**1. Country and Sector Background**

During the 1990s the energy sector was a vital part of the economy and still provides significant proportion of tax revenues. Inefficient use of energy is emerging to be a major cause of concern in Serbia. Consumption of primary energy in Serbia for every dollar of GDP is thirteen times more than Germany, ten times more than France, five times more than Slovenia, and almost twice that of Romania. Problems in the energy sector reflect the cumulative effect not only of complications arising from damage to infrastructure during the Kosovo war, but also of policies that channeled mass subsidies to firms and the population through cheap energy. The energy policies stimulated excessive and wasteful consumption, whilst at the same time deprived the energy sector of capital to develop its capacity to meet growing demand.

There is an excessive use of electricity for heating in Serbia. While industrial electricity consumption fell during the 1990s, the share of household consumption in all electricity use increased from 36 per cent to
55 per cent. Most of the increase in demand has come from electrical heating by households as electrical energy was, till recently, relatively cheap compared to other fuels such as natural gas, district heat and even wood. An estimated 8 TWh of electricity, or 25 percent of gross electricity consumption, was used for heating in 2000. In 2001, electricity demand for heating represented about 40 percent of daily consumption on an average winter day. Because of poor and uneven quality of heat supply, consumers tend to use as an alternative or sometimes even as a supplementary source, electricity - an inefficient source of space heating, individual oil boilers, or dirty fuels such as brown coal or wood. To reduce electricity consumption for heating, the GOS intends to rationalize energy prices, improve heat alternatives, and promote efficient use of energy. Future energy price increases will be increasingly difficult to implement due to affordability issues, which are one of the major concerns of the population and the Government. As price increases continue, their impact should be addressed by providing incentives and options to use energy more efficiently and to reduce energy consumption, particularly for the poorer segments of the population.

2. Objectives
The development objectives of the project are to (a) reduce the local and global environmental impact of the use of dirty fuels for heating buildings in Serbia, and (b) make heating more affordable by improving end-use energy efficiency.

These objectives will be achieved by financing (a) the replacement of inefficient lignite and oil-fired boilers, at the end of their economically useful life, with a gas-fired plant at the Clinic Center in Belgrade; (b) energy efficiency improvements in selected public buildings such as schools and hospitals throughout Serbia, including selected buildings in the Clinic Center; (c) technical assistance to the Serbian Energy Efficiency Agency for capacity building, developing a pipeline of projects, institutional development, public outreach/communications and monitoring and evaluation.

An associated GEF residential energy efficiency project is envisioned. While the IDA project will focus on improving the functional and health environments of public/social sector buildings, the GEF project would support the removal of barriers to energy efficiency improvements in residential buildings. The GEF is expected to help establish an Energy Efficiency Fund (EEF) for providing affordable financing to the residential consumers to improve energy efficiency of their homes and buildings. The combination of IDA and GEF support for public and residential buildings, respectively, would help the Government of Serbia (GOS) develop effective programs and institutions that will facilitate sustainable public and private initiatives for improving energy efficiency in key building categories (i.e. schools, hospitals and residences). The two projects will be processed separately due to differing processing schedules. They will be linked through their common development and global environment objectives, as well as through integrated implementation arrangements that aim to strengthen the Serbian Energy Efficiency Agency (SEEA), which is expected to play a pivotal role in operationalizing energy efficiency policies adopted by the Government of Serbia (GOS).

An important outcome of this project, as well as that of the associated GEF project, is to support the Government’s program of energy sector reform which includes institutional reforms (enactment of a new Energy Law, creation of regulatory agencies, restructuring of the electricity sector), gradual introduction of competition in generation and supply, and stepwise tariff adjustments to levels that cover costs. The Bank is supporting the power sector reforms in Serbia through the Electricity Power Reconstruction Project. However, rising electricity and other energy tariffs are generating concerns among the population and consequently political resistance to reforms. The project will help partially mitigate this impact by promoting energy efficiency to contain costs to consumers, without reducing the derived benefits. The investment in the Clinic Center and energy efficiency improvements in public and residential buildings will result in substantial environmental benefits by reducing local air pollution as
well as emission of Green House Gases.

Inefficient use of energy is a major concern in Serbia. Consumption of primary energy in Serbia for every dollar of GDP is thirteen times more than in Germany, ten times more than France, five times more than Slovenia, and almost twice that of Romania (see Section B.2). Working with the newly created Serbian Energy Efficiency Agency (SEEA), which has a broad mandate of *inter-alia* improving energy efficiency in Serbia, the project will foster partnerships with several other donors assisting Serbia in this field. The Government of Norway is providing assistance in improving energy efficiency of the industrial sector, the European Agency for Reconstruction (EAR) is providing technical assistance for institutional development and formulation of the Government’s policies in this field, the Bank is supporting technical assistance for the development of an Energy Strategy (including energy efficiency), the proposed IDA Credit would help implement energy efficiency program in selected public buildings, and the multi-donor financed GEF support will help overcome barriers to energy efficiency in the residential sector.

3. Rationale for Bank's Involvement

The major role the Bank plays in the Serbian energy sector reform agenda helps it leverage rather small amounts of GEF and IDA resources and weigh in on important demand-side policy reforms identified during project preparation and implementation. Likewise, the results of the project shall provide practical inputs to better inform evolution of Serbia’s energy strategy, which the Bank is supporting through the *Emergency Electric Power Reconstruction Project*.

4. Description

The project would consist of two components: (i) *Rehabilitation of Heat Supply System and Energy Efficiency Improvements in the Clinic Center (CC) in Belgrade*. This component will consist of two sub-components: (a) conversion of nineteen lignite and mazut fired boiler plants at the Clinic Center to one natural gas-fired plant for production of heat, sanitary hot water, and steam; (b) energy efficient retrofitting of CC buildings selected as high priority buildings by the Government. (ii) *Energy Efficiency Improvements in Social Services Facilities* This component will consist of two sub-components: (a) optimization of space heating in selected school and hospital buildings across Serbia; (b) technical assistance to SEEA for (i) institutional development in monitoring and evaluation, technical quality control, and external communications; and (ii) to train potential energy consultants in the state of art methodologies in energy auditing and energy efficiency project development.

Component (i). *Rehabilitation of Heat Supply System and Energy Efficiency Improvements in the Clinic Center*. The Clinic Center complex includes 76 buildings with a total covered area of 391 thousand square meters and spread over an area of 38 hectares. These buildings include hospitals, specialized Clinics, faculties and research institutes, as well as administration, service and storage buildings. The energy supply services within the CC consist of heat supply from 19 separate boiler plants (up to 50 years old, using lignite and heavy oil) comprising of total 72 boiler units with a variety of unit sizes. The CC's electric load of about 15 MW is supplied by the power distribution company. The heat is distributed through pipes mainly laid in channel beds either by steam or by hot water. The total installed capacity of the boiler plants is about 77 MW, and their annual consumption is 11,500 tons of heavy fuel oil, 650 tons of light fuel oil and 6,850 tons of coal, for which storage facilities have to be provided. The CC is connected to the power grid by underground cables.

The Clinic Center boiler plants are characterized by (i) low efficiency, (ii) costly operation and maintenance, (iii) low reliability of energy supply, and (iv) environmental pollution. By burning dirty fuels with outdated equipment, the existing boiler plants are major sources of air pollution for the central
part of Belgrade where they are located and in particular for the patients of the Clinic Center most directly exposed to its emissions. A feasibility study for evaluation of various alternatives for supply of heating, hot water, and steam to the Clinic Center and to determine the least-cost solution will be completed by May 2003.

A few important buildings of the Clinic Center will be retrofitted to demonstrate the benefits of improving energy efficiency. Remaining buildings will be taken up for retrofitting in a phased manner by the Clinic Center.

Component (ii). Energy Efficiency Improvements in Social Services Facilities.
This would include (a) installation of energy efficiency equipment and retrofitting in public buildings (schools and hospitals), and (b) technical assistance.

Under the public buildings (schools and hospitals) sub-component, the SEEA and the Ministries of Health and Education would agree on selection criteria for hospitals and schools, and to invest in energy efficiency measures designed to have a demonstrable impact on energy savings. The SEEA is expected to be accountable for the fiduciary and project management aspects of the installations on behalf of the Ministries (in the case of hospitals), and Municipalities (in the case of schools). The participating agencies are expected to provide access and facilitate implementation of the project, including ex-post monitoring of benefits and measurement of impacts.

Investment packages for schools and hospitals will be designed around (i) energy efficiency improvements and (ii) inter-fuel substitution. For energy efficiency improvements, investment payback would be 6 to 7 years. Each package will depend on the primary fuel and heating system used. For schools served by district heating utility, a package of roof insulation, weather-stripping and indoor/outdoor controller with a 3 way valve yield about a 4 year payback whereas for fuel oil heated schools the investment package could cover a wider range of measures due to the higher cost of the fuel oil. Inter-fuel substitution would be considered if significant cost savings can be achieved without switching to dirtier fuels. This would be the case with light fuel oil boiler conversions to district heating or natural gas, where available.

Technical assistance would be used by SEEA to develop training, communications, and monitoring and evaluation capacity that it would use not only for the implementation of this proposed project but also for follow on activities in residential and other building classes. For example, consultants and contractors trained in the state of art energy auditing and energy efficiency under the proposed project would be available for conducting energy audits of buildings and preparing investment proposals for beneficiaries of follow on projects. This methodology and experience is valid across several types of buildings. Similarly quality control capacity created in SEEA during project implementation would be available for follow on energy efficiency projects. The institutional capacity and development of local skills would be particularly useful to investments in the residential sector that are expected to be supported with the proposed associated GEF project.

Technical assistance requirements will be more clearly defined during project preparation but the preliminary assessment indicates the need for assistance for the following:

a. Capacity building of SEEA: (i) for design and implementation of a monitoring and evaluation program; (ii) for technical quality control of energy efficiency investment proposals, and (iii) for design and implementation of a communications campaign to disseminate lessons learned from the project to key potential beneficiaries.
b. Training of consultants and contractors in state of art energy auditing and in developing 
investment proposals.

c. Policy studies that strengthen incentives for end-use energy efficiency. These may include 
district heating consumption-based tariff methodologies, metering regulations, etc.

The project costs and the Bank financing indicated against each component in the Table below are 
indicative, and will be determined once the feasibility studies are finalized by end May 2003.

5. Financing

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<th>Total (US$m)</th>
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<tr>
<td>BORROWER</td>
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<td>GLOBAL ENVIRONMENT - ASSOCIATED IDA FUND</td>
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<tr>
<td>ITALY: DEV. COOP. DEPARTMENT (MOFA)</td>
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<tr>
<td>BILATERAL AGENCIES (UNIDENTIFIED)</td>
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<tr>
<td><strong>Total Project Cost</strong></td>
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<td><strong>$20.00</strong></td>
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6. Implementation

The project would be implemented by two agencies. The replacement of coal and mazut boilers with gas 
plant and the retrofit of buildings at the Belgrade Clinic Center will be managed by a small PIU to be 
established at the Clinic Center. The energy efficiency component would be managed by SEEA

7. Sustainability

The proposed project would make investments that produce demonstrable benefits in more efficient 
space heating and introduce building level improvements that increase consumers’ collective control of 
heat consumption, empowering homeowners and municipalities to make decisions about space heating.

8. Lessons learned from past operations in the country/sector

The construction of gas based heat generation plant is technically a simple investment but its success 
depends on good technical specifications, procurement, and contract administration. As regards energy 
efficiency component, similar Bank projects benefited from strong local technical capacity but required inputs on the state of art methodologies as well as business skills that enable stakeholders to maintain implementation flexibility and customer focus. The energy efficiency projects have also benefitted from strong sponsorship and commitment from the government and establishment of a good monitoring and evaluation arrangement for garnering benefits of early lessons from implementation process.

9. Environment Aspects (including any public consultation)

Issues: Connecting the Clinic Center to the gas pipeline and construction of gas based water 
boilers will require environmental protection measures during the construction works, and provision for 
emissions control in the design and operation of the boiler. Consultations will be held with the local 
community while deciding the route of the gas pipeline. The energy efficiency retrofitting projects will 
involve improvements, inter alia, to heating systems, insulation, thermostatic valves and other 
installations in buildings, as well as heat substations and networks. Capacity will be established within 
the SEEA to carry out the subproject EA work, as necessary. Any large new construction with 
significant environmental impacts is unlikely under this component. Local communities are expected to 
be consulted for retrofit projects in schools.
10. List of factual technical documents:

11. Contact Point:

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Note: This is information on an evolving project. Certain components may not be necessarily included in the final project.

Tables, Charts, Graphs:

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