the funding for demonstration projects that are expected. When the Project Documents were completed, funding applications had been made to the National Environmental Fund and National Trust Eco Fund, but the applications had not been finally approved. The activities under Output 2.2 of the Preparatory Assistance (PA) document have minimized this risk. The PA subcontractor has met the fund representatives to learn their requirement, the applications have been completed and submitted. The directors of the funds report that the applications meet their requirements and are to be reviewed positively. See letters in Annex VIII. The risk also is being minimized by preparing and submitting proposals to other potential donors, including USAID and Novem.

69. A second risk is that some of the energy audits and energy efficiency projects may not achieve all the energy savings that are predicted, which could weaken the interest in capacity building activities and in replicating the projects. This risk is being minimized by the careful technical evaluation of the potential projects by international, national, and local experts during the PA phase (See PA Output 2.1.). Despite technical expertise, it sometimes is difficult to establish the baseline energy use; for example, when street lights are broken and heating system are inoperative so that no energy is being used. To address this risk, the potential benefits have included improved energy services to building occupants and the general public (as in the case of eliminating over-lit and under-lit street lighting). The full energy and economic benefits will be realized as Bulgaria moves out of its current depression and energy use patterns return to normal.

70. A third risk is that delays will occur at the national and municipal levels in raising some energy prices to their full cost-recovery levels. Such delays could temporarily weaken capacity building activities and reduce the number of energy-saving projects by removing part of the financial incentive to use energy wisely. The Bulgarian Government has recognized in public policy statements the necessity of raising energy prices to the cost-recovery levels. (See Host country strategy, A.2.) Moreover, Bulgaria's heavy dependence on energy imports leaves it few alternatives over time. If energy prices are not raised to their cost recovery prices, someone--usually the national government or the municipalities--will have to pay the difference, which requires raising taxes which--in turn--falls on the Bulgaria's citizens. Either way, the country's basic energy realities are creating the need for the capacity to use energy efficiently and that need will drive the popularity of the capacity building activities.

G. PRIOR OBLIGATIONS AND PREREQUISITES

71. Bulgaria has met a prior obligation for GEF funding by signing the UNFCCC in June 1992 and by ratifying the Convention in March 1995.

72. The Standard Basic Assistance Agreement being a prior obligation for UNDP support was signed by the Bulgarian Government on August 20, 1992.

73. There are no prior obligations and no prerequisites connected with the approval of this project document.

H. PROJECT REVIEW, REPORTING AND EVALUATION

74. The project will be subject to tripartite review (joint review by representatives of the Government, executing agency and UNDP) at least once every 12 months, the first such meeting to be held within the first 12 months of the start of full implementation. The national project director and/or the project coordinator shall prepare and submit to each tripartite review meeting a Project Performance Evaluation Report (PPER). Additional PPERs may be requested, if necessary, during the project.

75. A project terminal report will be prepared for consideration at the terminal tripartite review meeting. It shall be prepared in draft sufficiently in advance to allow review and technical clearance by the executing agency at least four months prior to the terminal tripartite review.

76. The project shall be subject to evaluation six months before and 12 months after termination. The organization, terms of reference and timing will be decided after consultation among the parties to the project document.

I. LEGAL CONTEXT

77. This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of Bulgaria and the United Nations Development Programme, signed by the parties on August 20, 1992. The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.

78. The following types of revisions may be made to this project document with the signature of the UNDP resident representative only, provided he or she is assured that the other signatories of the project document have no objections to the proposed changes:

(a) Revisions in, or addition of, any of the annexes of the project document;

(b) Revisions which do not involve significant changes in the immediate objectives, outputs or activities of a project, but are caused by the rearrangement of inputs already agreed to or by cost increases due to inflation; and

(c) Mandatory annual revisions which rephase the delivery of agreed project inputs, or reflect increased expert or other costs due to inflation, or take into account agency expenditure flexibility.

J. BUDGET

Project Number: BUL/96/G31/A/1G/99
Project Title: Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions, Energy Efficiency Demonstration Zone in the City of Gabrovo, Bulgaria

UNDP/GEF BUDGET

/USD/

Component/ Item	Description of expenditures	1st quarter	1st year 2nd quarter	3rd quarter	4th quarter	2nd year	3rd year	4th year	5th year	Total
10	PROJECT PERSONNEL									
11	International professionals									
11.50	Consultants									
11.51	Project Management Consultant	16,250	16,250			32,500				65,000
11.52	Municipal Planning Consultant/Trainer		9,000	9,000		18,000	18,000			54,000
11.53	Lead Training Consultant	6,200	9,000	9,000	11,600	24,600	20,600	20,600	11,600	113,200
11.54	Energy and Environment Training Consultant			9,000	11,600	9,000				29,600
11.55	Financial Training Consultant				14,900	14,900				29,800
11.56	Financial Consultant	6,500	9,000			26,000	16,300	9,000	9,000	75,800
11.57	Energy Efficiency Building Retrofit Consultant		9,000	9,000		9,000				27,000
11.97	Short-term Consultancies	-	-	-	9,000	-	17,100	9,000	9,000	44,100
11.98	Sub-Total Consultancies	28,950	52,250	36,000	47,100	134,000	72,000	38,600	29,600	438,500
11.99	Sub-Total Experts and Consultants	28,950	52,250	36,000	47,100	134,000	72,000	38,600	29,600	438,500
13	Administrative support personnel									
13.01	Accountant	2,100	2,100	2,100	2,100	8,990	9,610	10,300	11,020	48,320
13.02	Secretary	1,050	1,050	1,050	1,050	4,490	4,810	5,150	5,150	24,160
13.03	Driver (part-time)	450	450	450	450	1,930	2,060	2,200	2,360	10,350

13.04	Technical Assistant	750	750	750	750	3,220	3,440	3,680	3,940	17,280
13.05	Interpreter (part-time)	900	900	900	900	3,850	4,120	4,410	4,720	20,700
13.50	Administrative support personnel	900	900	900	900	3,850	4,120	4,410	4,720	20,700
13.99	Subtotal administrative support	6,150	6,150	6,150	6,150	26,330	28,160	30,150	32,270	141,510
15	Travel	3,160	3,880	2,460	2,280	7,800	9,600	9,000	8,260	46,440
16	Mission costs				6,000	6,000	6,000	6,000	6,000	30,000
17	National professionals									
17.01	Project Director (part-time)	1,500	1,500	1,500	1,500	6,420	6,870	7,350	7,870	34,510
17.02	Project Manager	3,000	3,000	3,000	3,000	12,840	13,740	14,700	15,730	69,010
17.03	Business Manager	2,400	2,400	2,400	2,400	10,280	11,000	11,760	12,590	55,230
17.04	Capacity Building Coordinator	2,700	2,700	2,700	2,700	11,560	12,360	13,230	14,160	62,110
17.05	Municipal Network Coordinator	2,100	2,100	2,100	2,100	8,990	9,620	10,300	11,020	48,330
17.06	Training Coordinator	2,100	2,100	2,100	2,100	8,990	9,620	10,300	11,020	48,330
17.07	Financial/Economic Analyst	2,400	2,400	2,400	2,400	10,280	11,000	11,760	12,590	55,230
17.08	Information/Communication Expert	1,800	1,800	1,800	1,800	7,710	8,250	8,820	9,440	41,420
17.09	Demonstrations Coordinator	2,700	2,700	2,700	2,700	11,560	12,360	13,230	14,160	62,110
17.10	Street Lighting Coordinator	2,100	2,100	2,100	2,100	8,990	9,620	10,300	11,020	48,330
17.11	DH Coordinator	2,100	2,100	2,100	2,100	8,990	9,620	10,300	11,020	48,330
17.12	Buildings Retrofit Coordinator	2,100	2,100	2,100	2,100	8,990	9,620	10,300	11,020	48,330
17.50	Short-term National Professionals	39,740	42,720	18,790	17,470	48,270	57,560	46,900	49,230	320,680
17.99	**Sub-total National professionals**	**66,740**	**69,720**	**45,790**	**44,470**	**163,870**	**181,240**	**179,250**	**190,870**	**941,950**
19	**Personnel Component Total:**	**105,000**	**132,000**	**90,400**	**106,000**	**338,000**	**297,000**	**263,000**	**267,000**	**1,598,400**
20	**SUBCONTRACTS**									

21	Subcontract for implementing the street lighting energy efficiency project			8,000	8,000	8,000				24,000
22	Subcontract for implementing the investment plan for the DHS				18,000	14,000	13,000			45,000
23	Subcontract for the retrofit of the school building		10,000	15,000	5,000	5,000				35,000
24	Subcontract for the retrofit of the industrial building		2,000	1,000	1,000	1,000				5,000
25	Subcontract for the retrofit of the residential building		5,000	3,000	2,000	2,000				12,000
29	**Subcontracts Total**		**17,000**	**27,000**	**34,000**	**30,000**	**13,000**	**-**	**-**	**121,000**
30	**TRAINING AND FELLOWSHIPS**									
31	Individual fellowships									
32	Group training/training abroad/study tours	300	27,800	800	3,500	18,400	24,900	50,900	15,900	142,500
33	In-service training					2,700	2,700	2,700	2,700	10,800
39	**Component total training and fellowships**	**300**	**27,800**	**800**	**3,500**	**21,100**	**27,600**	**53,600**	**18,600**	**153,300**
40	**EQUIPMENT**									
45.01	Equipment and expendable supplies	3,200	3,200	3,100	3,100	11,500	11,500	11,500	11,500	58,600
45.02	Non-expendable equipment	56,000	17,000	40,000	52,000	70,000	40,000	15,000		290,000
49	**Component total equipment**	**59,200**	**20,200**	**43,100**	**55,100**	**81,500**	**51,500**	**26,500**	**11,500**	**348,600**
50	**MISCELLANEOUS**									
51	Equipment operation and maintenance	3,200	3,200	3,200	3,200	13,200	13,500	13,900	14,300	67,700
52	Reporting costs	500	500	500	500	2,000	2,000	2,000	2,000	10,000
53	Sundries	3,000	3,000	3,000	3,000	12,000	12,000	12,000	12,000	60,000

54	Project Support Serv.	9,000	9,000	9,000	9,000	18,000	5,000	5,000	5,000	69,000
59	**Component total miscellaneous**	**15,700**	**15,700**	**15,700**	**15,700**	**45,200**	**32,500**	**32,900**	**33,300**	**206,700**
99	**PROJECT TOTAL:**	**180,200**	**212,700**	**177,000**	**214,300**	**515,800**	**421,600**	**376,000**	**330,400**	**2,428,000**

K. ANNEXES

Annex I. Work Plan

Annex II. Equipment Requirements

Annex III. Training Programme

Annex IV. Incremental Costs

Annex V. Job Descriptions

Annex VI. USAID Parallel Financing

Annex VII. Response to Review

Annex VIII. Statements of Commitments

Annex IX. Financial and Accounting Arrangements
(Model Annex to the Project Document for National Executed Projects)

Annex X. Demonstration Projects

Annex I. WORK PLAN

Output/ Activity	Activity No	0 year (PA)	1st year				2nd year	3rd year	4th year	5th year
			1st quarter	2nd quarter	3rd quarter	4th quarter				
Output 1.1. Energy efficiency considerations are incorporated into public/municipal programs and strategies										
Developing/Implementing municipal network	1.1.1.		x	x	x	x	x	x	x	x
Establishing Demozone Support Office	1.1.2.		x	x						
Creating EEOs in municipalities	1.1.3.				x	x	x	x	x	
Preparing model municipal energy policy (MEP)	1.1.4.						x	x		
Conferences/Workshops to discuss the MEP	1.1.5.							x		
Disseminating the MEP	1.1.6.							x	x	x
Transmitting the experience from Gabrovo	1.1.7.						x	x	x	x
Reviewing/providing information	1.1.8.						x	x	x	x
Output 1.2. The capacity to identify, design, implement, and manage energy efficiency programs and projects on the local level is strengthened										
Assessing training needs, selecting programs	1.2.1.	x	x							
Developing a framework for training	1.2.2.	x	x	x						
Training trainers	1.2.3.				x	x	x			
Developing training materials	1.2.4.						x	x		
Conducting training programs	1.2.5.							x	x	x
Conducting an advanced training program	1.2.6.								x	x
Output 1.3. Existing critical financial barriers to the implementation of energy efficiency projects are eliminated										
Examining cost-recovery mechanisms	1.3.1.		x	x	x	x				
Reviewing existing regulations and practices	1.3.2.		x	x	x	x	x			
Developing recommendations for financing	1.3.3.						x	x		
Producing financing alternative packages	1.3.4.						x	x		
Preparing financing guidebook	1.3.5.							x	x	
Organizing workshops	1.3.6.								x	x
Developing bankable projects	1.3.7.								x	x
Promoting awareness of business opportunities	1.3.8.								x	x
Creating a clearing house	1.3.9.								x	x

<u>Output 2.1.</u> Energy-efficient street lighting will be demonstrated in Gabrovo; the results will be evaluated and reported in a case study to other municipalities										
Technical evaluation and a plan	2.1.1.	x	x	x						
Implementing the plan	2.1.2.				x	x	x			
Evaluating the project	2.1.3.						x	x		
Evaluating financial approaches	2.1.4.						x	x		
Preparing a case study	2.1.5.							x		
Workshop/training program	2.1.6.								x	x
Providing a clearinghouse activity	2.1.7.							x	x	x
<u>Output 2.2.</u> Progressive methods of planning, renovating and managing of existing district heating systems and heating end-uses will be demonstrated										
Technical evaluation	2.2.1.	x	x							
Performing a feasibility study	2.2.2.		x	x						
A plan for metering and a revised tariff structure	2.2.3.			x	x	x				
Assessment of the financial resources	2.2.4.			x	x					
Developing an investment and financial plan	2.2.5.				x	x				
Implementing the approved investments	2.2.6.					x	x	x		
Providing training and management programs	2.2.7.							x	x	
Evaluating the project and preparing a case study	2.2.8.								x	
Dissemination/workshop	2.2.9.								x	x
<u>Output 2.3.</u> The energy-efficiency retrofit of typical Bulgarian buildings will be demonstrated in Gabrovo										
Technical evaluation and plans	2.3.1.	x	x	x						
Undertaking pilot retrofit projects	2.3.2.			x	x	x	x			
Evaluating/case study reports	2.3.3.						x	x		
Training courses	2.3.4.							x	x	x
Innovative financing alternatives	2.3.5.							x	x	x
Dissemination and promotion	2.3.6.								x	x

Annex II. EQUIPMENT REQUIREMENTS

Equipment component of the project represents 14.4 per cent of GEF/UNDP-financed inputs. It amounts to US$ 348,600, of which US$ 58,600 (2.4%) for expendable equipment and supplies, and US$ 290,000 (12%) for non-expendable equipment.

The project will follow UNDP procurement procedures, according to the value of purchased goods. GEF/UNDP-supported equipment will remain UNDP property until formally transferred or disposed of. Disposal of equipment, including transfer, and final decision thereon, will be made by the UNDP Resident Representative, in consultation of the parties concerned. The executing/implementing agency will be responsible for ensuring that the use of equipment and supplies procured with GEF/UNDP funds is strictly for the purposes of the project. It will see to its proper custody, maintenance and care, and provide UNDP, upon request, with information regarding use, storage and maintenance of such equipment.

Non-expendable equipment includes items of a value of US$ 400 or more, with a serviceable life expectancy of at least five years. The executing/implementing agency will maintain inventory records for them. Three types of non-expendable equipment will be procured under this project:

- office and training equipment, according to the needs of the project staff and for the capacity building and dissemination activities included in the project;
- a vehicle (9-seats mini-van) to be used only for purposes connected to the execution and implementation of the project;
- equipment for the demonstration projects - a small share of the equipment needed for the demonstration projects will be procured with GEF/UNDP funds and it will be connected with the incremental costs of the projects. The basic part of the demonstration projects equipment will be an input from the parallelly financed activities.

Preliminary estimated items and costs for non-expendable equipment under this project are as follows:

1. Office and training equipment for the Executing/Implementing Agency, include. EEDZ Support Office:

N	Equipment	Unit Price	Cost US$
1.	Computers for the team (include. a notebook)	2,000	30,000
2.	Printer		1,100
3.	Scanner		700
4.	Telecommunication equipment (fax machine, phone system):		2,000
5.	Copy machine	11,000	11,000
6.	Furniture, lamps		5,000

7.	Training equipment:		
	• Overhead projector		1,600
	• Noboboard		2,600
	• Copy binder		600
	• TV set and video recorder		1,300
8.	Mini-Bus	18,000	18,000
	Equipment total:		75,000

2. *Office and training equipment for the EEO office in Gabrovo:*

N	Equipment	Unit Price	Cost US$
1.	Computers	2,000	6,000
2.	Printer		600
3.	Fax machine		2,000
4.	Copy machine		4,000
5.	Overhead projector		1,600
	Equipment subtotal:		14,200

3. *Network equipment for 30 municipalities:*

30 Computers	x 1,900 US$	57,000 US$
30 Printers	x 550 US$	16,500 US$
	Equipment subtotal:	73,500 US$

4. *Equipment for the demonstration projects:*

Energy efficiency lamps and fixtures for the street lighting retrofit project	60,000 US$
Thermostatic valves and allocators for the DHS retrofit project	67,000 US$
Equipment subtotal:	127,000 US$

Equipment Total: 289,700 US$

Annex III. TRAINING PROGRAMME

1. BACKGROUND

The Training Program comprises an important capacity building element of the project "Energy Efficiency Strategy to Mitigate GHG Emissions, Energy Efficiency Demonstration Zone in the City of Gabrovo, Bulgaria". The Training Program is directed to overcoming major barriers to increased energy efficiency in Bulgaria and to the associated reductions in GHG emissions, namely:

(a) Limited experience in incorporating energy efficiency considerations into private and public decision-making;

(b) Little experience in developing and implementing energy efficiency programs;

(c) An undeveloped infrastructure, including the institutions and individuals needed to deliver the technical, managerial, and financial services required by an energy-efficient society.

The Training Program is playing a substantial role for achieving the development and immediate objectives of the project. Within the structure of the project, the Training Program is included as a major activity for achieving Output 1.2.: The capacity to identify, design, implement, and manage energy efficiency programs and projects on the local level is strengthened.

2. TRAINING PROGRAM FRAMEWORK

During the Preparatory Assistance Phase for the project document, a mission was held to Bulgaria by international consultants to assess the training needs in Bulgaria. One of the basic conclusions reached was that the general level of education in Bulgaria is very high and technical skills are well developed. What is lacking is the practical capacity skills required to develop and to successfully plan, organize, and implement energy conservation programs and projects. There is also lacking the skills required to develop municipal programs and the required infrastructure and basic understanding of energy issues at the municipal level. It was found that there is also a need for specific training related to financial, economic and business issues.

2.1. Program Outline

To provide for sustainability of the training program it will firstly be given to a national core group of trainers. Training at this level will be provided by a team of international consultants. After the initial training phase, the core group of trainers will develop training materials, guidelines and manuals, that are tailored to meet the training needs in municipalities in Bulgaria and will conduct training programs for the municipalities in the energy efficiency network.

As a result of the training survey, the training activities which have been given priority within the GEF project will focus on two basic groups of topics:

- Municipal Energy Efficiency Policy Planning, and
- The ENergy CONservation Process (ENCON Process).

Because of budget and time restrictions the topics chosen have been limited, but are those that are deemed necessary to secure the development of successful energy efficiency projects in Bulgaria. Proven existing training programs were chosen where the agency/country responsible for developing the material was willing to support the GEF project with an in-kind contribution of this material. It is recognized that this material has a high value associated with it, and this will aid in reducing costs, but will ensure a high quality of training material. The partners, the Netherlands Agency for Energy and the Environment (Novem) and the Norwegian agency Energy Saving International AS (ENSI) have proven track records, and based on this, it is expected to ensure the success of the program.

The training program in Municipal Energy Efficiency Policy Planning is developed by the Netherlands Agency for Energy and the Environment (Novem), and is based on the Regional and Urban Energy Planning Programme of the European Commission. After being applied for the Netherlands local communities, the program has been transferred to the Czech Republic, Romania, Hungary, etc. It has been adapted to Bulgarian conditions within a short-term Netherlands' project for five Bulgarian municipalities.

Training in the ENCON Process is an interactive training program, that divides the training into four main programs: 1) Energy Auditing; 2) Financial Engineering; 3) Project Management; and 4) Energy Management. The program has been applied to a number of international training courses for CEE countries. The details of the training program can be found in an Appendix.

The interactive training approach divides training into several sessions which directly link the training to practical work. In addition to topics and methodology, the training program directly links training to practical experience; between these sessions, each participant will carry out practical homework which is presented and discussed at the following session. Thus the participants gain their own experiences while repeating and testing out their own newly gained knowledge.

Detailed subjects and topics will be co-ordinated with other ongoing activities and projects in Bulgaria (for example: USAID, PHARE and the Bulgarian Chapter of the Association of Energy Engineers). This will avoid duplication and overlapping of activities, ensures the local trainers will benefit from other relevant training activities and, due to the limited resources will help to introduce a wider range of topics.

2.2. Implementation Scheme of the Training Program

The program will be implemented in three steps:

- Training a national core group of trainers.
- Developing of training materials, guidelines and manuals, that are tailored to meet the training needs in municipalities in Bulgaria

- Conducting training programs for different expert and municipal managers groups

2.2.1. Identifying and Training a National Core Group of Trainers

In order to successfully implement this project, the appropriate local trainers will need to be selected. To fulfill the requirement both to create a permanent transfer of know-how and to give theoretical and practical training to engineers, economics, and managers, there should be four types of participants at the training program: engineers, economists, energy management professionals, and teachers/professors. Other basic criteria for selection of the core group of trainers includes participants who already have some work experience, but not too much that they are nearing the end of their careers. To get an efficient transfer of know-how to the teachers, they must be able to communicate directly in English with the International Team of consultants.

Team leaders from the demonstration projects and other subprojects can be members of the core group. This will both ensure a transfer of knowledge from the newly acquired skills received during the demonstration activities to the national core group of trainers, and that the skills developed during the training program will be used in the demonstration projects.

During the training process, the core group will attend all required sessions at no cost to themselves. The input of time from the core group will be considered as an in-kind contribution from Bulgaria to the GEF project. Once the core group of trainers are trained, they will be hired as local consultants to develop the Bulgarian manuals and guides and to implement further training programs.

All local trainers will participate in the total training process and must be committed to the program, not only during the training activity, but between training sessions which will require the time and effort to accomplish homework given at the previous training program and required prior to the start of the next session.

The whole core group of trainers will be given the same basic training in order to have equal fundamental understanding and to ensure that future training will be based on a common, co-ordinated methodology. Additional training in specific fields will be given to the different specialists in three subgroups: municipal energy management, technical aspects of energy efficiency and financial issues.

Once the core group of trainers is chosen, the interactive training will commence. The training program includes training in all topics that will be covered during the realization of energy efficiency projects: energy auditing; business planning; project management; and energy management. The entire training program consists of four (five) training courses. Each training course has three main elements:

- Presentation and discussions/consultations on the Homework;
- Introduction/teaching of new topics, lectures, examples, exercises, discussion; and
- Introduction to new homework.

At each training session, lectures in basic topics will be given to the entire core group. Detailed training in special topics will be given to the appropriate specialists of the core group. For example, introduction to the software in energy calculations will be given only

to the engineers and detailed training in financial evaluations will be given to the economists.
As the GEF project is focusing on Municipalities, emphasis in training will be given to the municipal owned or operated facilities (i.e. buildings, district heating, street lighting).

2.2.2. Developing of training materials, guidelines and manuals, that are tailored to meet the training needs in Bulgaria

After the core group of trainers have completed the training program, they will develop training materials tailored to meet the training needs in Bulgaria. The international consultants will support them in their work. The training materials used by the international consultants will be used as a basis, but required changes, or new training material can be incorporated into them.

Manuals and guides will be developed for specific topics in the entire ENCON Process in municipalities, as future training programs will follow the methodology used for training of trainers, but each will be individually focused on the field of expertise of the participants in the training program.

There will be different manuals for each type of program:

- Municipal Energy Efficiency Policy Planning
- Energy Auditing
- Financial Engineering with a Focus on Business Plans
- Project Management
- Energy Management

Manuals and guides on municipal energy efficiency policy planning will be developed in coordination with the activities under output 1.1.

Manuals and guides on financial issues will be developed in coordination with the activities under output 1.3.

2.2.3. Conducting training programs for different expert and municipal managers groups, using the training materials developed, evaluating the results and implementing further modifications if required

The core group will train appropriate experts in the appropriate fields; the training material will be reassessed, and if any additional changes are required, they will be made at this time.

The first group of Bulgarian participants (10-15), part of them from the demonstration zone in Gabrovo and the others from other municipalities in the Municipal Energy Efficiency Network, will be trained by trainers from the core group, under the initial guidance of the international consultant. The training process will be based on the same methodology and interactive process that the core group experienced and will take from 4 to 6 months.

Once the training process has been completed, the participants will evaluate the program and, if required, further adjustments and development of the Bulgarian training material will be made.

The training of experts will be done in a 4-6 month time schedule per program. There will be 4 (or 5) training sessions per program, with one to two months between for homework activities.

A schedule will be made to implement further training programs in other municipalities in Bulgaria. Once the core group of trainers has implemented the first training program, it may take some months to make required adjustments to the training material and to organize the schedule for the next training courses. There should be one to two training courses, consisting of participants from three to five municipalities provided each year.

The goal at the end of the five year program is in addition to the core group of trainers, there will be 60 to 80 experts trained.

2.2.4. Developing and implementing a program for advanced training to support development of private sector energy services and financing capabilities.

In so much as financing remains a major problem, national and international financial institutions are increasingly showing an interest in energy efficiency projects, with the result that more and more funds are available for investments. But the financial institutions complain about the lack of viable projects. This highlights a need for local know-how for developing acceptable energy audits, business plans, project management skills and energy management skills. This is why this activity is closely associated with the practical training required during the ENCON Process Training, and it is expected that the training and education in the ENCON Process will lead to the development of private sector energy services in the country.

As a result of the current state of the economy and the political situation in the country, an environment conducive to this type of business does not exists. However, it is expected that the economic situation will improve and there will be a need for these types of services in the private sector. Therefore, this activity will be further developed during the lifetime of the GEF Project, as the economic situation changes in the country.

As experts are trained in the ENCON Process, there will be further opportunities planned for those experts who wish to further develop their skills and incorporate these in a private sector enterprise will be given the opportunity to attend further training seminars and workshops with topics such as:

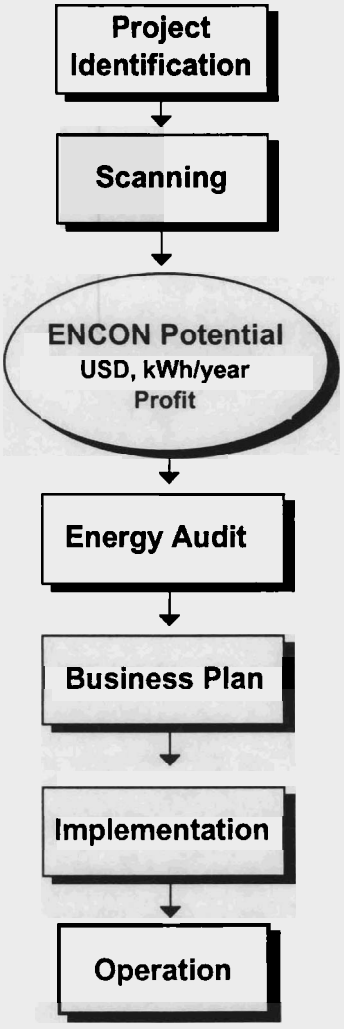
- Energy Service Companies (ESCO);
- Energy Performance Contracting (EPC);
- Activities Implemented Jointly (AIJ); and
- Climate Technology Initiatives (CTI) Agreements.

Appendix

ENSI Energy Saving International AS Training Program

The training material for this program (valued at US$ 300,000) will be an in-kind contribution from ENSI Energy Saving International AS, a partner in the Norwegian Energy Efficiency Group.

The following model describes a practical approach to how to realize energy projects step by step, according to the ENCON (ENergy CONservation) Process.



Every project is unique, and must be treated as such in order to find the energy conservation possibilities. The sponsor might also have various plans for renovation and different requirements for profit. It is necessary to find the possibilities and the economic consequences of the project before expending too much time on investigating all details. Hence the total ENCON Process is divided into several steps, as illustrated in the flow chart.

If the information gathered during the **Project Identification** phase reveals an interesting project, a **Scanning** is carried out in order to investigate whether profitable ENCON installations can be made or not (total energy saving potential, total required investments and total profitability).

If the sponsor finds the profitability interesting, the process will continue with a detailed **Energy Audit** (Technical and economic evaluation). In order to organize financing, a **Business Plan** is necessary (Financial evaluation).

During the **Implementation** period Project Management and Quality Assurance is Important. The operation personnel should also be given thorough training on all systems and equipment. The training ensures an energy efficient **Operation** of the building and processes. After having implemented the ENCON measures, the installed systems for **Maintenance** and **Energy Management** will contribute to keeping the energy consumption at a permanently, low level.

For training of the core group of trainers, the team of international consultants will be present during all the training sessions. The team of international consultants will be available between training sessions to answer any questions participants may have, or to give any support they may require.

The core group of trainers must be present at all of the training sessions.

Educational Material

As a result of the oil crisis in the 1970's, western countries started developing energy policies, energy conservation programs, and energy efficient and environmental technologies. Many western authorities focus on training and education in their national policy. It is considered important to train people to "do the right thing at the right time". Thus western countries have a wide experience in organizing and implementing efficient and profitable projects. This knowledge, including practical tools and training material is very useful for other countries. Hence western authorities also focus on capacity building or transfer of know how in their collaboration programmes with countries in central and eastern Europe and the CIS.

Norway has been a leader in these activities and has implemented similar training programmes in countries in transition in the past. As a result, most of the necessary material has already been developed and adjusted for central and eastern European conditions. Further development of the material is currently being done and the training material used in Bulgaria will include the updated training material. Necessary adjustments for specific Bulgarian conditions will be done as part of the training of the national core group. It is expected that most of the material can be translated into Bulgarian directly.

Schedule for Training Program: The preparatory time to choose the national core group of trainers and to prepare all training documentation, and logistics will take 3 to 4 months. Starting this preparatory process in September or October of 1997 will lead to the actual training courses commencing in January 1998.

Training course 1
Introduction to the ENCON Process

Objective: To present the basic methodology for the ENCON Process, to introduce the first step of the process and to introduce the basic ENCON measures.

Content/Course Outline:
Basic Topics:
- The ENCON Process
- Project Identification
- Scanning
- ENCON Measures

Topics for detailed training:
- Energy Calculations (engineers)

Homework:
- Project Identification and first step of Scanning
- Basic energy registrations for "properties" owned by the Municipality in Gabrovo

Training course 2
Energy Auditing

Objective: To present tools and examples of how to perform an energy audit. This session will include an introduction to the technical-economic calculations.

Content/Course Outline:
Basic Topics:
- Energy Auditing
- Technical-Economic calculations and evaluations
- Environmental issues
- Presentation Techniques

Topics for detailed training:
- Energy Audit, further details (engineers)
- Economic Calculations, further details (economists)

Homework:
- Finish scanning and first part of Energy Audit
- Scanning of some municipal owned properties in Gabrovo

Training course 3
Project Management and Energy Management

Objective: To introduce the basic topics, methodology, tools and examples on how to organize project management and project implementation. To introduce tools and methodology to organize and implement energy management to ensure long term energy efficiency of the project.

Content/Course Outline:
Basic Topics:
- Project Implementation
- Project Management
- Models for Contracts
- Operation and Maintenance
- Energy Management

Topics for detailed training:
- Operation, Maintenance and Energy Management
- Project Management and Project Implementation

Homework:
- Completion of Energy Audit
- Action Plan for Energy Efficiency in Gabrovo
- Detailed Project Implementation plan for homework projects and Gabrovo projects

Training course 4
Financial Engineering

Objective: To introduce the methodology and tools needed for financial and economic analysis of energy efficiency investment projects and how to develop a business plan for the project.

Content/Course Outline:
Basic Topics:
- Financial Calculations and Evaluations
- Business Plans

Topics for detailed training:
- Financial Calculations and Evaluations
- Energy Performance Contracting

Homework:
- Business Plan for homework projects and Gabrovo projects
- Financial mechanisms for projects in Gabrovo

Final Meeting

Final presentations by participants, summary of program, and discussion of necessary changes to training program. Planning for first training program by core group of trainers to commence in Autumn 1998.

Proposed Topics for Workshops (Workshops to be organized, and sponsors to be found at a later date):

- energy efficiency technologies in end use, products available on market (find sponsors - for example equipment suppliers)
- Project Implementation - PHARE
- International Financial Institutions - 1/2 of full day workshop on requirements etc.
- ESCO's - Johnson Controls or Honeywell

Annex IV. 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 of 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 this project, there is a fertile ground for energy efficiency investments which are 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 is taken according to the baseline scenario of the Bulgarian Country Study for the development of the energy sector during the years of the project life cycle.

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 increase the capacity of Bulgarian citizens 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 energy efficiency 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 practices within Bulgaria's municipalities which are mostly small- and medium-sized cities. These barriers can be identified as inappropriate municipal policies and legislation, limited institutional capacity to manage energy at the local level, and no existing network for the dissemination of information about energy efficiency initiatives.

The project will remove these barriers by developing a model municipal energy strategy and a municipal network of energy efficiency offices based in the municipal administrations, first of Gabrovo and then in other cities. The costs of these offices 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 started with support from USAID (see Annex VI. USAID Parallel Financing). The network will then be expanded to 30 municipalities and 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. Of this total, US$ 424,200 is being requested from GEF. The rest of the funding for this activity will be from Bulgarian sources and USAID.
A substantial input to this subproject will be contributed by the municipal authorities in-kind for their participation in network meetings and activities, including the Energy Efficiency Offices staff in Gabrovo and the other municipalities, travel expenses for participation in network meetings and activities

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 obtain financing for energy efficiency projects. The necessary material to train these local professionals and technicians does not now exist in Bulgaria. Therefore, a barrier exists from both limited human capacity to implement energy conservation projects at the local level and inadequate training materials to facilitate the implementation of these projects.

This second subproject will address the training needs of the people at the municipal level who will be involved in energy conservation programmes. To provide for sustainability of the training program it will firstly be given to a national core group of trainers. After the initial training phase, the core group of trainers will develop training materials, guidelines and manuals, that are tailored to meet the training needs in municipalities in Bulgaria and will conduct training programs for the municipalities in the energy efficiency network.

The cost of overcoming this shortage of trained personnel and limited training material is estimated at US$ 657,000. GEF is being requested to pay US$ 369,200 of this total. The remainder of the funding is being provided by Bulgarian sources in-kind and US-AID parallel projects.

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$ 245,800, and the remainder is being contributed in-kind by Bulgarian sources.

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 IV-1. Under the baseline, the missing and burnt lamps should be replaced with mercury vapor lamps as they fail. The costs for this path of action together with the replacement of the newly burnt lamps for the project period come to about US$ 471,340. The costs of replacing all street lamps with sodium ones, replacement of fixtures with more efficient ones, installing net telecontrol systems, and electronic control systems for night and semi-night duty cycle comes to US$ 1,277,000. On the basis of electricity price prognosis the savings come to US$ 2,844,460. Over a ten-year project lifetime and with a 8,74% discount rate, the incremental costs of the activity are negative, estimated at US$
(-) 2,038,800.

Compared to the baseline parameters this subproject will result in the reduction of CO_2 emissions by 5,063 tonnes/year. Over the course of sub-project life cycle, these emissions total 50,630 t. 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$ 194,000. 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.

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 generation system of Gabrovo and partial replacement of old and worn-out steam mains. The total costs of these activities over the life of the project come to US$

367,780 (Table IV-2). Under the subproject being proposed, a number of measures would be undertaken simultaneously in the heat transmission and distribution system, and the end-user system. The total present value of these interventions comes to US$. 2,417,450. The gross incremental costs of this intervention are therefore, US$ 2,049,670. Given the value of the potential energy savings estimated at US$ 3,326,000, the net incremental costs are estimated as being negative US$ (-)1,276,330. All economic indices are discounted on the basis of 15 years sub-project life cycle and an actual interest rate of 8%.

Compared to the baseline situation, there will be a reduction of CO_2 emissions by 12,817 tonnes/year through the implementation of this subproject, or nearly 192,000 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$ 245,000 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, heat meters will be installed within a World Bank's loan.

Subproject 6: **Retrofit of Existing Buildings to Reduce Energy Use**

Although building standards and codes have been established for new construction and renovated buildings, Bulgarian building stock is relatively old and inefficient in energy terms. At present, there is a need to demonstrate the potential energy and economic savings from building retrofits. This element will provide technical assistance to demonstrate the economic potential of building retrofits using one hospital, one school, one multi-family residence, and one industrial building.

In the incremental cost tables (Table IV-3, 4 and 5), the cases of the school, the residential building, and the industrial building are shown (with US-AID support the hospital demonstration project has been completed). The baseline costs involve merely maintaining the current systems at adequate performance levels. The alternative will involve retrofitting the buildings for a total of US$ 71,000. Over 10 years, the energy savings are estimated at about US$125,800 per year. The gross incremental costs come to US$57,880 and the net incremental costs come to US$(-) 222,490. As energy prices continue to rise to world levels and the retrofits to the building last longer than ten years, the economic effects of the project will be much greater than those analyzed in the proposal. When compared to the baseline situation, this subproject will result in a reduction of CO_2 emissions by 477 tonnes/year. Additional benefits will involve a reduction of sulfur emissions and improvements in the comfort of building inhabitants.

GEF support is requested for US$222,800 which will cover technical assistance costs to prepare the retrofit plans and to share the results with other cities. Additional support for this activity is expected from Bulgarian sources, US-AID, PHARE, and possibly JICA.

TABLE IV.1

Comparison of Costs And Benefits of the Alternative Intervention to the Baseline for the Demonstration Project:
"Energy Efficiency Improvement of the City Street Lighting System in Gabrovo"

	Total Costs US$	Domestic Benefits (Services provided)	Global Benefits (tons CO_2 equivalent)
BASELINE: • Replacement of burnt out luminaries by new ones of the same type; • Full load of the installed capacity to achieve service according to the norms.	471,340	• 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 5,455,000 kWh/per year.	Increase of CO_2 emissions by 4,215 t/year from current situation
ALTERNATIVE INTERVENTION: • Replacement of the existing luminaries by more efficient ones; • Introduction of net remote control and installation of electronic control system for night and semi-night duty cycle.	1,074,000 203,000	• Reduction of the installed capacity; • Reduction of energy consumption by 6,507,000 kWh/year compared to the baseline; • Reduction of running costs; • Improvement of services.	Reduction of CO_2 emissions by 850 t/year compared to the current situation and 5,063 t/year compared to the baseline.
GROSS INCREMENTAL COST: (alternative-baseline) **NET INCREMENTAL COST: (alternative-baseline-savings)**	**805,660** **(2,038,800)**		Reduction of CO_2 emissions by 5,063 t/year or 50,630 t over 10 years compared to the baseline situation.

TABLE IV.2

Comparison of Costs and Benefits of the Alternative Intervention to the Baseline for the Demonstration Project:
"Energy Efficiency Renovation of District Heating and Heating End-Use in the City of Gabrovo"

	Total Costs US$	Domestic Benefits (Services provided)	Global Benefits (tons CO_2 equivalent)
BASELINE: • Annual repair and reconstruction of the Heat Generating Plant and repair and replacement of existing steam mains which are obsolete and worn out.	367,780	• 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 309 kg/MWh (103,545 t/year)
ALTERNATIVE INTERVENTION: 1. Repairs in the DHP and repair and replacement of existing steam mains which are obsolete and worn out.	**367,780**	**Reduction of heat requirements for the 15 years of** the life cycle of the project by:	**Reduction of CO_2** emissions by 12,817 t/year compared to the baseline situation.
2. Measures in heat transportation.		39,864 MWh /yr in heat generation;	
• Replacement of existing damaged foam concrete pipes with preinsulated pipes (700 m) and replacing gland compensators with expansion joints (66);	550,000	569 MWh /yr in purchased electricity; 12,263 MWh/yr in heat transportation; 27,602 MWh/yr in distribution and end-use.	
• Replacing pipeline laid in non-passable channel with pipeline laid overground (1,5 km).	228,200		
	409,000		

3. Distribution and end-use measures: • Replacement of 64 direct sub-stations with completed modernized and automated indirect ones; • Automation of 140 indirect sub-stations; • Installation of heat meters in 150 sub-stations; • Installation of thermostatic valves and cost allocators in residential buildings.	330,000 120,000 412,470		
GROSS INCREMENTAL COST: (alternative-baseline)	**2,049,670**		Reduction of CO_2 emissions by 12,817 t/year compared to the baseline situation.
NET INCREMENTAL COST: (alternative-baseline-savings)	**(1,276,330)**		

TABLE IV.3

Comparison of Costs and Benefits of the Alternative Intervention to the Baseline for the Demonstration Project:
"Retrofit of Existing Buildings to Reduce Energy Use - A School Building in Gabrovo"

	Total Costs US$	Domestic Benefits (Services provided)	Global Benefits (tons CO_2 equivalent)
BASELINE: • Replacement of broken windows; • Taking apart the existing venting lines and to mount an automatic air vents on every supply risers in the last floor; • Replacement of burnt out lamps; • Recovering the normal operation of the ventilation system in the swimming pool; • Installation of the designed shower heads in the baths.	11,160	• Keeping the energy systems of the school building working and satisfying the needs according to the norms; • Preventing increase in losses;	
ALTERNATIVE INTERVENTION: • Retrofit and weatherization of the windows with wooden frames; • Zone temperature control of the heating system; • Installing low flow shower heads; • Energy efficient retrofit of the ventilation system in the swimming pool; • Replacement of lamps with more efficient ones.	45,820	• Reduction of heat energy needs by 2,362 Gcal/yr and of electricity by 14,430 kWh/yr for a 15 years project life cycle; • Reduction of heat losses; • Improvement of heat comfort.	Reduction of CO_2 emissions by 303 t/year compared to baseline situation.
GROSS INCREMENTAL COST: **(alternative-baseline)**	34,660		Reduction of CO_2 emissions by 303 t/year compared to the baseline situation.
NET INCREMENTAL COST: **(alternative-baseline-savings)**	(154,570)		

TABLE IV.4

Comparison of Costs and Benefits of the Alternative Intervention to the Baseline for the Demonstration Project:
"Retrofit of Existing Buildings to Reduce Energy Use - A Residential Building in Gabrovo"

	Total Costs US$	Domestic Benefits (Services provided)	Global Benefits (tons CO_2 equivalent)
BASELINE: • Replacement of broken windows. • Installation of heat meters in the sub-stations (within demoproject 2); • Installation of thermostatic valves and cost allocators (within demoproject 2);	630 7,530	• Keeping the heating system working and satisfying the needs of the inhabitants of the building; • Preventing increase in losses; • Creating prerequisites for energy conservation measures (within demoproject 2);.	
ALTERNATIVE INTERVENTION: • Installation of heat meters in the sub-stations (within demoproject 2); • Installation of thermostatic valves and cost allocators (within demoproject 2); • Retrofit and weatherization of the windows; • Installation of heat reflectors; • Installation of heat vents; • Installation of low flow shower heads • Replacement of lamps with more efficient ones.	7,530 16,890	• Reduction of the heat energy needs by 132 Gcal/yr and of electricity by 25,590 kWh/yr for a 15 years project life cycle; • Reduction of heat losses; • Improvement of heat comfort.	Reduction of CO_2 emissions by 84 t/year compared to baseline situation.
GROSS INCREMENTAL COST: (alternative-baseline) **NET INCREMENTAL COST: (alternative-baseline-savings)**	16,260 (27,540)		Reduction of CO_2 emissions by 84 t/year compared to the baseline situation.

TABLE IV.5

Comparison of Costs and Benefits of the Alternative Intervention to the Baseline for the Demonstration Project:
"Retrofit of Existing Buildings to Reduce Energy Use - Industrial Building in Gabrovo"

	Total Costs US$	Domestic Benefits (Services provided)	Global Benefits (tons CO_2 equivalent)
BASELINE: • Replacement of broken windows; • Restoring the heating system to normal work.	1,340	• Keeping the system working and satisfying the needs of the building; • Preventing increase in losses.	
ALTERNATIVE INTERVENTION: • Draught stripping of metal doors; • Installation of ventilator closing valves; • Metal part of roof insulation; • Double glazing of roof windows; • Lowering of the lighting system.	8,290	• Reduction of the heat energy needs by 175 Gcal/yr and of electricity by 4,780 kW/yr for a 20 years project life cycle; • Reduction of heat losses; • Improvement of the heat comfort of the building.	Reduction of CO_2 emissions by 90 t/year compared to the baseline situation.
GROSS INCREMENTAL COST: **(alternative-baseline)**	6,950		Reduction of CO_2 emissions by 90 t/year compared to the baseline situation.
NET INCREMENTAL COST: **(alternative-baseline-savings)**	(40,390)		

Annex V. JOB DESCRIPTION

PROJECT DIRECTOR
(Budget line 17.01)

I. Main Duties

1. Takes the lead for policy activity on the national level and translates the lessons learned to national policy recommendation.
2. Provides synergy with other activities of the executing/implementing agency and of other local/national organizations in order to increase efficiency of the overall activities and to achieve the best possible results.
3. Provides liaison and co-ordination with international initiatives in the field of the project.
4. Provides for the inputs from the sources of parallel financing of activities related to this project. Co-ordinates the parallelly financed activities and provides for incorporating the results of them into the outputs of the project.
5. Assumes responsibility for financial reporting to UNDP and the Steering Committee on quarterly basis, as far as for the custody and proper use of UNDP funds provided for the project's implementation.
6. Provides organization and implementation of bidding procedures for hiring staff members, subcontractors and equipment providers.

II. Specific Job Qualification

A. Mandatory qualification:

1. Formal education: University degree
2. Experience in supervising large or very large teams.
3. Experience in managing of highly complex projects or sub-projects.
4. Areas of technical experience: municipal development, regional and town planning, local energy studies and planning, urban energy efficiency.
5. Proven experience in the field of energy efficiency policy formulation and/or implementation.
6. Research work and/or publications.
7. Long term experience in international activities and programmes.
8. Well-known prestige within his field of expertise, able to organize work-teams integrated by experts and consultants from different professional areas and co-ordinate duties. Experience dealing with high officials from the central and local governments and from public and/or private sectors, as necessary.

B. Desired qualification:

1. Teaching experience and/or university practice.
2. Foreign languages.

PC, Word Processing and spreadsheet programmes.

PROJECT CO-ORDINATOR
(Budget line 17.02)

I. Main Duties

1. Carries the overall responsibility for the implementation of the project and focuses his/her efforts on obtaining concrete replicable results. Provides overall leadership and oversight of the project to ensure that the budget, schedule, and goals are accomplished.
2. Carries out the operational day-to-day management of the project and assumes the prime responsibility for all of its aspects, include. the management of the Demonstration Zone Support Office, the demonstration and dissemination activities. Prepares work schedules, assigning duties to experts and consultants. Carries out relevant trials pertaining to the project.
3. Co-ordinates, programmes and executes consulting services within the project. Supervises the activities carried out by teams of experts from diverse professional fields within the project scope.
4. Programmes and supervises technical and/or scientific studies within the components/sub-projects and prepares reports, proposals and recommendations for discussion. Directs and designs implementation of surveys and research work within the project components.
5. Co-ordinates specific design of methods, rules and procedures for implementation of the project components/sub-projects. Formulates guidelines for the design of manuals and/or relevant documents pertaining to the project.
6. Co-ordinates training programmes for the working-team, as well as the training materials. Gives lectures and seminars.
7. Provides organization and implementation of bidding procedures for hiring staff members, subcontractors and equipment providers.

II. Specific Job Qualification

A. Mandatory qualifications:

1. Formal education: University degree
2. Experience supervising large or very large teams. Experience in co-ordinating highly complex projects or sub-projects.
3. Areas of technical experience: municipal development, regional and town planning, local energy studies and planning. Proven experience in urban energy efficiency. Research work and/or publications.
4. Well-known prestige within his field of expertise, able to organize work-teams integrated by experts and consultants from different professional areas and co-ordinate duties. Experience dealing with high officials from the central and local governments and from the public and/or private sectors, as necessary.

B. Desired qualifications:

1. Teaching experience.
2. Foreign languages.

PC, Word Processing and spreadsheet programmes.

NATIONAL CAPACITY BUILDING CO-ORDINATOR
(Budget line 17.04)

I. Main Duties

1. Carries out the co-ordination of all capacity building activities within the project.
2. Carries the responsibility for the co-ordination and implementation of the activities to achieve immediate objective 1 and for obtaining replicable outputs. Provides leadership and oversight of the capacity building activities to ensure that the budget, schedule, and goals are accomplished.
3. Prepares and co-ordinates work schedules, assigning duties to experts and consultants involved in achievement of immediate objective 1. Carries out relevant trials pertaining to that activities and outputs within the immediate objective 1.
4. Co-ordinates, programmes and executes consulting services within the immediate objective 1. Supervises and co-ordinates the activities carried out by teams of experts from diverse professional fields within the scope of the capacity building activities.
5. Programmes and supervises technical and/or scientific work to achieve the immediate objective 1 and prepares reports, proposals and recommendations for discussion. Directs and designs implementation of surveys and research work for achieving immediate objective 1.
6. Co-ordinates specific design of methods, rules and procedures for implementation capacity building activities. Formulates guidelines for the design of manuals and/or relevant documents concerning immediate objective 1.
7. Co-ordinates training programmes for the working-team, as well as the training materials and gives lectures and seminars to achieve the immediate objective 1 and relevant outputs.
8. Provides organization and implementation of bidding procedures for hiring staff members, subcontractors and equipment providers.
9. Provides co-ordination of capacity building activities (immediate objective 1) with the demonstrations within the project (immediate objective 2).

II. Specific Job Qualification

A. Mandatory qualifications:

1. Formal education: University degree
2. Experience supervising large teams. Experience in co-ordinating complex projects or sub-projects.
3. Areas of technical experience: municipal development, regional and town planning, local energy studies and planning, urban energy efficiency. Proven experience in training and education. Research work and/or publications.
4. Well-known prestige within his field of expertise, able to organize work-teams integrated by experts from different professional areas and co-ordinate duties. Experience dealing with officials from the public and/or private sectors.

B. Desired qualifications:

1. Teaching experience.
2. Foreign languages.

PC, Word Processing and spreadsheet programmes.

DEMONSTRATION CO-ORDINATOR
(Budget line 17.09)

I. Main Duties

1. Carries out the co-ordination of all demonstration activities within the project.
2. Carries the responsibility for the co-ordination and implementation of the activities to achieve immediate objective 2 and for obtaining replicable outputs from the demonstrations. Provides leadership and oversight of demonstration activities to ensure that the budget, schedule, and goals are accomplished.
3. Prepares and co-ordinates work schedules, assigning duties to experts and consultants involved in achievement of immediate objective 2. Carries out relevant trials pertaining to that activities and outputs within the immediate objective 2.
4. Co-ordinates, programmes and executes consulting services within the immediate objective 2. Supervises and co-ordinates the activities carried out by teams of experts from diverse professional fields within the scope of the demonstration activities.
5. Programmes and supervises technical and/or scientific work to achieve the immediate objective 2 and prepares reports, proposals and recommendations for discussion. Directs and designs implementation of surveys and research work for achieving immediate objective 2.
6. Co-ordinates specific design of methods, rules and procedures for implementation demonstration activities. Formulates guidelines for the design of manuals and/or relevant documents concerning immediate objective 2.
7. Co-ordinates training programmes for the working-team, as well as the training materials and gives lectures and seminars to achieve the immediate objective 2 and relevant outputs.
8. Provides organization and implementation of bidding procedures for hiring staff members, subcontractors and equipment providers.
9. Provides co-ordination of the demonstrations (immediate objective 2) with capacity building activities within the project (immediate objective 1).

II. Specific Job Qualification

A. Mandatory qualifications:

1. Formal education: University degree. Experience supervising large teams. Experience in co-ordinating complex projects or sub-projects.
2. Areas of technical experience: municipal development, regional and town planning, local energy studies and planning, urban energy efficiency. Proven experience in engineering/economics/building design and construction. Research work and/or publications.
3. Well-known prestige within his field of expertise, able to organize work-teams integrated by experts from different professional areas and co-ordinate duties. Experience dealing with officials from the public and/or private sectors.

B. Desired qualifications:

1. Teaching experience and/or university practice.
2. Foreign languages.

PC, Word Processing and spreadsheet programmes.

FINANCIAL / ECONOMICAL ANALYST
(Budget line 17.07)

I. Main Duties

1. Carries the responsibility for and carries out the financial/economical analyses to all elements of the project. Co-ordinates, programmes and executes/supervises activities and/or consulting services for fulfilling specific financial/economical tasks within the project.
2. Carries the responsibility for the co-ordination and implementation of the financial aspects of all activities within the sub-projects to achieve the immediate objectives and for obtaining replicable outputs. Provides leadership and oversight of the financial/economic activities to ensure that the budget, schedule, and goals are accomplished. Takes part in the preparation and co-ordinates of work schedules.
3. Plays the lead in the activities supporting output 1.3, include. the development and examining of cost-recovery mechanisms for the demonstration sub-projects, reviewing the existing regulations and practices and developing recommendations that affect the business climate for energy efficiency activities in the municipalities, producing financial alternative packages and bankable projects, as well as guidebooks for municipalities etc.
4. Carries the responsibility for organizing workshops to introduce financial packages and guidelines to the municipalities, as well as for creating a clearinghouse to bring potential borrowers and lenders together. Takes the lead for promoting awareness of business opportunities in the field of energy efficiency and GHG emission reduction.
5. Co-ordinates specific design of methods, rules and procedures for implementation of financial mechanisms/tools. Formulates guidelines for the design of manuals and/or relevant documents concerning financial mechanisms/tools.
6. Co-ordinates training programmes for the working-team, as well as the training materials and gives lectures and seminars concerning financial/economical aspects within the sub-projects.

II. Specific Job Qualification

A. Mandatory qualifications:

1. Formal education: University degree
2. Experience supervising large teams. Experience in co-ordinating complex projects or sub-projects.
3. Areas of technical experience: municipal development, regional and town planning, local energy studies and planning, urban energy efficiency. Proven experience in financing and economics. Research work and/or publications.
4. Well-known prestige within his field of expertise, able to organize work-teams integrated by experts from different professional areas and co-ordinate duties. Experience dealing with officials from the public and/or private sectors.

B. Desired qualifications:

1. Teaching experience.
2. Foreign languages.

PC, Word Processing and spreadsheet programmes.

DEMONSTRATION SUB-PROJECT CO-ORDINATORS

(Street Lighting Co-ordinator - Budget line 17.10)
(District Heating Co-ordinator - Budget line 17.11)
(Building Retrofit Co-ordinator - Budget line 17.12)

I. Main Duties

1. Organize and supervise the subcontractors in implementing the demonstration sub-projects. Take part in the preparation and co-ordinates of work schedules.
2. Carry the responsibility for monitoring and recording the implementation of the demonstration projects.
3. Analyze the overall implementation process of the demonstrations and prepare reports.
4. Support the financial/economical analyses to the demonstration sub-projects.
5. Provide information for the clearinghouse and the information database. Support the dissemination of the results of the demonstrations. Take the lead in preparing a case studies on the demonstrations.
6. Participate in the training activities within the core group of trainers.
7. Support the organization of workshops and the promotion of awareness of business opportunities.

II. Specific Job Qualification

A. Mandatory qualifications:

1. Formal education: University degree
2. Experience supervising large teams. Experience in co-ordinating complex projects or sub-projects.
3. Areas of technical experience: municipal development, regional and town planning, local energy studies and planning, urban energy efficiency. Proven experience in street lighting / district heating / building retrofit. Research work and/or publications.
4. Well-known prestige within his field of expertise, able to organize work-teams integrated by experts from different professional areas and co-ordinate duties. Experience dealing with officials from the public and/or private sectors.

B. Desired qualifications:

1. Practical technical experience.
2. Foreign languages.
3. PC, Word Processing and spreadsheet programmes.

Annex VI. USAID PARALLEL FINANCING TO THE PROJECT

In order to contribute to the implementation of the project *"Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions. Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria"* USAID agreed to co-ordinate with this project the scope and objectives of its new long-term project *"Municipal Energy Efficiency Initiative"*, started in 1995. The USAID project covers several Central and East-European countries, include. Bulgaria and focuses 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. The activities within the project expand upon previous USAID-sponsored work at the municipal level and support UNDP/GEF efforts, which are also focused at the municipal level. The general structure of the project ***Phase I*** consist of the following major tasks:

Task 1. Development of private sector energy services and financing capabilities

To initiate these activities an energy efficiency demonstration project was planned in the Regional Hospital in Gabrovo with participation of EnEffect as part of the Bulgarian private energy engineering expertise. The project was focuses on economic and budgetary benefits, and financial opportunities for energy efficiency , and was expected to serve as a basis for training at the municipal level. The scope and the objectives of the demonstration project in the hospital in Gabrovo were closely co-ordinated with the demonstration components of UNDP/GEF project *"Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions. Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria"*.

Energy Retrofit of the Gabrovo Hospital

(Short summary of task results)

Objectives and benefits. *The energy conservation project in Gabrovo was designed to demonstrate the technical as well as managerial aspects of an energy conservation effort, including application of engineering assessment methods, available energy saving technologies, approaches to deal with a practical aspects of implementation, and saving distribution. Project had accomplished its goals. Besides the energy conservation, result of the project include benefits, such as: 1) lower boiler emissions, 2) improved temperature management in part of the hospital building which was usually underheated, 3) improved indoor air quality in surgery department and 4) training of several local firms involved in the project. Management of several other municipalities and regional hospitals were addressed at two seminars organized to disseminate the project experience and the results. A positive response and interest of several of them indicates that the energy conservation project in Gabrovo will be used as a "template" for future projects.*

Technical scope. *The project consisted of an energy audit, technical and economic assessment of energy efficiency potential, and demonstration installation of selected energy efficiency measures, followed by saving verification measurement.*

Energy audit was aimed at the hospital building structures, boiler house equipment, ventilation system serving the surgery department, and the electrical equipment, with main objective to assess the current state of energy utilization and to identify energy conservation potential. The ASEAM (A Simplified Energy Analysis Method) computer program based on ASHRAE Fundamentals was used for the analyses.

Total of 37 energy conservation measures (ECOs) were identified and analyzed, based on their technical parameters, economic value, availability and overall practicality. 14 measures were short-listed and evaluated in more significant details. To demonstrate all aspects of energy conservation project including design, material specification, installation and verification measurement, eight ECO's were selected for the installation. It included measures related to building envelope, to boiler house equipment and to ventilation system.

Installation started during the late summer and was completed before the heating season 1996/97.

Verification of measurement was performed during the season 1996/97 and the results were normalized for comparison with the 1995/96 season. The test results had shown significant, better than expected, energy savings in heavy oil fuel consumption, as well as in electricity cost. The savings resulting directly from the installation of conservation measures were 21% of the total fuel consumption, or 2,780 GJ/year. Such energy savings produce a tangible monetary benefits to the municipal budget. Municipal and hospital management have therefore mutually agreed on distribution of savings and signed a Memorandum of Understanding in which they assigned 70% of the annual savings back to the hospital budget and 30% to the municipality. Municipal management made a commitment to use the saved money to fund other municipal energy conservation projects.

***Management.** The project was managed by Electrotek Concepts, Inc., Arlington VA, the prime contractor to US AID. Electrotek Concepts, Inc. contracted with EnEffect, the Bulgarian Foundation for Energy Efficiency, charged with managing the in-country project activities including the selection and procurement of all local suppliers and contractors, quality assurance issues and contact with municipal and hospital management. The energy audit, verification measurement and analysis of achieved savings were performed by AEE, the Bulgarian Chapter of the Association of Energy Engineers. Tysak Engineering, the energy efficiency consulting firm from Acton, MA, provided direct oversight of the project work.*

Task 2. Development and implementation of Municipal Energy Efficiency Network

The project envisages the experience from the demonstration hospital project to be disseminated through a municipal network. The network should build upon the existing infrastructure established by USAID at 10 priority municipalities and should link with established local networks in the U.S. and through Europe. 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 scope and the objectives of the activities concerning the municipal network were closely co-ordinated with the capacity building component of UNDP/GEF project *"Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions. Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria"*.

Municipal Energy Efficiency Network

(Short summary of task results)

Objectives. *The purpose of the network is to disseminate information on energy efficiency at the municipal level, to provide training of municipal officers and experts and to serve as a mechanism for identification of new energy efficiency projects.*

Scope. *The USAID project envisaged investigation of existing local and international municipal networks with a similar scope and objectives. A limited number of selected municipalities were invited to act as founders of the municipal network. 22 municipalities (twice more than expected) took the role of founders and identified contact persons for the network among the responsible experts from their administrative staffs. Draft activity regulations, work plan and initial information packages were developed and disseminated among the participating municipalities.*

Management. *The project is managed by Electrotek Concepts, Inc., Arlington VA, the prime contractor to US AID. Electrotek Concepts, Inc.contracted with EnEffect, the Bulgarian Foundation for Energy Efficiency, charged with managing the in-country project activities including contacting and selection and first municipalities to enter the network, to develop work plans, regulations etc. IRG, the energy efficiency consulting firm from USA, provided direct oversight of the project work. The focal point / secretariat of the network is EnEffect.*

Task 3. Development of Association of Energy Engineers (AEE) capabilities.

As member of the AEE, EnEffect is taking part in all training and other activities, provided in order to increase members capability. This may be considered as indirect U.S. contribution to the UNDP/GEF project *"Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions. Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria"*.

The overall project plan consist of additional tasks to be implemented during the next years. Their initial scope was also co-ordinated with those of the UNDP/GEF project *"Energy Efficiency Strategy to Mitigate Greenhouse Gas Emissions. Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria"*. The following

table shows the financial contribution of the overall USAID project, distributed by the UNDP/GEF project components and subprojects.

USAID PARALLEL FINANCING TO GEF PROJECT

Subprojects	USAID Project Budget	Expenditures until 31.03.97
1. Using Municipalities To Disseminate Energy Efficiency	185,940	80,000
2. Training and Education	90,690	52,120
3. Overcoming Financial Barriers		
4. Energy Efficiency Improvement of City Street Lighting Systems		
5. Energy Efficiency Renovation of District Heating & Heating End-Use		
6. Retrofit of Existing Buildings to Reduce Energy Use (include. equipment)	579,040 (253,000)	332,320 (102,320)
7. Project Management	68,910	51,560
8. Others		
TOTAL:	**924,580**	**516,000**

Annex VII. RESPONSE TO REVIEW BY DR. JAYANT SATHAYE

Introduction

The proposal for an Energy Efficiency Demonstration Zone in the City of Gabrovo, Bulgaria, received no comments by the members of the Executive Council of the Global Environment Facility. However, the proposal was reviewed by Dr. Jayant Sathaye, a senior scientist at the Lawrence Berkeley National Laboratory; Berkeley, California, USA. The general description of the proposal is very positive by Dr. Sathaye.

Dr. Sathaye also makes a number of excellent suggestions for clarifying and strengthening the proposal. These suggestions have been incorporated in the revised proposal and the Project Documents. The purpose of this annex is to identify Dr. Sathaye's comments and to describe how they have been reflected in the current Project Documents.

Metering

Comment: "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 is a barrier without focusing on approaches to overcoming it. It is important that the approach incorporate ways to address this issue."

Response: We agree with this comment. Metering to obtain accurate baseline data has been incorporated into the project plan for each of the demonstration projects. In the crucial area of district heating, the Bulgarian Committee on Energy, using World Bank funds, will provide 204 heat meters for all of the Gabrovo system's substations. The district heating demonstration will include a strategy for extending this metering to all end users and to revise the tariffs accordingly. The inclusion of information on the importance of metering has been incorporated into the municipal strategies (Output 1.1), training (Output 1.2) and financing (Output 1.3) activities.

Value of Saved Electricity

Comment: "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$ .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."
Response: We agree that the fuel used for peak-power generation is an important issue in estimating the reduction in GHG emissions and the value of projects that reduce peak demand. However, we have not been able to refine the benefits beyond the estimates made in the proposal.

In seeking to respond to this comment, we have encountered a number of difficulties. In the past, the investment in Bulgarian power plants has been guided primarily by the need for baseload plants to meet the dominant industrial demand. The result is shown in the fuel mix for electricity generation. In 1992, the Bulgarian electric generating plants consumed 9.3 million tonnes of oil equivalent (Mtoe).[1] Coal and lignite supplied 51.5% of this energy; nuclear, 33.4%; natural gas, 7.0%; hydro; 6.0%; and petroleum, 2.1%. The nuclear plants are baseload units. Much of the hydro generation is seasonal. This analysis led to the assumption in the report that the primary marginal fuel would be coal.

When the analysis turns to the 4.4 Mtoe of energy used in 1992 to generate heat, a different picture emerges. Here, the primary energy source is natural gas (56.5%), followed by petroleum (29.2%), coal (14.3%) and wood (0.5%). The Gabrovo district heating plant, which relies primarily on locally mined coal, is not reflective of this national fuel mix. To complicate things further, many residential customers are switching from district heating to electric resistance heating, creating a winter electricity demand problems. Meanwhile, the Bulgarian economy is undergoing a transition from heavy industry to more consumer-oriented industries, which is affecting the electricity demand profile.

Bulgarian energy managers recognize the need to move to cost-based tariffs, so that the kind of assessment recommended by Dr. Sathaye will be possible. The National Electric Company (NEC) has announced operating changes so that the powering up of its generating plants will be determined by their production costs. As described in Paragraph 34, one of the important additional beneficiaries of the project will be to give energy planners important information on end-use load shapes and how they are affected by demand-side management projects.

Carbon Content of Lignite

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

Response: The biggest low quality coal deposit in Bulgaria (about 95% of the lignites) is Maritza East, which is providing coal to three thermal power plants of the National

[1] The energy data used in this response is derived from the Bulgarian Climate Change Country Study, Part III, "Study of Energy Sector Base-line Scenario by 2020 and Greenhouse Gas Emissions Project," prepared by Energoproekt, 1995.

Electric Company. The lignites burnt are high ash and low-grade, with 55 % moisture , 34% ash, airdried basis, and 5880 kJ/kg calorific value which is 4 times less than good quality coal, like Donbass coal for example.

Institutional Arrangements

Comment: "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 in the project document stage. Also, letters of support for the baseline funding should be required prior to project implementation."

Response: We agree with this comment. The Project Documents describes the funding and roles of the participating institutions in greater detail. Letters of support are attached to the Project Documents.

Share of GEF Funding

Comment: "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."

Response: We agree with this comment. The Project Document provides a more detailed description of the need for GEF funding. See Paragraphs 44-46.

Incremental Cost Savings

Comment: "The incremental cost estimates show negative costs for each of three demonstration projects. A better approach 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."

Response: We agree that the best approach to estimating incremental cost savings is to make a distinction between fuel (and other operating) costs and capital costs (including capacity deferment) and to combine the results of these estimates. Unfortunately, because of the complex transitions now taking place in the Bulgarian electric power and thermal energy systems, this is extremely difficult at this time. Because of the poor physical condition of both the electricity and heat systems, the capital cost component of future costs will be high, compared with average international experience. This means that the approach taken is conservative and that the actual future savings will be somewhat higher than the estimates used here.

Annex VIII. STATEMENTS OF COMMITMENTS

Unofficial translation from Bulgarian

MUNICIPALITY OF GABROVO

5300 Gabrovo, "Vazrazhdane" Square, Tel: (066) 220 51, Fax: (966) 293 71
Bank Account No. 3010003804, BIN 6304000000 - OBB - AD - Gabrovo

Ref. No. 92-00-430/7.08.97

Mr. Antonio Vigillante,
UNDP Resident Representative,
Sofia

Re.: "Energy Efficiency Strategy to Mitigate GHG Emissions, Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria" Project

Dear Mr. Vigillante,

As you already know, the Municipality of Gabrovo is the pioneer in the energy efficiency field in Bulgaria and as such has hosted numerous important initiatives and projects on how to reduce energy consumption. Part of these initiatives are being realized with the participation of interested parties from abroad. We acknowledge with deep satisfaction the approval of the project " Energy Efficiency Strategy to Mitigate GHG Emissions, Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria", proposed jointly by the Ministry of Environment, the Municipality of Gabrovo and the Bulgarian Foundation for Energy Efficiency "EnEffect". For us it is a way of recognition of the years-long efforts of the municipal leadership in the field of energy efficiency and of the proverbial sound judgment and thriftiness of the inhabitants of Gabrovo which serve as a significant prerequisite for the success of the project.

In support of this project and in close relation to it the Municipality of Gabrovo has become the host of several other projects which get funding from other sources parallel to the GEF-funded project. The most important among them is the project "Municipal Energy Efficiency Initiative", funded by the US Agency for International Development, and the project for rehabilitation of the roof insulation of the Regional Hospital in Gabrovo, funded by the Swiss Government through the "Interasist" Foundation. As a result of these projects considerable fuel and cost savings have been achieved during the past heating season (1996-1997) which have been utilized to meet other urgent needs of the hospital. The Municipal Council, jointly with EnEffect, initiated the establishment of a Municipal Energy Efficiency Network which now unites more than 20 municipalities throughout the country.

All these results comply with the objectives of the project funded by GEF and form an integral part of the rest of the results estimated to be attained by this project. For this reason they are treated as parallel tasks which are considered to be component parts of the overall project " Energy Efficiency Strategy to Mitigate GHG Emissions, Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria ".

The Municipality of Gabrovo will continue to expand its support and direct input to the above project. In this connection the municipal leadership re-affirms the following:

- The "Energy Efficiency Strategy for Mitigation of GHG Emissions. Energy Efficiency Demonstration Zone in Gabrovo" project complies with the priority objectives of the policy for sustainable development of the municipality, by which the new municipal leadership abides.
- The Municipality of Gabrovo is prepared to become the centre of the demonstration activities in the framework of the project and to contribute to the dissemination of the results obtained on its area among the rest of municipalities throughout Bulgaria.
- The Municipality of Gabrovo is prepared to establish a specialized energy efficiency unit in the structure of the municipal administration for work on the implementation of the project and after its completion. The initial steps in this direction have already been made.
- The Municipality of Gabrovo is prepared to delegate its representatives (in terms of senior officials and experts) to the project Steering Group and project Financing Group.
- The Municipality of Gabrovo will make an input to the financing of certain elements of the project with means of its own either by way of direct contributions or in kind as follows:

a) direct contributions to some demonstration projects (as per the attached Project Document),

b) in kind input - by way of provision of temporary offices and relevent equipment for the project teams in Gabrovo, by making available appropriate premises for holding courses and seminars in the framework of the project, by ensuring the participation of senior municipal officials and local experts in the project-related courses and seminars and any other co-operation (as defined in the Project Document).

Hereby the Municipal Administration reaffirms and specifies its commitments undertaken with respect to the "Energy Efficiency Strategy to Mitigate GHG Emissions, Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria" project and expresses its hope that it will be finally endorsed in the nearest future. The Municipality is ready to embark immediately on concrete work for the implementation of the project

MAYOR:	CHAIRMAN OF THE MUNICIPAL COUNCIL:
(sgnd. illegible)	(sgnd. illegible)
Nikolay Dachev, M.Sc. (Eng.)	Ivan Nenov

Unofficial translation from Bulgarian

TPP "TOPLOFIKATSIYA - GABROVO" Single-owner PLC

Thermal Power Plant (TPP):	(066)	2-64-94
		2-46-59
Executive Director:		
Tel./Fax:		2-50-89
Chief Engineer:		2-44-87
Chief Accountant:		2-85-88
Procurement Dept.:		2-85-30
District Heating Dept.		2-86-11

Mr. Antonio Vigillante,
UNDP Resident Representative,
Sofia

Re.: Project "Energy Efficiency Strategy to Mitigate GHG Emissions, Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria"

Dear Mr. Vigillante,

Hereby the management of the Gabrovo District Heating Company "Toplofikatsiya - Gabrovo" Single-owner PLC reaffirms its preparedness to implement on its area the sub-project "Energy Efficiency Improvement of District Heating and Heating End-Use" in the framework of the "Energy Efficiency Strategy to Mitigate GHG Emissions, Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria" Project. The required pre-conditions for successful implementation of the project have been already created on the area of the Municipality of Gabrovo and within the company in view of the great economic and social effect of the project for both the company and the municipality, as well as for the entire population of the city.

In the framework of the approved Rehabilitation Program of the company for the period 1998-2002 an amount of BGL 600 million has been envisaged, including for measures to improve the energy efficiency of heat generation, transportation and distribution in the system of the company proper. In compliance with the objectives of the above mentioned project and in agreement with the municipal administration the company is prepared to allocate BGL 400 million (US$ 220 thous.) of the above amount for implementation of the measures envisaged in the "Energy Efficiency Improvement of District Heating and Heating End-Use" sub-project. These funds are allocated by the state budget and as such should be treated as part of the financial contribution of the Bulgarian party.

We express once again our conviction that the implementation of this project will be of great importance not only for the future of our company but will also produce substantial social and environmental benefits for the entire municipality and may serve as a tested model for similar reconstruction of other district heating companies around the country. For this reason we hope that the proposed Project Document of the "Energy Efficiency Strategy to Mitigate GHG Emissions, Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria" project will be duly approved as soon as possible in order to allow us to embark on its practical implementation.

Executive Director
"Toplifikatsiya-Gabrovo" Single-owner PLC: (Sgnd. illegible)

Ognyan Kossov, M. Sc. (Eng.)

Unofficial translation from Bulgarian

NATIONAL ELECTRIC COMPANY PLC - Sofia
ELECTRICITY SUPPLY BRANCH - City of Gorna Oryahovitsa
ELECTRICITY SUPPLY DISTRICT - City of Gabrovo
5300 Gabrovo, 1, "Orlovska" Street, P.O.Box 58; Tel: (066) 25 232, Fax: (966) 34 145; Telex: 67 576

Mr. Antonio Vigillante,
UNDP Resident Representative,
Sofia

Re.: "Energy Efficiency Strategy to Mitigate GHG Emissions, Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria" Project

Dear Mr. Vigillante,

Hereby the management of the Electricity Supply District - City of Gabrovo reaffirms its preparedness to implement on the area of the city Sub-Project "Energy Efficient Reconstruction of Street Lighting" in the framework of the "Energy Efficiency Strategy for Mitigation of GHG Emissions, Energy Efficiency Demonstration Zone in Gabrovo" Project. The management bodies of the Municipality of Gabrovo and Electricity Supply District - City of Gabrovo are convinced in the significant economic, environmental and social impact of the project and are engaged in creating conditions for its successful implementation.

In compliance with the established practice, the National Electric Company, through its Electricity Supply Branch in the city of Gorna Oryahovitsa and its sub-division in Gabrovo is responsible for the maintenance of the installed street lighting system of the city. In this connection for the period 1998-2002 it is planned to spend the equivalent of US$ 50 thousand for the application of energy efficiency measures, rehabilitation and repair works, as laid out in the Sub-Project "Energy Efficiency Improvement of City Street Lighting System". This amount shall be allocated through the National Electric Company and should be accounted as part of the contribution of the Bulgarian party to the implementation of the "Energy Efficiency Strategy to Mitigate GHG Emissions, Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria" project.

Through the participation of its Gabrovo district unit in this project, the National Electric Company will contribute to the fulfulment of Bulgaria's commitment under the UN Framework Convention on Climate Change. We state our support for the project and hope that the proposed Project Document shall be approved in the nearest future in order to create the basis for embarking on practical implementation of the scheduled activities.

HEAD OF ELECTRICITY
SUPPLY DISTRICT,
City of Gabrovo: (Sgnd. illegible)
M. Minkov, M.Sc. (Eng.)

Annex IX. FINANCIAL AND ACCOUNTING ARRANGEMENTS (Model Annex to the Project Document for National Executed Projects)

A. General

1. The Government designated "executing agency" - the Bulgarian Foundation for Energy Efficiency EnEffect (hereinafter referred to as "EnEffect"), is responsible to the Administrator of UNDP for the custody and proper use of the funds advanced to it by UNDP/GEF.

2. EnEffect will maintain separate accounts, including a separate bank account, for UNDP/GEF resources. It will use the funds provided to it only for inputs financed by UNDP/GEF, in accordance with the project budget, covering UNDP/GEF's contribution.

3. Advances of funds to and payments by UNDP on behalf of the Government are governed by the applicable UNDP Financial Regulations and Rules and directives regarding the utilization of currencies.

4. EnEffect will provide UNDP with financial statements of UNDP/GEF funds received and spent, prepared in accordance with the UNDP financial year (1 January to 31 December) in English. The periodicity and content of such statements are set out below. Annual financial statements will be audited by the legally recognized auditors of EnEffect's own accounts. To the extend feasible, the audit principles and procedures prescribed for the United Nations will be applied by the auditors, who will provide audit reports annually together with the reports set out below.

5. For the purpose of reporting to UNDP, US dollar equivalents will be calculated at the United Nations operational rate of exchange. The Resident Representative of UNDP will inform EnEffect of such United Nations rates of exchange and of changes thereto when they occur.

B. Advance of Funds

6. Advances will be made by the Resident Representative at the request of EnEffect in accordance with the project document and in the required currencies subject to the conditions set below.

7. EnEffect will indicate its cash requirements from UNDP/GEF funds for each period of the schedule of advances included in the project document at least two weeks before the payment is due (Attachment 1 of this annex, Request for advance of funds). Advances will be made by UNDP at the time indicated in the schedule of advances, in the amounts and currencies requested by EnEffect. (See also paragraph 9 below for requests for cash advances in currencies not available to the UNDP field office.)

8. If the schedule of advances included in the project document no longer reflects actual requirements for funds, a new schedule will be prepared by EnEffect in consultation with the Resident Representative, in accordance with the format indicated in attachment 5 of this annex, Schedule of Advances. Advances should normally be sufficient to cover anticipated cash requirements for a maximum of three months.

9. Advances to EnEffect in US dollars will normally be made by the Resident Representative.

10. Advances to EnEffect in US dollars will be made by the Resident Representative if this currency is available to him. The Resident Representative will arrange for advances in currencies not available to him to be made by UNDP Headquarters or other field offices, as deemed appropriate.

C. Direct Payments by UNDP

11. At the request of EnEffect, UNDP will, after verification of the supporting documentation, make payments directly to individuals or firms providing UNDP-financed services or goods. The request will be addressed to the Resident Representative who will either arrange for the payments to be made by his office or by UNDP Headquarters. The request will indicate payee, amounts and currencies required, justification for the request and payment instructions reflecting payee's bank, its address and the account number.

12. The Resident Representative will provide EnEffect with statements of direct payments made by UNDP within 15 days following 30 April, 31 August and 31 December, for incorporating in the project delivery report in accordance with paragraph 13 (b) below.

D. Periodic Financial Statements

13. EnEffect will furnish the Resident Representative with certified financial statements within 30 days following 30 April and 31 August and within 60 days following 31 December. The statements will include the following:

(a) Status of Funds Advanced by UNDP (attachment 2 of this annex).
The statement will be submitted for each period indicated above and will be prepared in the currency of the advance. Separate statements will be issued where different currencies have been advanced. Each statement will reflect cumulatively for the year the amount of funds available at the beginning of the year, funds advanced by UNDP, funds expended by EnEffect during the reporting period and the resulting balance at the end of that period. The statement will also detail expenditure incurred by month in local currency and the US dollar equivalent calculated at the applicable United Nations operational rate of exchange.

(b) Project Delivery Report (attachment 3 of this annex).
The report will be submitted for each period indicated above and will reflect cumulative current-year expenditure classified according to the items listed in the approved project budget. It will incorporate the expenditure incurred by EnEffect and, where appropriate, the expenditure statement of the co-operating agency, if any, and the statement of direct payments made by UNDP;

(c) Annual Report of UNDP-financed non-expendable equipment (attachment 4 of this annex). EnEffect will furnish the Resident Representative with a financial statement for the year to 31 December, within 60 days following that date and together with other financial statements due at that date, with an annual report of non-expendable equipment. The report will include all UNDP-financed non-expendable equipment furnished to the project during the year. Non-expendable equipment purchased by the co-operating agency, if any, and furnished to the project will also be included. The report will describe each item in detail, list the identification number given by EnEffect and the serial or registration number assigned by the maker and reflect the cost at the US dollar equivalent at the time of purchase calculated at the United Nations operational rate of exchange;

(d) Expenditure Statements for Jointly Financed Projects. In the case of joint financing of project activities by the Government and UNDP/GEF and other sources of assistance, the certified financial statements referred to above shall be accompanied by a separate statement reflecting expenditure for the full project covering the same period as the certified financial statements. To this expenditure statement should be added an indication of the apportionment by the Government of the reported expenditure to UNDP/GEF's contribution and other available funds.

14. If EnEffect cannot submit the financial statements on the date on which they are due, it will inform the Resident Representative of the reasons and indicate the planned submission date.

E. EnEffect's Annual Audited Financial Statements

15. A certified and audited annual financial statement of the status of funds advanced by UNDP, as described in paragraph 13 (a) above, will be made available by EnEffect to the Resident Representative within 120 days after the end of the calendar year.

16. The financial statement will be audited and attested to by the entity specified in paragraph 4, above.

F. EnEffect's Final Financial Statements

17. Upon financial completion of UNDP/GEF assistance to the project, EnEffect will provide final financial statements to cover the period 1 January to the date of either financial completion or refund of the unspent balance of UNDP/GEF funds, if

any (see paragraph 18 below). The financial statements will be audited so as to conform to the requirements set out in section E above. The format given in attachments 2 and 3 of this annex should be used. The statements will be provided within 120 days from the date of financial completion to the Director, Division of Finance, with copies to the UNDP Resident Representative.

18. If there is an unspent cash balance of UNDP/GEF funds held by EnEffect, that balance will be refund by EnEffect in the currency of the advance not later than 30 days after the date of financial completion.

G. Audit by UNDP

19. All accounts maintained by EnEffect for UNDP/GEF resources may be audited by the UNDP internal auditors and/or the United Nations Board of Auditors or by public accountants designated by the United Nations Board of Auditors.

Attachment 1

Bulgarian Foundation for Energy Efficiency EnEffect

REQUEST FOR ADVANCE OF FUNDS FROM UNDP

for project: ENERGY EFFICIENCY STRATEGY TO MITIGATE GREENHOUSE
GAS EMISSIONS, Energy Efficiency Demonstration Zone in the City of
Gabrovo, Republic Of Bulgaria
No: BUL/97/G31/A/1G/99

For the period from ..... 19... to ..... 19...

Currency	Cash in hand at beginning of period	Estimated disbursements to end of period	Net advance required	Payment details		
				Bank Name and address	Account title	Number

Certified by:

.....

Name (typed)

Title

Attachment 2

Page 1 of 2

Bulgarian Foundation for Energy Efficiency EnEffect

STATUS OF FUNDS ADVANCED BY UNDP[a]

for project: ENERGY EFFICIENCY STRATEGY TO MITIGATE GREENHOUSE GAS EMISSIONS, Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic Of Bulgaria
No: BUL/97/G31/A/1G/99

For the period from ..... 19... to ..... 19...
(In [currency])

A. Summary of funds received and expended	Amount (In currency of advance)
Balance at 1 January 19	XXX XXX
Add.: Advances received from UNDP	XXX XXX
Total funds available for project purposes	XXX XXX
Deduct: Total expenditures for year-to-date	YYY YYY[b]
Balance at ..... 19 ...	XXX XXX
Represented by:	
Cash in bank	XXX XXX
Cash on hand	XXX XXX
Balance at ..... 19 ...	XXX XXX

[a] / A separate statement is required for each currency advanced by UNDP.
[b] / This amount should be the same as the total expenditure (in currency of advance) in table B.

Attachment 2

Page 2 of 2

B. Summary of expenditure by month

	Expenditure (in currency of advance)	UN operational rate of exchange	Expenditure in US $ equivalent)
January	XX XXX	X.XX	XX XXX
February	XX XXX	X.XX	XX XXX
March	XX XXX	X.XX	XX XXX
April	XX XXX	X.XX	XX XXX
May	XX XXX	X.XX	XX XXX
June	XX XXX	X.XX	XX XXX
July	XX XXX	X.XX	XX XXX
August	XX XXX	X.XX	XX XXX
September	XX XXX	X.XX	XX XXX
October	XX XXX	X.XX	XX XXX
November	XX XXX	X.XX	XX XXX
December	XX XXX	X.XX	XX XXX
Total	YYY YYY[a]		XXX XXX

Certified correct by:

Name (typed)
Chief Accountant
Government agency

Approved by:

Name (typed)
Title
Government agency

AUDIT CERTIFICATE
(As issued and signed by the Auditors)

REQUIRED ONLY FOR ANNUAL AUDITED AND FINAL AUDITED FINANCIAL STATEMENTS

[a] / This amount should be the same as the total expenditure for year-to-date in table A.

Attachment 3

Bulgarian Foundation for Energy Efficiency EnEffect

project title: ENERGY EFFICIENCY STRATEGY TO MITIGATE GREENHOUSE
GAS EMISSIONS, Energy Efficiency Demonstration Zone in the City of
Gabrovo, Republic Of Bulgaria
UNDP Project No: BUL/97/G31/A/1G/99

Project delivery report for funds provided by United Nations Development Program (UNDP)
for the period 1 January to ..... 19...
(Prepared in US dollars)

		EXPENDITURES				
Budget line	Description	Budgets	Government	UNDP direct payments	Co-operating agency	Total
1	2	3	4	5	6	7
99.00	TOTAL		[a]/			

Certified correct by:	Approved by:
Name (typed)	Name (typed)
Chief Accountant	Title
Government agency (department)	Government agency (department)

AUDIT CERTIFICATE
(As issued and signed by the Auditors)

REQUIRED ONLY FOR ANNUAL AUDITED
AND FINAL AUDITED FINANCIAL STATEMENTS

[a] / Total of US dollars equivalent shown in each attachment 2.

Attachment 4

Bulgarian Foundation for Energy Efficiency EnEffect

Annual report of UNDP-financed non-expendable equipment

For project No: BUL/97/G31/A/1G/99

For the year ended 31 December 19 ...

Description			EnEffect identification number	Maker's serial or registration number	Cost in US dollars[b]
Total					

Certified by:
Name (typed)
Title

[b] / US dollar equivalent at time of purchase calculated at the United Nations operational rate of exchange.

Attachment 5

project title: ENERGY EFFICIENCY STRATEGY TO MITIGATE GREENHOUSE GAS EMISSIONS, Energy Efficiency Demonstration Zone in the City of Gabrovo, Republic of Bulgaria
UNDP Project No: BUL/97/G31/A/1G/99

SCHEDULE OF ADVANCES[a]

			US $
A.	Funds advanced to date		XXX XXX
B.	Funds to be advanced in forthcoming 12 months[b]		
	i. To EnEffect		
	Date	Amount	
		Total	XXX XXX
	ii. To Co-operating agency		XX XXX
C.	Funds to be advanced in subsequent periods		XXX XXX
	TOTAL ALLOCATION PER PROJECT BUDGET (LINE 99)		X XXX XXX

[a] / To be included in the project document immediately following the budget for UNDP's contribution (part IV). Advances should only cover anticipated cash requirements for a maximum of three months.

[b] / The period to be covered should be the 12 months following the date of approval of the project revision.

Annex X. DEMONSTRATION PROJECTS

A limited number of highly representative demonstration projects were identified in order to provide practical support to the capacity building process within the project. They were selected among a long list of opportunities with the view to be replicated in other Bulgarian cities.

Demonstration project:
"Energy Efficiency improvement of City Street Lighting System"

The street lighting system in Gabrovo, as in other Bulgarian cities, is inefficient. Street lighting consumed 313 gigawatt hours of electricity in Bulgaria in 1994, making this an attractive target. 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. The results will be disseminated to other cities, which will be encouraged to consider street lighting retrofit projects.
Based on the results of a comprehensive technical and economical evaluation of the street lighting system, the following energy efficiency measures were identified for implementation within this project:

- *Replacement of the existing luminaries by more efficient ones*

The main purpose of this measure to provide electric energy savings, higher quality of street lighting, corresponding to the European norms and extension of the equipment working period.

- *Optimization of the street lighting service regimes*

The basic purpose of this measure is to decrease the budget expenses for electricity paid by the municipality for street lighting, to set in correspondence the street lighting working schedule to the seasonal daylighting changes, to assist in introduction of night and half-night lighting for the city high ways, to contribute to diminishing of service expenses, to ensure possibility for enlargement of system functions in order to provide additional profits for the electricity supply company, for the end-users of electricity, and for the social sector and the industry.
The project is designed to encourage the use of top-level technology and quality control applications. The city street lighting project 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 project can be replicated in cities throughout Bulgaria. Because of the direct participation of the City, this project will be closely co-ordinated with project 3, which will be used to identify the optimal method of financing the new city street lights.
This demonstration project will be funded parallelly from different financial sources. shown at the following table:

TABLE X.1

Expected Funding Sources for the Project:
"Energy Efficiency Improvement of City Street Lighting Systems"

Funding Sources	Funds Planned for the Year (thous.US$)				
	1988	1999	2000	2001	2002
A. Bulgarian Party Contribution					
• National Environment Protection Fund	100	100	-	-	-
• Municipality of Gabrovo	80	70	10	10	10
• National Electric Company	110	250	50	50	50
• National Eco Trust Fund	100	90			
B. GEF Contribution	60	-	-	-	-
C. Bank Credits	60	70	-	-	-
Total	510	580	60	60	60
Grand Total for the Project			**1,270**		

Demonstration project:
"Energy Efficiency Renovation of District Heating and Heating End-Use in the City of Gabrovo"

About 20 of the big and medium-size Bulgarian cities have district heating enterprises. All of them except those in Sofia, belong to the state (the DH company in Sofia is owned by the municipality). Due to old equipment and worn up facilities, the overall efficiency of the district heating systems is low, a condition found in similar state- and municipality-owned district heating systems in Bulgaria and other CEE countries. Heat losses are big and the potential for energy efficiency improvements is significant. Due to this facts, demonstration in a district heating company could be of significant value for the rest of the companies in the country, as well as for similar enterprises in other CEE countries.
The state-owned co-generation station in Gabrovo 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.
The project will be based on a comprehensive technical and economical energy evaluation of the district heating plant, the distribution grid, and a representative sample of end user customers.
Currently, consumers are 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. 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 lessons learned in Gabrovo will be disseminated in other municipalities where similar district heating systems are in use and to local industrial heating stations. Following the recommendations of the technical/economical assessment the following basic energy efficiency measures are foreseen within this project:

- Repairs in the DHP and repair and replacement of existing steam mains which are obsolete and worn out.
- Measures in heat transportation: replacement of existing damaged foam concrete pipes with preinsulated pipes; replacing gland compensators with expansion joints; replacing pipeline laid in non-passable channel with pipeline laid overground.
- Distribution and end-use measures: replacement of direct sub-stations with completed modernized and automated indirect ones; automation of indirect sub-stations; installation of heat meters in sub-stations; installation of thermostatic valves and cost allocators in residential buildings.

TABLE X.2

Expected Funding Sources for the Project:
"Energy Efficiency Renovation of District Heating and Heating End Use"

Funding Sources	Funds Planned for the Year (thous.US$)		
	1998	1999	2000
A. Bulgarian Party Contribution			-
• National Environment Protection Fund	515	300	-
• District Heating Gabrovo	100	100	104
• National Eco Trust Fund	500	-	-
• World Bank	50	70	-
B. GEF Contribution	67	-	-
C. Bank Credits	140	120	60
Total	1,372	590	164
Grand Total for the Project		**2,126**	