

## V.9. SECTOR PRIORITIES – ENERGY SECTOR

### 1. Goals of the energy sector reform

The major goals of the energy sector reform are:

- 1.1. stimulate national and international investment;**
- 1.2. ensure a more reliable supply of energy, in accordance with defined quality standards and at lowest prices;**
- 1.3. join the international market through a single market of electric power and gas in BiH;**
- 1.4. enhance cost-effectiveness and rational use of energy sources and improve energy efficiency;**
- 1.5. implement liberalization and introduce competition and transparency;**
- 1.6. ensure protection of environment in accordance with national and international standards;**
- 1.7. protect interests of the system users;**
- 1.8. increase the use of renewable energy sources;**
- 1.9. meet the conditions of the European Energy Charter Agreement, as well as other international contracts and agreements.**

### 2. Energy sector in general

The operation of energy market also determines the conditions of the environment in which commercial companies work, and thus this market affects the overall reconstruction of economy. Under the SAA (Stability and Association Agreement), the cooperation in this area will reflect the principles of market economy and the European Energy Charter Agreement, and will develop in the direction of gradual integration of the European energy market. This cooperation will likely focus on formulation of energy policy, improvement of infrastructure and development of energy resources, and energy savings. From the standpoint of the SAA, the matter of the Power III Project is of particular importance.

#### **2.1. Present status**

Energy consumption is a significant indicator of the living standard. In 2000, the average consumption of energy in the world was about 70 GJ per capita. In developed countries it reached 236 GJ/capita, and in Bosnia and Herzegovina was about 45 GJ per capita, which clearly indicates that it was significantly below average. Power consumption per capita in BiH is also lower than the world average and in 2000 it amounted to 1,915 kWh/capita; the world average was 2,343 kWh/capita, and the average for OECD countries amounted to 8,089 kWh/capita. This is another clear indication that some BiH inhabitants live below the general poverty line. The level of energy consumption in BiH before the war (1991) was about 73 GJ per capita, which exceeded the world average (about 69 GJ/capita).

One of the indicators of the efficiency of energy utilization in a country is the energy intensity ratio, which represents the ratio of energy consumed and the GDP. In 2000, on average, 10.14 GJ was consumed to produce 1000\$ of GDP on the world level. In the same year, developing countries used 22.57 GJ for 1000\$, and in BiH 30.1 GJ was consumed for generation of the same level of revenue.<sup>1</sup>

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<sup>1</sup> Data for Bosnia and Herzegovina for both energy consumption and energy intensity should be taken with a degree of caution. Reliable data for BiH are not available, as no institution consolidates energy-related data, and, even where some data is collected, it tends to be incomplete. In comparison, in the USA, with the energy intensity factor of 10,9 GJ/1000 US\$, it is estimated that the consumption in the energy sector represents about 6,1 percent of GDP (i.e. 11,7% if equipment costs are included); in the EU countries, the energy intensity is about 7,55 GJ/1000US\$, and the energy market is estimated at about 4,75 percent of its GDP.

This data points to the conclusion that in BiH, with the existing level of energy intensity, more than 20 percent of GDP is spent in the energy sector. Such a high share of the energy sector in the GDP clearly indicates that the energy sector in BiH requires considerably more attention.

The basic identified sources of primary energy in BiH are coal and hydro-power. In 2001, annual production of energy from those sources in BiH amounted to about 62 percent of the total consumption of primary energy, which indicates that BiH is dependent on the imports of energy, as certain energy sources, for now, can not be replaced with domestic energy sources. The overall coal reserves in BiH is estimated at 3,856 million tons (excluding the reserves in Ugljevik, Gacko and Livno), of which 1,330 tons are brown coal reserves and 2.526 tons are lignite deposits. Off-balance sheet reserves are estimated at 905 million tons (224 million tons of brown coal and 678 million tons of lignite). The total hydro-power potential is estimated at 22,050 GWh annually, i.e. at 6,126 MW of installed capacity

Preliminary research surveys of oil and gas, which were interrupted by the war, had indicated the presence of promising deposits on a number of sites in certain areas of BiH. Information about this research is not publicly available (although the off-balance sheet reserves are estimated at about 50 million tons of oil, and less than 10 percent of potential deposits has been surveyed) and it is not known what the future plans are regarding exploration of oil deposits. Depending on the results of the preliminary research, these should continue, but, for now, liquid fuels and natural gas need to be imported.

Potential for exploitation of geo-thermal energy, wind energy, solar energy and bio-mass energy have not been sufficiently explored, but the share of these energy sources in the overall consumption will certainly remain modest, as is the case in the world, where it is projected that in 2020 the share of all renewable sources (including hydro-power, which holds the most significant share) will amount to about 7,7 percent. However, the increased use of renewable sources of energy in the world is significant and the their potential and feasibility of their use should be analyzed.

The bulk of coal (about 70% in 1990, more than 90% in 1997 and about 78% in 2001) is used for power production. Taking into account the economy of coal exploitation, as well as the existing efficiency of the transformation of coal energy into other forms of energy, a part of coal used in the production of electricity could be reduced in comparison with the existing situation. The present level of consumption of oil and gas is significantly lower than the pre-war consumption. The consumption of oil and gas should rise once the economy revives. It will remain necessary to import oil in the coming years. The imports of petroleum products and the processing of oil will depend on the resolution of political issues in BiH, as the processing capacities in the country are sufficient for virtually the total of consumption of petroleum products in the country.

Current gas consumption is significantly lower than in 1990, again due to the poor conditions in the industrial sector. Due to the unfavorable natural gas consumption mix (relatively high share of heating and household consumption), the dynamics of consumption are also unfavorable (winter consumption is considerably higher), resulting in increased prices of natural gas. In addition, gas is procured over only one pipeline and from one supplier only, which makes supply stability an issue.

The problem of storing oil and, possibly, natural gas, has not been resolved, although some solutions for gas storage facilities exist. In the EU countries, the preparations for the increase of oil supplies above the mandatory 90-days supplies are underway. In addition to securing the flow of oil in case of supply disruptions, these supplies would be used in case of unpredicted oil price market fluctuations. The problem of storing oil and petroleum products needs to be addressed urgently naftnih derivata.

Although the level of meeting basic energy needs is rather high in BiH, the poor still have a significantly more limited access. Most households in BiH are connected to the electric power supply, but that is much less frequent when it comes to natural gas or district heating. The people in lower income categories spend significantly more to satisfy their basic energy needs. In addition, the use of firewood is very widespread in BiH, particularly in poor households.

## **2.2. Problems**

The main consumers of the final forms of energy are households and the commercial sector (often considered as one consumer category), the industry and the transport sector. The share of individual consumer groups varies depending on a number of factors, climate being one of the most important. In the EU countries, with similar climate conditions, the corresponding distribution is as follows: households and commercial sector account for 40.7 percent, the transport sector for 31 percent and the industry for 28.3 percent.

According to the estimates for 2000, the households and the commercial sector in BiH accounted for 50 percent, the industry for 25 percent and the transport for 25 percent of the total energy

consumption. Therefore, the share of households and the commercial sector in the consumption of energy is the highest. The energy consumed by the households and the commercial sector is used (predominantly) for heating (water heating and treatment, cooking, illumination and electrical appliances and equipment).

The reduced energy consumption in this segment can be partly achieved by introduction of district heating. Most of the current systems do not achieve the satisfactory effects, partly due to inadequate maintenance, and partly because there are no instruments for measuring individual heat consumption of consumers. The possibilities of combined production of heat and electric power, an option that is convenient for larger buildings or groups of buildings, are also underutilized. Because of its efficiency, the district heating saves fuel, and also contributes to reduced emission of CO<sub>2</sub>. The district heating systems can be used in hospitals, hotels, recreational and trade centers, and other larger public facilities, particularly those where the natural gas can be used as a fuel.

In addition, taking into account that the largest share of energy is used for heating, and that the relative consumption of energy for heating in BiH is much higher than in the EU countries (according to the assessments made in the EU countries, at least one fifth of the energy consumed in households and commercial sectors is "easily savable"), and, obviously, there is a lot of room to reduce the energy consumption in this area. The methodology for designing energy performance indicators in buildings, used in Bosnia and Herzegovina, is mostly outdated and the revision of methodology would assist in both achieving energy savings in the buildings and reducing the investments for energy infrastructure in newly constructed buildings. This could also have an important role in the reconstruction, i.e. restoration of buildings.

In the transport sector, significant changes need to be made with respect to energy demand, especially taking into account that the primary source of energy used is imported oil, i.e. petroleum products. For this reason, ways to increase the share of rail transport relative to road transport, which would allow for a greater use of domestic energy sources, should be considered.

The possibilities for energy savings in the industry sector are also considerable. Most industries treat energy as tangible cost and include the energy cost in the final price of the product, which does not promote energy savings. The cost of energy should be registered separately, compared with the energy costs in the same activities in the developed economies, and measures should be taken to rationalize the consumption. Subsidies could present an effective solution for such measures. Generally, the awareness about the savings that could be achieved with the increased energy consumption efficiency should be raised. Energy savings require investments, but these investments pay off quickly.

Energy efficiency in Bosnia and Herzegovina, both on the production and transformation side, and on the consumption side, is low, relative to the developed economies. The energy production in BiH is based on technologies developed some thirty years ago, from the period of the construction of a number of blocks in the thermal power plants. In the case of construction of new plants and in major reconstructions of the existing facilities, new technologies should be introduced whenever possible.

Renewable energy sources (except hydro-power), at the current level of development and at the current share in the overall energy consumption, could serve only as a complement, rather than a replacement for the major plants. However, due to their low environmental impact, these technologies are developing rapidly and their use is increasing<sup>2</sup>.

Energy prices are still set by administrative decisions and there is no internal energy market<sup>3</sup>. In BiH, as in other former command economies, energy prices were systemically lower than in other parts of the world. Even now, the fuel prices in the FBiH differ from the prices in the developed countries, especially in terms of price ratios<sup>4</sup>. Industrial price of natural gas in the FBiH is among the highest in Europe. The ratio of electricity and natural gas prices per energy unit (1,5:1) varies considerably (from 2 to 4 : 1) from the ratios in most European countries.

"Energy tariffs must be fair and must promote savings". This means that the tariffs need to be set at cost return levels and must include the environmental protection costs, given the negative environmental impact of the energy sector. In specific circumstances, certain temporary consumer subsidy measures may be justified; subsidizing energy sector producers and service providers has

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<sup>2</sup> In the European Union countries, a campaign is launched for the extended use of renewable energy sources.

<sup>3</sup> «The Report of the Commission to the Council on Readiness of BiH to Start Negotiations with the EU on the Stabilization and Accession Agreement» (Feasibility Study). Brussels, November 18, 2003, page 38.

<sup>4</sup> In developed economies, industrial fuel prices are lower than commercial prices (in some countries the price ratio is 1:2 and more – and in others it is as high as 1:4).

negative effects.

The government has an important role in the energy policy and in the development of the regulations, especially in case of market reforms leading towards regional or even global solutions. Efforts should be made to harmonize the national energy regulations with the European regulations. The EU countries are intensifying their integration, harmonizing their activities and adopting joint plans which include non-EU members, too. Bosnia and Herzegovina should take a more active part in the development of such plans. Nonexistence of a coherent strategy of the BiH energy sector development, which would define the approaches to the problems such as the diversification, economy in energy consumption, securing the offer, environment protection and other international regulations, has been recognized as a problem also in the Feasibility study of the EC.<sup>5</sup>

Energy facilities have a significant impact on the environment. The aspects of the environmental impact are considered in a different section of the PRSP Strategy (Sectoral Priorities - Environment). To mitigate the environmental impact, efficiency improvements, application of new technologies and by expanded use of renewable energy sources could achieve significant effects.

The ministries of energy should prepare public education programs. The level of general awareness about the importance and the cost of energy, efficiency, potential savings and environmental impact should be raised. These purposes might be achieved by preparation of popularizing content and its dissemination through the media and the Internet. The competent energy ministries, in cooperation with the ministries of education, should influence education and training for the energy sector, by proposing study subjects and their contents for incorporation into the educational system.

The energy statistics is crucial to monitor development of the energy sector and take adequate measures, in view of intensive changes in this sector in the BiH environment. Therefore a solid energy statistics base should be established at the state level, which ought to allow reliable data on energy sources (domestic and imported), energy consumption by types and structure, as well as energy-related costs.

### **2.3. Priorities**

#### **2.3.1. Establish, develop and implement clear, well designed energy policy and appropriate action plans**

- adopt the BiH Energy Development Strategy, in coordination of the BiH Ministry of Foreign Trade and Economic Relations and the competent FBiH and RS ministries, and with cooperation of domestic and international experts,
- establish the Energy Department in the BiH Ministry of Foreign Trade and Economic Relations,
- develop the methodology for collection of energy statistics.

#### **2.3.2. Encourage energy saving in households and industry**

- to reduce energy consumption, use existing and available technologies such as heat isolation, air recycling, more efficient electric appliances etc.
- as a priority, encourage greater use of public transportation and rationalize use of cars in cities
- increase awareness on savings possible through increased energy efficiency.

#### **2.3.3. Reform the energy pricing system**

- Prices must be based on economic criteria and include costs of environmental protection.

#### **2.3.4. Encourage application of renewable and alternative energy sources, research and application of new energy technologies and other technologies increasing energy efficiency**

- intensify construction of planned hydro-power plants through a concessionary model, and build small hydro-power plants,
- install pilot facilities for utilization of wind, solar, geothermal and biomass energy.

## **3. Electric power**

### **3.1. Situation**

The electricity sector is one of the mainstays in the development of Bosnia and Herzegovina. Considering the export potential of the sector, and in view of considerable electricity shortages in the

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<sup>5</sup> «The Report of the Commission to the Council on Readiness of BiH to Start Negotiations with the EU on the Stabilization and Accession Agreement» (Feasibility Study). Brussels, November 18, 2003, page 38.

Southeast Europe, and significant untapped natural resources, Bosnia and Herzegovina's orientation towards the reconstruction and restructuring of the sector is clearly justified

The reforms of the electric power sector which will ensure sustainability, efficiency and competitiveness of the electric power production in BiH, are implemented within the framework of the Power III Project, which envisages investment of around USD 250 million into the reconstruction of existing power production plants over the coming years.

In BiH, electricity is produced in hydro- and thermal power plants. Currently, the production capacities exceed the domestic demand, and the electricity is exported to Croatia, Slovenia and Serbia and Montenegro. With respect to natural resources, BiH has considerable reserves of brown coal and lignite used as a fuel in thermal power plants, and great and untapped hydro-power potential.

In BiH, there are at present three vertically integrated electricity monopolies in charge of the generation, transmission and distribution:

- Elektroprivreda BiH (Electric Power Enterprise) of Bosnia and Herzegovina (EPBiH);
- Elektroprivreda (Electric Power Enterprise) of the Croatian Community Herzeg-Bosnia (EPHZHB); and
- Elektroprivreda (Electric Power Enterprise) of the Republika Srpska (EPRS).

EPBiH has 1,839 MW of installed production capacity, of which thermal power plants account for 73% and hydro power plants for 26%. The 762 MW of EPHZHB production capacities come from hydro power plants only. Distribution-level consumption was 1,075 GWh. The Electricity Company of the Republika Srpska's production capacities total 1,375 MW.

Total power production in BiH in 2002 was 10.8 TWh. Sixty percent of production comes from thermal, and 40% from hydro-power plants. The gross consumption realized (distributive, direct and losses) of 9.7 TWh, which left the net surplus of 1.1 TWh. The total losses in the transmission and distribution network were 1.6 TWh, which is more than 15% of power produced. In 1999, the collection rate of elektroprivredas was between 75% and 99%, while losses in the low- and high-voltage grids were 9.8% (in EPBiH).

Each elektroprivreda is responsible for the allocation and dispatching of its power plants, and for the control of frequency and voltage on its territory. However, the Common Electricity Coordination Center (Zajednički elektroenergetski koordinacioni centar - ZEKCC), jointly owned and managed by the three elektroprivredas, was established in November 1998, to coordinate dispatching and ensure the integrity of the system within . The main function of ZEKCC is to coordinate the management of the power supply system in a safe, effective and efficient manner and to ensure the transmission of electric power to domestic and foreign consumers.

If calculated on the cashflow basis, the electric power sector is profitable, but when depreciation is included, the large resulting losses become evident. In effect, the revenues cover only 30% of the depreciation amount per year, which results in enormous delays in the systems maintenance and causes major losses: in excess of 20% at the BiH level, in comparison with 12% in EU countries.

The privatization process in the power sector has begun, by privatization of 10% of the Elektroprivreda of BiH and the Elektroprivreda of HB – Mostar (excluding the transmission segment) through the public share offering in FBiH, as well as 20% of the RS Elektroprivreda Holding Company, through the voucher offering

### **3.1.1. Legal and institutional framework**

The foundations for the reform of the power sector in BiH include the references to the following international documents and national acts

- The Constitution of Bosnia and Herzegovina;
- The Dayton Peace Accord;
- The EU White Paper;
- The European Energy Charter Treaty (ECT);
- EU Directive 92/96;
  - The Government of the FBiH and RS Electricity Policy Statement;
  - The Amendments to the FBiH and RS Electricity Policy Statement;
  - The BiH Law on Electricity Transmission, System Regulator and Operator;
  - The laws on electricity of the FBiH and RS;
  - The Study "Bosnia and Herzegovina: Electricity Sector Restructuring and Privatization Analysis and Action Plan" – PA Consultant

The Law on Electric Power Transmission, System Regulator and Operator in Bosnia and Herzegovina came into effect on April 18, 2002 and it is the initial step in the implementation of the reform objectives in the energy sector. This law was envisaged to create the conditions for unlimited and free trade and continued electricity supply in line with the specified quality standards. The Law is based on the typical international experiences and relevant EU directives. The intention of this law was to facilitate and accelerate the establishment of the electric power market in BiH, the integration into the regional market, introduction of competitiveness and strengthening of customer protection.

The Law on Electric Power Transmission, System Regulator and Operator specifies the institutions of Bosnia and Herzegovina in charge of electricity transmission:

- **State Electricity Regulatory Commission (Državna regulatorna komisija za električnu energiju - DERK)**, has jurisdiction over and is responsible for power transmission, transmission system operations and international trading in electric power. DERK is to be an independent and non-profit institution, which will operate on the basis of principles of objectivity, transparency and equality.
- **Independent System Operator (Neovisni operator sistema - NOS)**, is responsible for the management of the transmission network operating and dispatching in Bosnia and Herzegovina and for the governing, maintenance planning and coordination, network construction and expansion in cooperation with the elektroprivredas. **NOS** will be a non-profit agency, independent from any individual the market participant and from electricity production, distribution and supply activities. ISO shall not venture into trading with electricity, keeping its independence and authority, and the owners of the Electricity Transmission Company will devolve all relevant responsibilities for the management of the system to ISO. ISO will operate in line with objectivity, transparency and equality principles and will have full authority to coordinate the electric power transmission system.
- **Single Power Transmission Company** is responsible for the transmission, maintenance, construction, expansions and the management of the electricity transmission network. The Single BiH Power Transmission Company will take over the facilities of the existing elektroprivredas. Neither of the elektroprivredas will have jurisdiction or powers in such cases.
- **Ministry of Foreign Trade and Economic Relations** is responsible for policy formulation and for the international policy of Bosnia and Herzegovina in the power sector.

With the entry into force of the BiH Law on Transmission, Regulator and Operator of the Electric Power System, the electric power sector reform in BiH began, and it will mean establishment of a transparent regulatory framework, liberalization and opening of markets. Transmission and distribution activities will be regulated, in order to ensure equal access to grids, and thereby competition in power production and supply. Entity electric power laws regulate power production and distribution, power supply, trade, representation and brokering on the domestic market.

Attracting investors is one of the most important preconditions for the successful development of the electricity market in Bosnia and Herzegovina. Transparent processes, politically neutral decision making based on economic principles and an independent regulatory authority are the elements that should be attractive for foreign investors and international financial institutions. The entity regulatory commissions will be established by entity laws as independent and non-profit institutions with the capacity of legal person, with main competences to oversee and regulate relations between producers, distributors and buyers of electric power.

The main objective of the new institutional framework is creating competition in production. A precondition for attracting foreign and domestic investments is for the production companies to operate in a competitive environment, based on explicit rules. Electric power sector will enable the producers to sell power under free bilateral contracts to qualified consumers and independent electric power traders. Distribution companies will be responsible for construction, expansion, development, management and maintenance of the distribution grids.

For the market to become functional gradually and for the competition to be introduced, electric power suppliers' freedom of choice will be limited to qualified consumers and independent electric power traders, who will be able to purchase power directly from production or trading companies. There will be three categories of qualified consumers:

- **Qualified Consumers (QC)**: In the beginning, this category will include major industrial consumers, who will have a right to a free selection of their power supplier. While the qualified consumers purchase power directly from the producers, the role of transmission and distribution will include only the delivery of the purchased power;
- **Regional Electricity Traders (RET)**: RETs are fully separate trading operations of the distribution companies, empowered to purchase power from anyone. A RET will be able to purchase power from the production company or to contract a delivery from another RET or from independent traders.

- **Independent Retail Traders** will be companies with the exclusive function of buying and selling electric power to the qualified consumers and other power traders.

In view of the fact that the situation on the international capital markets has significantly deteriorated since 2002 and that the interest of investors for emerging market opportunities has been reduced, it is unlikely that considerable investments into the energy sector would occur in the coming medium-term period. Nevertheless, the forthcoming integration of the power grid into a single transmission company will make this sector more attractive. In addition, solid and stable revenues of the elektroprivredas will make it easier for these companies to access commercial loans.

### **3.2. Problemi**

Functioning of the electric power system, and of transmission capacities in particular, is insufficiently efficient throughout the country, nor is the entire system fully interconnected, and there are still bottlenecks in transmission grids. The electric power system has been rebuilt to a great extent, but the reconstruction has not been completed. In addition, the present structures and organization in the sector are inefficient and non-transparent.

The basic problems in the power sector are: unsatisfactory commercial discipline, inadequate work of supervisory boards in the elektroprivredas, high losses in the system, poor investment coordination owing to the fragmentation of the system, and excessively close links with coal production.

### **3.3. Priorities**

The central issue in the reconstruction and privatization program is the separation of three vertically integrated elektroprivredas in BiH into transmission, production and distribution. The transmission system will remain under the authority of BiH (the transmission company will be jointly owned by the two entities), while the production and the distribution will be privatized, to attract investments to BiH, ensure better governance and create efficient competition. The study entitled "BiH: Power Sector Restructuring and Privatization Analysis and Action Plan"<sup>6</sup> worked out the sequence, scope and the dynamics of restructuring and privatization of the three elektroprivredas by early 2004, formulated a set of recommendations for the restructuring of the energy sector in BiH and defined the privatization strategy, designed to attract major strategic investors. On the basis of this study, the entities prepared and harmonized action plans which include the following phases:

#### **3.3.1. Reallocation of assets (Phase I)**

In this phase, the elektroprivredas will separate assets and liabilities of the different sectors – production, distribution, transmission and system management and allocate personnel to new organizations. The transmission company will be formed, and it will receive assets and staff from the elektroprivredas. The Joint Electric Power Coordination Center (ZEKC) will be transformed into the NOS, and the assets and staff will be allocated to NOS by the elektroprivredas. The planned tasks are as follows:

- establish four distinct thermal power plant public corporations;
- restructure coal mines, in parallel with the restructuring of the generating corporations, in order to improve efficiency of the mines make their privatization possible, either with the thermal power plants or separately;
- establish three to four separate hydro-power public corporations, organized around a given river system;
- establish the Independent System Operator (NOS) responsible for system planning and dispatching;
- establish the single state transmission company, which will own all high voltage transmission facilities and be responsible for systems maintenance and operation in accordance with the instructions of the NOS ;
- restructure distribution areas to establish distribution regions to facilitate privatization;
- establish new shareholders companies for power generation and distribution;
- establish a wholesale power market, through contracts between suppliers and traders and, in addition to this contractual market, a balance market to be created by the NOS;
- establish a market operator for the balance market;
- commercialize newly established production and distribution companies, in order to attract potential strategic investors;
- take part in establishment of the regional electric power market.

#### **3.3.2. Corporatization (Phase II)**

- In this phase, production and distribution companies act as separate organizations. New statutes must be written for all new organizations. Accounting and financial standards will

<sup>6</sup> American consulting firm "PA Consulting Group", December 2001.

be introduced into the new companies. All companies will have identical IT systems for accounting, collection and communications.

- Regulatory commissions will issue temporary licences for new organizations.
- New tariff methodologies for transmission, NOS (State Regulatory Commission) and distribution and generation tariffs (entity regulatory commissions) will be introduced.
- NOS will draft initial contracts for auxiliary services with production companies, to define quantities and conditions under which every producer will provide specific auxiliary services.
- During this period Market Rules will enter into force, and the market operator will be established within the NOS.

### **3.3.3. Commercialization (Phase III)**

New production and distribution companies will act as commercial companies, in order to produce positive business reports for presentation to potential strategic investors. They will prepare their plans of cost reduction for the coming years, including reduction of losses and increase of collection rate, prepare financial reports and forms for their investors, check and update investment needs and plans. Commercialization will continue until privatization. Until the time when the companies will be privatized, the elektroprivredas will disappear.

### **3.3.4. Complete the «Power III» reconstruction project**

The main objective of the Electricity System Reconstruction Project Power III is to follow-up after the BiH Energy Sector Post-Conflict Reconstruction Program, facilitating continued electricity supply at lower prices, along with the mitigation of environmental impacts, as well as a complete reform of the electric power sector. The Project is supported by the international financial institutions and bilateral creditors: the World Bank, the European Bank for Reconstruction and Development, the European Investment Bank, the governments of the US, Switzerland, Germany, Norway and Spain, and includes the following sub-projects:

- Reconstruction of high-voltage long-distance power lines;
- Reconstruction of high-voltage transformer stations;
- SCADA/EMS Telecommunications Project;
- Thermal power plants environmental projects;
- Reconstruction of hydro power plants;
- Reconstruction of the distribution network.

The reconstruction of the 400 kV and 220 kV transmission network, including the 110kV system facilities, and particularly the reconstruction of the damaged transformer stations, will enable the reconnection and reintegration of the BiH power grid, as well as the reconnection with the UCTE, the Balkans and Southeastern Europe systems.

The Supervision, Control and Data Acquisition Project (SCADA) will ensure the functioning of the electricity system of BiH, on an integrated basis. The implementation of the SCADA Project and the reconstruction of high-voltage transmission network will permit the electric power system of BiH to operate as integrated control area in accordance with the UCTE rules, with the UCTE control block encompassing Slovenia, Croatia and BiH. The implementation of these projects should be completed by early 2005.

The reform of the electric power sector will have considerable effect on the social conditions in the country. The sector reconstruction process itself should yield considerable positive effects, considering that most project implementation activities will be entrusted to local firms. On the other hand, the construction of the distribution network, especially in the refugee and IDP return areas, will greatly improve their economic situation, i.e. create most important preconditions for starting small businesses, which is one of the economic policy priorities of BiH.

During the process of company restructuring, which implies separation into the transmission, distribution and production sectors, surplus labor force will be identified. Various modalities for providing for redundant workers should be considered in the early stage of the preparation of these activities. The first solution under consideration is starting small factories for production of electro industry equipment, with own seed capital, and with the support of the international community and the entity funds.

## 4. Coal sector

### 4.1. Situation

On the basis of the currently identified coal reserves in Bosnia and Herzegovina, coal accounts for 93 percent of the total energy potential of BiH. At present, only lignite coal and brown coal are extracted. Over 80 percent of coal in BiH is produced in the Tuzla Basin (Kreka, Banovići and Đurđevik), Central Bosnia Basin (Kakanj, Zenica and Breza), Ugljevik and Gatački Basin, and powerful thermal power systems were built on this basis. Various analyses have confirmed that the energy and market prospects of coal in BiH is stable for the next fifteen years (and most likely even longer).

The current production level, at 40 percent of the pre-war production, is meeting the current demand of all consumers. At present, there is no need for any significant increases of coal production, but rather for maintaining the current level of production, with the implementation of the modernization and rationalization programs of the mines. The special focus should be given to the social implications of this process, given the estimate that a half of the current workers are redundant.

The authors of various studies offered different projections of the potential demand for coal in BiH by 2015. These projections range from 5 to 8.6 million tons for the FBiH, and from 3.2 to 4 million tons for the RS, i.e. from 8.2 to 12.6 million tons for BiH. In the structure of production, the electric power generation accounts for 70 percent, and the remainder is used between industry and households.

In BiH there are two types of mines:

- mines supplying coal for thermal power plants
- mines working for the general market (market competition).

In 1990, the production in the mines in FBiH totalled approximately 12 million tons of coal, with approximately 27,000 workers. Two-thirds of the coal was produced in strip mines and one-third in subsurface mines. In the mines on the territory of the RS, the production in the same year was approximately 4 million tons of coal, with approximately 3,000 employees and with over 95 percent of the coal produced in strip mines. In the post-war period (2001), the annual production of coal in FBiH was 5.5 million tons, and 3.3 million tons in RS. The mines in FBiH employ approximately 14,000 workers, and in RS some 2,000.

The coal sector comprises 15 separate organizational units, many of which manage several separate mines. There are no forms of either horizontal or vertical integration between the mines, nor are there any shared infrastructure, market or any other links.

In the FBiH, the coal is sold on the basis of the electric power sector decisions, at the price of KM 3.612 per GJ (price valid for the last 4 years). The mines in the RS are parts of a single company, together with the thermal power plants, and the price of coal is included in the price of electricity, as the expense determined in the energy balance for each year (approximate calculation price is KM 4.5 per GJ).

The coal demand of four thermal power plants is satisfied from the mines in their immediate vicinity. The thermal plants Kakanj and Tuzla are supplied by railway, trucks and transporters from several mines, and the thermal plants Gacko and Ugljevik are supplied by continuous conveyor, so that, besides economic links, there are also physical links between the mines and the thermal power plants. In all other mines, the production plan is based on the coal demand of the traditional long-term consumers, with individual market offer and creation of competition in the market.

#### 4.1.1. Legal and institutional framework

The starting point for the analysis of the prospects of the coal sector in BiH is in the following international and internal documents:

- FBiH Law on Mining
- RS Law on Mining
- BiH Law on Concessions
- RS Law on Concessions
- BiH Law on Geological Research
- Law on Privatization of State Equity
- RS Law on Bankruptcy
- F/S (Feasibility Study) Marston&Marston USA, for Central Bosnia and Tuzla basin mines
- F/S DMT-Montan Consulting GmbH Germany, for the FBiH mines
- F/S Fichtner Germany, for the Bosnia and Herzegovina's electricity sector
- F/S Kennedy&Donkin Ltd. USA, for the mine and smelter in Gacko
- F/S JCI Japan, for the lignite mine in Stanari and the mine and smelter in Ugljevik
- Japanese Government YEN Credit Agreement for BiH mines

- Other credit and grant agreements.

In both entities, the competences for the mines lie with the line ministries – the FBiH Ministry of Energy, Mining and Industry and RS Ministry of Economy, Energy and Development.

#### **4.2. Problems**

The current situation in the coalmines in BiH is characterized by the general decline of the production rates and the stagnation of economic growth, as well as the retrograde trends in all technical and technological phases of the exploitation and processing. The basic characteristic parameters of surface and subsurface coal extraction are as follows:

- deep levels of subsurface excavation,
- existing subsurface production system models are exhausted, and require new opening, reconstruction and investment methods,
- severe lagging in removal of overlay in surface extraction,
- return to the traditional semi-automated subsurface excavation methods,
- decline of production rates and productivity,
- lack of investments,
- inadequate qualification structure of the employees.

#### **4.3. Priorities**

BiH has coal reserves of  $10 \times 10^9$  tons, which implies that coal will continue to be the most important primary energy source. Even the necessary restructuring and capital increase in the coalmines will not mean a significant increase of production.

To overcome the current unfavorable situation, the strategic program goals in the sector must be reconsidered and updated, at all levels of professional, research, social, economic, and state institutions. The solutions for strategic issues in the coal sector should start with the integral approach to coal basins and coal beds and proceed to selection of specific adequate technological processes, taking into account the following elements:

- demand outlook for energy from coal for the period up to 2015,
- status and potential total balance and exploitation reserves and possibilities for introduction of new technologies (subsurface gasification, IGCC coal gasification technology and refined processing).

The coal sector reform is indispensable for implementation of the strategic goals:

- lowering coal production costs, increase productivity, reduce employment, improve working conditions, raise the living standard of employees and protect environment,
- restructure coal mines, which requires a differentiation between the profitable and unprofitable mines, as part of the privatization preparations,
- introduce new production technologies which will improve profitability and ensure better protection of environment.

The existing studies and adopted international and national documents contain guidelines for a comprehensive transformation of coalmines into independent for-profit companies. In that context, the action plans have been prepared, with a particular focus on the electric power sector (elektroprivredas) and specifying the required resources. The privatization of the coal sector, following its restructuring, is proposed in principle. In principle, after restructuring, privatization of the coal sector through tenders is envisaged.

In the adopted documents, the costs of capital increases of the mines in FBiH are estimated at KM 188 million, and KM 122 million for the mines in RS. Closing of unprofitable mines will require additional funds, which in the studies to date was not estimated, nor were the sources identified. The primary conclusion of the restructuring analyses is that over the next five years, the workforce in the mines must be cut from around 14,600 to some 3,500, to enable the coalmines to deliver coal at the price of KM 4 per GJ. It is estimated that alleviation of the unemployment problem would require KM 86 million. This problem may not be resolved solely through social programs and re-training of the unemployed miners.

## 5. Natural gas sector

### 5.1. Situation

Of the primary energy sources, natural gas is undoubtedly the most desirable fuel, because of its environmental and technological advantages:

- use of primary energy without additional transformation;
- possibility of achieving high efficiency even at low intensity;
- availability at the point of production;
- possibility of easy regulation and adjustment of intensity to current needs;
- possibility of combination with other energy sources;
- reduced losses in the energy production and transmission cycle;
- in specific technological processes, direct impact on the product quality, as well as on reduction of air pollution and CO<sub>2</sub> emissions.

Even under the assumption that the most favorable price level is reached, which is not the case at present, the fact that the gas is imported fuel is crucial for this analysis and in the planning of the energy sector development from the aspect of poverty reduction. This fuel, notwithstanding its considerable advantages, presents a major challenge for the national policy makers, from the standpoint of protection of the domestic economy. On the other hand, the conditions are in place for wider use of natural gas, as the present level of use is below one-quarter of the capacity of the existing gas pipelines, and this would offer a clean alternate fuel for the needs of the population.

From the aspect of the economic development, and primarily development of small and medium industrial and agricultural businesses, the gas is the best energy choice. Therefore, the development of the gas sector in BiH is unquestionable in terms of strategy, but the issue remains about the pace of the gas sector development and whether the sector would developed in a planned manner, i.e. in conformity with the national interests and strategic goals. This concern is founded on the extremely negative experiences with the establishment of the integrated energy policy at the level of BiH.

The options of substituting the imported natural gas with the gas produced by coal gasification have been under consideration for a long time. Even though this technology had been rejected in all previous expert analyses, based on low utilization ratios, the most recent technological innovations, as well as positive experiences of other countries, give cause for a more serious consideration of this option. It is estimated that, with application of modern gasification processes, one million tons of coal, which is a realistic increase for the mining sector, could fully substitute the present imports of natural gas.

The development of the gas sector will still mostly depend on the developments in the region. Specifically,, the planned construction of the "South European Gas Ring" will determine the future of both the gas sector and the entire energy sector in BiH. However, this project is still uncertain, and at this point it cannot be awarded greater importance in the program of emergency poverty reduction interventions.

Just like the entire energy complex in the post-war BiH, the gas sector is also in the competence of the entities and this structure is at the root of all problems in the sector. It could be said that, out of the three predominant segments of the energy sector (electric power, liquid fuels and gas), the gas sector is the least developed. The existing gas sector of BiH comprises four companies, two in each entity:

In RS:

- **Gaspromet Pale** (manages the transmission line Karakaj - Zvornik - approximately 20 km)
- **Sarajevogas Lukavica** (transmission line Zvornik - Kladanj and distribution in the municipality of Srpsko Sarajevo)

In FBiH:

- **BH Gas - Sarajevo** (transmission lines Kladanj - Sarajevo - Zenica, the biggest post-conflict supplier and gas wholesaler in Bosnia and Herzegovina)
- **Sarajevogas - Sarajevo** (gas distribution in Sarajevo)

Although it no longer formally conducts the transport and distribution of gas, the **Energoinvest Sarajevo**<sup>7</sup> needs to be added to the above list of entities (until the outbreak of the war, Energoinvest Sarajevo managed the entire gas system in BiH and was the exclusive gas supplier for the territory of BiH). Because of outstanding debts from the period before and during the war, and the obligations under long-term contracts with Russian suppliers, this company continues to be a major player on the complicated BiH gas market..

All natural gas is imported from the Russian Federation and is transported to BiH via the gas transport systems in Ukraine, Hungary and Yugoslavia. Due to the above mentioned post-war dissolution of the energy system, BiH is facing an absurd situation – in the entire gas transport (over 5000 km) from the gas wells in Siberia to Sarajevo (which is the main consumer in BiH) the intermediaries involved in the internal transport of gas in BiH outnumber the transport intermediaries up to the BiH border.

The main features of the gas system in BiH are: length of 191 km and the projected annual capacities of 1 billion m<sup>3</sup>. The existing leased transport capacities to BiH are 750 million m<sup>3</sup>/year. In the post-war years, the consumption ranged from 150-200 million m<sup>3</sup>, mostly because of the failure of the war-ravaged industry to recover. The pre-war consumption in BiH was approximately 610 million m<sup>3</sup> and was on the rise.

With respect to the long-term projected gas needs, previous studies<sup>8</sup> analysed three different scenarios (high, low and basic) by comparing economic indicators with other countries and conducting separate analysis across all consumption sectors. The demand projections for all three scenarios are similar for both methods, and amount to 3 billion m<sup>3</sup> for the high scenario, 2 billion m<sup>3</sup> for the basic scenario and around 1.5 billion m<sup>3</sup> for the low scenario, until 2020. In the case of low growth scenario, the energy policy would be based on the use of national energy sources, with partial use of gas where the domestic energy sources are thought non-competitive or technologically inappropriate. From the aspect of this study, this is what makes this particular scenario realistic and conceptually acceptable.

#### **5.1.1. Legal and institutional framework**

The legal and institutional framework in this sector is still non-existent, which prevents any foreign investment and any development of gas sector.

In 2001, after the preparation of studies on the reform and development of the BiH gas sector, the World Bank offered to both entity governments a draft **Statement of BiH Gas Policy**, which was supposed to serve as the fundamental, common concept of the reform of the gas sector, and, at the same time, the foundation for development of the legislation in the gas sector, following the model previously applied in the electric power sector. Until the adoption of the BiH Medium-Term Development Strategy, the compromise about this Statement has not been reached.

To organize the gas sector on principles of the single and liberalized market and on the principle of separation of production, transport, distribution and consumption functions, it is indispensable to introduce a minimum legal framework at the state level, in accordance with the applicable European energy sector legislation. This implies passing of a general state-level energy law, and of the law on transport, regulatory agency and operator of the gas system, to be accompanied by appropriate entity energy laws.

#### **5.2. Problems**

The major problems in the gas sector are:

- non-harmonized entity energy policies – non-existence of the gas legislation and regulations;
- organizational fragmentation between the entities makes the coordination in development of the gas network difficult, increases the consumer price of the gas and is considered one of the factor that deters potential investors;
- one source of supply – one transport route – unreliable supply;
- excessively high wholesale gas price (USD 200 per m<sup>3</sup>);
- unbalanced tariff structure that is detrimental to district heating;
- low load factor in gas transport system in BiH, leading to high transport costs;
- high import dependence makes taking the counter-measures more difficult in the case of price increases and thus inhibits the economic development;

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<sup>7</sup> Energoinvest Sarajevo and BHGas import natural gas to BiH from the Gazprom company from Russia, via Ukraine, Hungary and Serbia and Montenegro.

<sup>8</sup> As early as 1999, the World Bank financed the preparation of two studies on the reform and the development of the gas sector in BiH: Study on Natural Gas Sector Reconstruction (NERA) and Study on Natural Gas Sector Development (RAMBOLL).

- unfavorable consumption structure, i.e. lower consumption in industrial, and higher in the residential sector has created strong seasonal disparity. The seasonal variations need to be smoothed out, because at present they impose the obligation to cover the costs for underused capacities in summer, or to purchase additional quantities in winter.

The gas sector needs to be set up in harmony with the national energy resources, which would minimize the transport and distribution costs and achieve the best price of gas for the end consumer. Instead of having a well-elaborated strategy of the gas sector development, which would rank BiH as an equal among European natural gas consumers, BiH consumers buy the most expensive gas in Europe, and have completely unreliable supply.

### **5.3. Priorities**

Regardless of which scenario for its development comes true, the gas sector must undergo a process of reform and restructuring. The reform of the gas sector will be implemented in accordance with the BiH Strategy of Energy Sector Development, which is expected to be adopted by January 2005, according to the agreement between the BiH Ministry of Foreign Trade and Economic Relations and the line ministries in FBiH and RS.

The key reform steps in the gas sector are:

#### **5.3.1. Transform legislative and institutional framework**

- adopt the Gas Sector Development Strategy within the BiH Strategy of Energy Sector Development..
- adopt appropriate legislation and regulations, establish an independent system operator and resolve the regulatory functions by establishing one common regulator for oil and gas,
- create an internal gas market,
- introduce a tariff system.

#### **5.3.2. Strengthen capacities and improve efficiency of the gas sector**

- build an alternative supply route,<sup>9</sup>
- build underground storages and improve the load factors in the existing gas system,
- diversify the sources of gas supply,
- expand the gas distribution network to include several cities to which gas can be cost-effectively supplied through the extensions of the existing system,
- make preparations for attracting strategic partners – prepare the privatization documentation<sup>10</sup>

Ultimately, this means implementation of the EU Gas Directive and liberalization of the market, which is a precondition for integration into the European market.

#### **5.3.3. Actively represent BiH interests on the international scene**

- Protect BiH interests in planning the regional energy networks;
- Take part in the establishment of the regional gas market;
- Strive to have one of the legs of the South-European Gas Ring pass through BiH.

## **6. Oil sector**

### **6.1. Situation**

In the existing BiH economic structure, the oil industry sector encompasses imports and refining of imported crude oil and production of petroleum products. In view of the importance and the scope of its role, this sector may become one of the important factors for the successful implementation of the Development Strategy and for the economic growth of BiH. There is a marked demand for the oil sector products in the BiH market, especially the demand for motor fuels, motor oils and industrial lubricants, and there are significant production capacities, presently not fully employed, due to import orientation, especially for motor fuels, oils and lubricants, as a consequence of inadequate coordination in the post-war development of BiH.

The BiH oil sector developed production and transport capacities.

<sup>9</sup> When it comes to alternative supply and distribution network development, in addition to the undisputed "northern connection", it will be necessary to determine the "external preconditions" in order for BiH network to develop further - meaning here the final route of the future South-European Gas Rng, as well as the routes of other gas interconnections in the immediate surroundings.

<sup>10</sup> The restructuring of the sector does not prejudice the method of its actual privatization.

**The production segment** comprises production organized in two refineries within the "NIRS" (Naftna industrija RS – RS Oil Industry) Company. The first, basic capacity is the oil refinery<sup>11</sup> in Bosanski - Srpski Brod, where imported crude oil is refined into various products - motor fuels, liquid petroleum gas and a range of others, especially those for the needs of construction and road construction.

The second of these capacities is the Refinery of Motor Oils and Lubricants in Modriča, which is essentially the next technological stage in the processing and refining of the Brod refinery products. This refinery produces high-quality motor oils, as well as various special purpose technical oils for the industry and for other industrial and commercial purposes, paraffin and various motor and other lubricants for industry, and especially transport, as well as for households. The installed production capacities are used at the level of around 25 percent of the pre-war production.

**The commercial sphere** in Bosnia and Herzegovina comprises the oil products distribution capacities, especially for motor fuels, oils and lubricants. In both entities, there are two major state-owned distributors, but the greatest share of the market is covered by small private distributors. The demand for motor fuels on the domestic market in the present conditions is approximately 1.5 million tons annually. The oil refinery delivers around 500,000 tons to the market, and the rest is imported. Considering that the number of private petrol stations is on the increase and has reached approximately 300 stations, objective estimates suggest that the commercial capacities in BiH market are already oversized.

The present state on the BiH oil products market suggests not only inadequate usage of own production capacities, and large imports of such products, but also the problems of the frequent imports of cheap low-quality products, especially motor fuels. This situation needs to be urgently addressed and the relations on the market improved.

#### **6.1.1 Legal and institutional framework**

After the war, the oil sector legislation was not passed neither at entity nor at BiH levels. The Yugoslav regulations dating back to the 1980s on transport and management of fuels, gas and inflammable substances, as well as the applicable rule books on storage and transfer of highly inflammable substances are still in force. In regulating the rights of the production in the oil industry and in performing other related activities, the entity ministries of energy and their inspectorates have the main role.

### **6.2. Problems**

The present situation in the energy sector is characterized by the lack (or non-existence) of harmonization of the legal and regulatory framework, absence of inter-entity cooperation and coordination, and the excessive liberalization of the oil products market – which is almost chaotic. Such conditions had negatively impacted the utilization and the operation of the refinery capacities, and, in turn, the refinery utilization rates were rather low and the performance indicators were unfavorable. The problem of financing of the oil sector, both of the ongoing production and of the capacity building, is fairly remarkable and complex, considering that the period of rehabilitation ended without major investments taking place. As a result, the issue of liquidity, i.e. financing of the ongoing production and the necessary investments is very acute in the Bosnia and Herzegovina oil market today. A realistic solution for this situation may be sought only in attracting foreign investments

### **6.3. Priorities**

#### **6.3.1. Establish a unified legislative and regulatory network**

The oil sector can and should be a significant factor for the development of the economy of BiH and both entities. This is why it is considered that the concept of the development of the oil sector in BiH should become an integral part of the Medium-Term Development Strategy for BiH. The initial improvements were already made by the adoption of the Decision on the Quality of Liquid Oil Fuels by the BiH Council of Ministers of in September 2002, stipulating the obligation and the need of importing only the liquid fuels that correspond to the regulations and meet the EU quality standards.

It is necessary to harmonize the issues of the payment of taxes and other budget obligations at the entity level, and to ensure equal treatment of the companies from both entities on the oil market. This would qualitatively improve the BiH oil market and the principles of free market and healthy

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<sup>11</sup> The production capacities for refining crude oil in Bosnia and Herzegovina are sized to 5 million tons of refined oil per year, and are based on the most up-to-date world technology. The past period of conflict and the present condition of economy in BiH have significantly reduced production capacities of the oil refinery in Brod – the capacities for refining are now realistically around 2 million tons a year, and the realized production in the past several years had not exceed 600,000 tons.

economic competition would come to the fore, along with the demand for quality of oil products in the market, and the economic principles and strength of overall operations of the companies.

In accordance with the EU practices, already implemented in several sectors of BiH economy, a number of activities in relation to adequate restructuring and regulating must be initiated in the oil sector as well. The regulation of the oil sector should imply acceptance of the contemporary European Union practice, according to which the operating rules and the conduct of companies in this sector are regulated at the state level, while an independent regulatory body is responsible for direct approvals, i.e. licensing of companies. The key tasks in this sector are:

- adopt the BiH oil industry development policy (under the BiH Strategy of Energy Sector Development);
- adopt appropriate legislation and regulations on the basic principles of separation of functions of production, transport, storing, distribution and trade, for the purpose of establishing an open market and secure supply with this fuel;
- set up a single agency to perform the regulatory function in this sector for all energy activities.

### **6.3.2. Revitalize and modernize the oil industry capacities**

In view of the difficulties in operation of the oil industry over the recent years and the low level of investment in maintenance, full revitalization of the sector will only be possible if foreign investments arrive. To attract investors, it is necessary to improve effectiveness and transparency of operations of oil industry companies. One of the most significant improvements in terms of transparency is the decision of the BiH Council of Ministers on exclusive imports of oil and petroleum products by rail, which will permit better control of collection of import duties and taxes.

The privatization of the oil sector is an important goal and task of the entity governments. In both entities, oil companies are defined as strategic companies of entity interest, and their privatization will be implemented through special privatization programs, as well as by international public tenders.

In the oil sector, there is a marked potential for development of numerous smaller production capacities, which will further refine petroleum products and offer a range of new, specialized products in demand in the market. This is a specific area of the so-called low-tonnage chemistry, well suited for the development and growth of small and medium enterprises. In this domain, it will be necessary to:

- develop the program of improving operational effectiveness of oil companies;
- complete the privatization in oil industry;
- implement the decision made by the BiH Council of Ministers on exclusive imports of oil by railway;
- encourage development of small and medium size companies in oil industry.

Just by an increase in the utilization rate of the existing production capacities, i.e. an increase in production in the oil sector, would achieve some positive economic effects, and with needed, relatively modest investments in modernization of higher-stage capacities in this sector would result with even more favorable economic effects. These effects would be reflected, first of all, in the increased employment, significant growth of profits of companies, and in the real increase in budget revenues from taxes, contributions, fees, and other budget dues. In addition, higher utilization rate of the domestic production capacities and an increase in production would ensure a better, more regular and convenient supply of domestic markets with these commodities. The improved results in foreign trade of BiH should be taken into account, because the imports of more expensive final oil products would be substituted by imports of cheaper crude oil.

## **7. District heating**

### **7.1. Present status**

Of over twenty district heating systems in BiH, only the Sarajevo district heating system has been to a certain extent renovated and repaired. In other larger cities, in the best case, only temporary interventions were carried out on the district heating systems. Except in Sarajevo, all other district heating systems generate large energy losses – frequently above 60 percents. This levels of losses significantly reduce the quality of services and prevent the sustainability of the system. Firewood is widely used, which is a very expensive alternative. In addition, in the long term, it threatens the quality of air in the cities.

## 7.2. Problems

The district heating systems are in the most part worn out, due to very little investment in maintenance, which explains why their costs are so high, as well as the energy losses in the system. In Though the district heating is an important municipal function in larger cities, neither the municipalities, nor the entity ministries of energy pay the necessary attention to the district heating sector. There is no regulatory supervision in the sector, and the municipal competence over the public district heating companies, because of short-term political calculations, has caused the prices of heating to remain unrealistically low. The tariff levels and collection rates have not sufficed to cover the system maintenance, which makes this sector economically unsustainable. There is no data base on the district heating sector (except in Sarajevo and Banja Luka).

## 7.3. Priorities

### 7.3.1. Establish the legislative and regulatory framework in the district heating sector

- adopt a strategy for resolving problems in the district heating sector;
- establish a system of regulating the district heating prices at the level of BiH within the framework of a general energy price regulation system.

### 7.3.2. Improve efficiency and accessibility of district heating

- improve technical efficiency of the district heating systems – complete the rehabilitation projects and introduce the necessary oversight mechanisms;
- expand the district heating coverage in cities and towns where the district heating systems have been reconditioned;
- modernize existing district heating systems and make possible conversions to the heat from thermal power plants where this is possible, or to natural gas in the cities that will be connected to the gas network.

The above considerations clearly indicate that the preparation of the BiH Energy Sector Development Strategy is a precondition for implementing all activities in this area, without which there will be no reduction of poverty, nor any significant economic development. At long last, it should become clear that the strategy must cover the entire BiH, because without the single energy policy, there can be no hope of accession to the EU.

## 8. Indicators for monitoring the energy sector reforms

Indicator	Source	Estimate for BiH (2000/2001)	2007
Consumption of electric energy/per capita (kwh/pc)	WDI 2002	540.0	1050
GDP per unit of consumed energy (economic efficiency indicator)	On the basis of WDI 2002, calculated for IHR MRC Report	47.5	40
Emission of carbon dioxide/per capita (u 1.000 kg)	IHR MRC Report	3.2	3.5