Strategic Environmental and Social Assessment
Strategic Environmental and Social Assessment, Executive Summary
June 2008

Government of Kosovo
Ministry of Energy and Mining
Lignite Power Technical Assistance Project (LPTAP)
The World Bank grant: IDA H 254 KOS / H 318 KOS

Environmental and Social Safeguard Advisory Services for Private Sector Participation in the Development of New Generation Capacity, Related Transmission and the Development of the Sibovc Lignite Field

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Editor: Katherin Golitzen

Production: www.rota.com
Cover: Visar Ulaj
Design and Layout: Arbër Matoshi

Printed: June 2008
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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>BTEX</td>
<td>Benzene, Toluene, Ethylbenzene, and Xylenes</td>
</tr>
<tr>
<td>CDF</td>
<td>Community Development Fund</td>
</tr>
<tr>
<td>CFB</td>
<td>Circulating Fluidized Bed</td>
</tr>
<tr>
<td>CLRP</td>
<td>Clean up and Land Reclamation Project</td>
</tr>
<tr>
<td>CO&lt;sub&gt;2&lt;/sub&gt;</td>
<td>Carbon Dioxide</td>
</tr>
<tr>
<td>COWI</td>
<td>Consultancy within Engineering, Environmental Science and Economics</td>
</tr>
<tr>
<td>DeSO&lt;sub&gt;x&lt;/sub&gt;</td>
<td>Desulphurization</td>
</tr>
<tr>
<td>EAR</td>
<td>European Agency for Reconstruction</td>
</tr>
<tr>
<td>EHS</td>
<td>Environmental Health and Safety</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Monitoring Plan</td>
</tr>
<tr>
<td>ERM</td>
<td>Environmental Resource Management</td>
</tr>
<tr>
<td>ESTAP</td>
<td>Energy Sector Technical Assistance Project</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>GWh</td>
<td>Gigawatt hour</td>
</tr>
<tr>
<td>IDA</td>
<td>International Development Association</td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Corporation, World Bank Group</td>
</tr>
<tr>
<td>ILE</td>
<td>Iber-Lepenc Enterprise</td>
</tr>
<tr>
<td>IPA H&amp;W</td>
<td>Legal and Regulatory Advisors, Hunton &amp; Williams</td>
</tr>
<tr>
<td>IPPC</td>
<td>Integrated Pollution Prevention and Control</td>
</tr>
<tr>
<td>KEK J.S.C</td>
<td>Kosovo Energy Corporation, Joint Stock Company</td>
</tr>
<tr>
<td>KEPA</td>
<td>Kosovo Environmental Protection Agency</td>
</tr>
<tr>
<td>KOSTT J.S.C</td>
<td>Transmission System and Market Operator of Kosovo, Joint Stock Company</td>
</tr>
<tr>
<td>MEM</td>
<td>Ministry of Energy and Mining</td>
</tr>
<tr>
<td>MESP</td>
<td>Ministry of Environment and Spatial Planning</td>
</tr>
<tr>
<td>Mt/y</td>
<td>Million Tons per Year</td>
</tr>
<tr>
<td>MW</td>
<td>Megawatt</td>
</tr>
<tr>
<td>MWh</td>
<td>Megawatt Hour</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organizations</td>
</tr>
<tr>
<td>NO&lt;sub&gt;x&lt;/sub&gt;</td>
<td>Nitrogen Oxide</td>
</tr>
<tr>
<td>NMFD P</td>
<td>New Mining Field Development Plan</td>
</tr>
<tr>
<td>OP 4.12</td>
<td>The World Bank’s Operational Policy on Involuntary Resettlement</td>
</tr>
<tr>
<td>PAH</td>
<td>Polycyclic aromatic hydrocarbons</td>
</tr>
<tr>
<td>PCB</td>
<td>Polychlorinated biphenyls</td>
</tr>
<tr>
<td>PF</td>
<td>Pulverized Fired</td>
</tr>
<tr>
<td>PSC</td>
<td>Project Steering Committee of the Kosovo Lignite Power Technical Assistance Project</td>
</tr>
<tr>
<td>SESA</td>
<td>Strategic Environmental and Social Assessment</td>
</tr>
<tr>
<td>SO&lt;sub&gt;2&lt;/sub&gt;</td>
<td>Sulfur Dioxide</td>
</tr>
<tr>
<td>TPP</td>
<td>Thermal Power Plant</td>
</tr>
<tr>
<td>TPP A</td>
<td>Thermal Power Plant Kosovo A</td>
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<tr>
<td>TPP B</td>
<td>Thermal Power Plant Kosovo B</td>
</tr>
<tr>
<td>TPP C</td>
<td>New Thermal Power Plant Kosovo C</td>
</tr>
<tr>
<td>UNMIK</td>
<td>United Nations Interim Administration Mission in Kosovo</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WEI</td>
<td>Water Exploitation Index</td>
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</table>
The Government of Kosovo has taken a decisive step towards more effectively harnessing the country’s fossil fuel resources for urgently needed economic and social development. Its first major undertaking towards this end is the Strategic environmental and Social Assessment (SESA) of the proposed mine/power plant project “Kosovo C”.

Background

Kosovo’s power sector as we know it today is the result of capital investments carried out several decades ago (1962 – 1984). Those investments included development of Bardh and Mirash mines, with total coal reserves of 300 million t, and construction of power plants Kosovo A and later Kosovo B with a total installed capacity of 1,478 MW.

The dedicated coal reserves of Bardh and Mirash mines were known to be insufficient to supply both power plant units until the end of their operational lives; therefore, a new mine was planned to ensure supply for Kosovo B and possible expansion of its generation capacities, in a second phase (2x340MW).

During the 1990s, due to political and economical situation, the power sector stagnated; there was no expansion of the mine and the second phase was not built. Today, nearly two decades later, this is reflected in insufficient power supply, old unreliable power plants that need to be replaced and coal mines that will be completely depleted by 2010. The environmental and social legacy is a heavy one, while demand for electricity continues to grow at an enormous rate, partially fostered by non-payment for electricity used.

Since 1999 more than 50 technical studies, papers and reports were prepared by consultants funded by the international donor community focusing on mining, generation, power sector restructuring, legal, environmental and social issues in the power sector. Conclusions and recommendations of these studies were presented in the Kosovo Energy Strategy (2005) covering the period 2005-2015. To implement the recommendations of the Strategy within the framework of a competitive and liberalized energy market adhering to European standards and international best practice, the Lignite Power Technical Assistance Project (LPTAP) was initiated in 2006.

Based on the recommendations of the Kosovo Energy Strategy and later studies, the Government proposed and LPTAP supported a three component project to be developed through foreign direct investment:

(i) Construction of a new power plant, “Kosovo C,” with a capacity that would allow for phased replacement of the old generation capacities (1,478 MW), and secure long term electricity supply at competitive prices while meeting domestic demand;

(ii) Rehabilitation of certain units at the existing power plants until the first units of Kosovo C are built, to meet domestic demand in the short to medium term, and

(iii) Development of a new mine to supply Kosovo A and B in the short to medium term as well as fueling Kosovo C for the duration of its 40 year operational life.

The pre-qualification process resulted in four highly qualified short-listed bidders that are ready to help develop the power sector to make it a profitable business from which Kosovo can benefit. The Government of Kosovo has thus taken a decisive step towards more effectively harnessing the country’s fossil fuel resources for urgently needed economic and social development, while building its capacity to meet international environmental and social standards for development.

Its first major undertaking towards this end is the Strategic Environmental and Social Assessment (SESA) of the proposed project. The SESA is the formal, systematic and comprehensive process of evaluating the effects of the proposed project and its components, including a written report on the findings of that evaluation, and using the findings in a publicly accountable decision making process. This process is in line with the European Commission’s Directive on Strategic Environmental Assessment of Plans and Programs and the World Bank’s Safeguards Policies and Procedures.
SESA

The Strategic Social and Environmental Assessment (SESA) has been prepared for the Kosovo Lignite Power Technical Assistance Project (LPTAP) of the Ministry of Energy and Mining of Kosovo (MEM).

The main objectives of the SESA are the following:

- Prepare an environmental and socio-economic baseline in a lignite deposit area located northwest of Obiliq town, including Hade, Hamidi, Lajthishte, Si-bovic villages, hereafter known as New Mining Field.
- Compare potential development scenarios, including the three proposed locations, type of technology available (pulverized fired ‘PF’ or circulating fluidized bed ‘CFB’), size of the power units (300 or 500 MW), and phasing of development (rapid or phased). The “zero” or no action alternative was also taken into account.
- Identify and assess the environmental and socio-economic impacts of projected development alternatives.
- Make recommendations on the preferred development scenario and integrate SESA results into the New Mining Field Development Plan (NMFDP).
- Facilitate the process of public consultation.

The SESA was prepared in two phases:

- Phase I - Baseline Study, including:
  - Environmental and socio-economic baseline data;
  - Detailed household surveys and establishment of Community Development Forums to fill socio-economic data gaps;
  - Local/regional power sector development strategies; and
  - SESA legislative and regulatory review.
- Phase II - Evaluation Process, including:
  - Comparison of potential development scenarios;
  - Evaluation of environmental and socio-economic impacts of the development scenarios; and
  - Preparation of the environmental management plan, including mitigation measures and environmental monitoring plan.

In parallel to the above, the Consultant has provided assistance to the Ministry of Environment and Spatial Planning (MESP) in the preparation of the NMFDP, on the basis of the work conducted for the SESA. The Draft NMFDP presents:

- Lignite power sector development schemes;
- Planned or anticipated regional developments in other sectors, such as land-use and infrastructure;
- Interactions and linkages among the various developments in different sectors;
- Measures and conditions to optimize sector development and minimize negative impacts; and
- Administrative procedures and regulations and institutional roles and responsibilities under which the NMFDP will be implemented.

The Draft Final SESA includes the following Sections:

- Environmental and Social Baseline;
- Alternative Scenarios for Kosovo C Thermal Power Plant Development;
- Environmental and Social Impacts of Selected Development Scenarios;
- Mitigation Measures and Monitoring Plan; and
- SESA Legislative and Regulatory Review.

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1 The work was carried by the Consortium (the Consultant) led by Environmental Resources Management (ERM) Italy and supported by ELC Electroconsult and CSA Group Ltd as part of the assignment “Environmental and Social Safeguards Services for Private Sector Participation in the Development of new generation capacity, related transmission and the development of the New Mining Field” between July 2007 and July 2008. The main scope of the assignment is to provide environmental and social safeguards advisory services to the Project Steering Committee of the Kosovo Lignite Power Technical Assistance Project (PSC), established jointly by the United Nations Interim Administration Mission in Kosovo (UNMIK) and MEM of the Kosovo Provisional Institutions of Self-Government. The project is funded under a grant to these institutions from the International Development Association (IDA) of The World Bank Group.

2 Planning document aimed at describing the spatial implications of the development of a new mine and associated power plants and setting the spatial planning cornerstones and framework for the development activity.
ENVIRONMENTAL AND SOCIAL BASELINE

The SESA is the formal, systematic and comprehensive process of evaluating the effects of the proposed project and its components, including a written report on the findings of that evaluation, and using the findings in a publicly accountable decision making process.

Environmental and socio-economic indicators were identified to compare the present situation in the area of interest with the various proposed development alternatives and to identify the “most preferred” option with regard to environmental and social impacts. The indicators considered refer to the following components:

- Environment: air, soil and groundwater, surface water and wastewater, noise, waste, natural environment; and
- Socio-economic: demographics, economy, land use, water use, infrastructure, health, education, community attitudes.

It is important to note that due to a number of circumstances, data was inadequate or unavailable for many of the selected indicators. Conclusions are thus based on available data and field observations. Where available, summary data tables are provided. Overall, there is a need for environmental monitoring equipment to be put in place at the mines and the plants, and plans made for such equipment at the proposed new developments. Issues requiring further investigation are noted here and discussed in detail in the main report.

Area of Interest

The area of interest for the proposed development (see Map 1) includes Bardh and Mirash lignite mines, Kosovo A and Kosovo B lignite fired thermal power plants (TPP) and the disposal sites related to the TPPs and mines, which are located in the municipality of Obiliq, about 3 km SW from the city limit of Prishtina. The proposed New Mining Field is situated north of the Bardh and Mirash mines. Korporata Energjetike e Kosovës (Kosovo Energy Corporation, KEK) has recently split into two joint associations, KEK J.S.C. and KOSTT J.S.C., as part of the process of moving from a publicly-owned enterprise to a joint stock company. The mines, TPPs and disposal sites are owned by KEK J.S.C; their installed capacity is 1,478 MW but overall effective capacity ranges from 645 to 710 MW.

The area is located between the Sitnica River valley in the east and a mountain chain extending north to south, with elevations exceeding +750 m above sea level. To the west lies the Drenica River valley and Cicavice hill. A portion of the municipalities of Fushe Kosova and Vushtrri falls into in the area of interest. The land surrounding the mining area is mainly used for agriculture, with only a few small forests in the northern part of the basin.

There are 20 towns and villages in the area. Most of them (towns of Obiliq and Fushe Kosova and villages of Bardh, Grabovci Poshtem, Hade, Palaja/Crkvena Vodica, Lajthishte, Sibovc, Dardhishte, Shipitulle and Plemetin) are located close enough to the existing mines and power plants sites to be substantially affected by the environmental pollution that they generate. In 2003-2004, due to an increased risk of slope failure, part of Hade village was resettled.

The majority of the population in the area is Kosovo Albanian. The villages of Babimoc/Babin Most, Millosheve/Milosevo, Plemetin/Plemitina and Palaja/Crkvena Vodica are inhabited primarily by Kosovo Serbs and other non-Albanian ethnic minorities. Although an official census has not been conducted since 1981, the estimated
The most important activities in the area are mining of lignite coal and power generation. Lignite has been mined here for nearly a century. Large-scale open cast mining operations and power generation have been in place for about 40 years, for most of that time with little concern for environmental impacts. Excavated overburden from initial surface mines was dumped outside the open cast mines, with seven dumps now surrounding the present mining area.

Annual coal production is currently around 7 million tons. Bardh and Mirash mines supply Kosovo B and Mirash alone supplies Kosovo A. Lignite is excavated by bucket wheel excavators and transported by two belt conveyor lines (transport capacity of 1,400 t/h - 33,000 t/day per belt) to the separation plants. The lignite is deposited close to power plants, in open yards.

Kosovo A has 5 units that were built in two phases (from 1962 to 1964 and from 1970 to 1975). Kosovo B has 2 units built between 1983 and 1984. The two power plants differ in terms of environmental impact given their differences in age and technology. Adjacent to the Kosovo A site, where the power plant continues to operate, is an abandoned industrial area where a gasification plant and fertilizer factory were in operation until 20 years ago. The impact of activities in the area (including the gasification and fertilizers plants) is seen today in contaminated soil and infiltration of trace metals and salts in the soils leading to pollution of rivers and groundwater. A full environmental assessment of KEK’s existing generation and mining installations and facilities is attached to the main Draft Final SESA report as Annex A.

Environmental Baseline

Air

Air Emissions. The main concerns regarding air quality in the study area are emissions from lignite mining activities, the power plants, ash disposal, and local traffic and heating systems, especially in Prishtina and Obiliq. The Trepca mining/metallurgy complex is in Mitrovica, about 30 km north-northwest of the site. Around 20 km west of Prishtina, and 10 km from the site is the Alferon/Feronikeli mine/smelter.

Particulates are the main emission generated by the mines. Coal dust from the active mining area is a large contributor to air pollution. According to the consultations conducted, the residents of Grabovci Poshtem village are particularly affected by this, because of their close proximity to Sibovc South West mine. Residents of Dardhishte (located between Mirash mine and the ash dump at Kosovo A) have concerns about the impact of ash and particulate on their quality of life. Air pollution is a health risk for workers and others living near the mines. Residents of Dardhishte, Hade, Palaj and Grabovci Poshtem are particularly concerned about health issues that they associate with the mines and power plants. Respiratory diseases are prevalent health complaints in these communities.

Combustion of lignite in Kosovo A and Kosovo B power plants results in emissions of particulates; SO$_2$ and NO$_2$; soot, CO and hydrocarbons from incomplete combustion; and the greenhouse gas CO$_2$.

In Kosovo A there are 5 stacks each 100 meters high, while Kosovo B has a single stack 182 meters high. Electrostatic precipitators for the removal of solid particles are installed at both power plants, but are functioning at far lower efficiencies than designed. There is no desulphurization or denitrification process at either plant.

Odor is another concern in the villages close to the plants.

At Kosovo A, ash handling is hydraulic for two of the units (A1-A2) and mechanical, using conveyor belts, for the other three (A3-A5); the ash is carried to ash dumps located in the direct vicinity of the plant. The system has been in operation for over 40 years and is in poor condition; particulate emission rates are high and have a serious impact on the environment. Particulate pollution occurs at all operation points, at the bunkers, along the belt conveyors, at the discharge points, and during the dumping and leveling process.

The air emissions for the power plants have been calculated based on fuel characteristics and combustion process parameters. An efficient monitoring system is needed to obtain accurate measurements. According to the European Union (EU) Large Combustion Plants (LCP) directive, the emissions limits for new power plants above 500 MW for particulate, nitrogen oxides (NO$_x$), and sulfur dioxide (SO$_2$) are as follows:

<table>
<thead>
<tr>
<th>Pollutants</th>
<th>SO$_2$ [mg/Nm$^3$]</th>
<th>NO$_x$ [mg/Nm$^3$]</th>
<th>Particulate [mg/Nm$^3$]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCP (after 1 January 2016)</td>
<td>&lt;50</td>
<td>&lt;500$^{(1)}$</td>
<td>&lt;400</td>
</tr>
</tbody>
</table>

Calculations performed by the KEK Environmental Department on CO$_2$ emissions (t/year) from Kosovo A and B for 2006 are presented in the following Table 4. These emissions are calculated from total lignite used and according to lignite composition measurements carried out on a regular basis. The method used for the calculation is not known.

<table>
<thead>
<tr>
<th>Power plant</th>
<th>Unit</th>
<th>CO$_2$ emissions [t/year]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kosovo A</td>
<td>A1, A3, A5</td>
<td>1,532,930</td>
</tr>
<tr>
<td>Kosovo B</td>
<td>B1, B2</td>
<td>3,608,874</td>
</tr>
</tbody>
</table>

No reliable data are available for Kosovo A and B emissions. Some indicative estimates are presented in the following table:

<table>
<thead>
<tr>
<th>(in milligrams per normal cubic meter)</th>
<th>Particulate (mg/Nm$^3$)</th>
<th>NO$_x$ (mg/Nm$^3$)</th>
<th>SO$_2$ (mg/Nm$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kosovo A</td>
<td>700-1300</td>
<td>-700</td>
<td>300</td>
</tr>
<tr>
<td>Kosovo B</td>
<td>150-230</td>
<td>500</td>
<td>400</td>
</tr>
</tbody>
</table>

By way of comparison the following table shows the applicable limits for Kosovo A and B, according to the LCP Directive, assuming the units are considered separately (with a capacity between 100 and 500 MW).

<table>
<thead>
<tr>
<th>Pollutants</th>
<th>SO$_2$ [mg/Nm$^3$]</th>
<th>NO$_x$ [mg/Nm$^3$]</th>
<th>Particulate [mg/Nm$^3$]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limit for Kosovo A (according to LCP Directive)$^{(3)}$</td>
<td>1,200</td>
<td>600</td>
<td>100</td>
</tr>
<tr>
<td>Limit for Kosovo B (according to LCP Directive)$^{(3)}$</td>
<td>400</td>
<td>500$^{(1)}$</td>
<td>50/100$^{(2)}$</td>
</tr>
</tbody>
</table>

$^{(1)}$ After 1 January 2016 the limit is 200 mg/Nm$^3$
$^{(2)}$ depending upon lignite characteristics
$^{(3)}$ emissions limit values referred to existing plants with a capacity of 100-500 MW

*Compliance with the LCP is required for new power plants. Existing plants should in principle comply from January 1, 2008; however, a reduction plan for existing power plants with restriction in operating hours can be agreed over a period beyond 2008 with feasible improvements and with the objective to reach compliance not later than December 31, 2015. If compliance is not feasible, existing plants need to be taken out of regular production by 2017 and can then only be used for limited operational hours as emergency back-up or to meet peak demands.*

Table 2. Indicative Emission Estimates for Kosovo A and B

<table>
<thead>
<tr>
<th>Power plant</th>
<th>Unit</th>
<th>CO$_2$ emissions [t/year]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kosovo A</td>
<td>A1, A3, A5</td>
<td>1,532,930</td>
</tr>
<tr>
<td>Kosovo B</td>
<td>B1, B2</td>
<td>3,608,874</td>
</tr>
</tbody>
</table>

The data available, while incomplete, demonstrate the heavy pressures on the environment:

- \( \text{SO}_2, \text{NO}_x \) and particulate emissions are not in compliance with current EU standards and no efficient abatement measures are currently in place;
- Uncovered ash dumps at both Kosovo A and Kosovo B and mine operations at Kosovo A constitute an extremely heavy source of particulate emissions, which is further aggravated in case of strong winds and dry periods. Mitigation measures are completely lacking.

Based upon the above, it may be concluded that:

- An air emission reduction program should be prepared and implemented for Kosovo A and B;
- Ash should be disposed of using hydraulics rather than mechanical systems at all locations to reduce dust;
- The slopes of the ash dumps should be flattened and vegetation established, to prevent further particulate emissions.

At present, there is limited information on the number or type of motor vehicles in the area. Data on the heating systems, both district heating and household oil/coal/wood fired heating systems is also poor. Therefore, it is not possible at present to accurately estimate the impact from these types of emissions on air quality in the area.

\textbf{Climate and Air Quality.} The Kosovo basin is characterized by a continental climate with dry and warm summers and variable winter temperatures depending on the influence of high-pressure systems from Siberia or low-pressure ones from the Atlantic Ocean. The average annual temperature is about +10°C and average annual precipitation about 600 mm. No data are available on atmospheric stability classes, statistics on wind direction or intensity or on temperature gradient; pollutant dispersion parameters therefore cannot be calculated. New monitoring stations for meteorological parameters are needed, and existing ones should be improved through installation of radiometers and/or solar devices to measure solar radiation and temperature gradient, in order to be able to reconstruct stability classes.

The available data indicate that the prevailing wind comes from the N-NE. This means that villages more affected by air pollution are those located S-SW from Kosovo A and Kosovo B power plants, ash dumps and the mine operating front.

Air quality data is limited and unsystematic. There is no data on \( \text{NO}_x \) concentrations, for example. Information on data collection methodology and equipment maintenance programs was unobtainable, making the available data difficult to interpret. That said, the information available shows that air quality in the area is likely not in compliance with EU standards. Particulate deposition measurements indicate heavy particulate pollution although soot concentrations appear to be below former Yugoslavia limits.

An air quality monitoring network, including continuous monitoring equipment, should be established as soon as possible in the area of interest.

Two air quality monitoring stations are present and were functioning in 2006: the first in Obiliq city and the second at the INKOS Institute near Kosovo A. Results of air monitoring in 2006, as reported in the KEK Environmental Report 2006, are presented in the following Table 5.

\textbf{Table 5. Air Quality Monitoring Results – (Average of Monthly Averages – 2006)}

<table>
<thead>
<tr>
<th></th>
<th>SO(_2) [µg/m(^3)]</th>
<th>Soot [µg/m(^3)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>INKOS</td>
<td>19.46</td>
<td>11.97</td>
</tr>
<tr>
<td>Obiliq(2)</td>
<td>20.70</td>
<td></td>
</tr>
<tr>
<td>INKOS</td>
<td></td>
<td>19.33</td>
</tr>
<tr>
<td>Obiliq(3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) The annual average standard is 30/50 µg/m\(^3\), according to former Yugoslavia legislation, 40 µg/m\(^3\), according to EU legislation, and 50/100 µg/m\(^3\), according to World Bank (WB) Guidelines.

(2) PM10 (particulates smaller than 10 micrometer) are fine particulates and the fractions of particulates that are particularly harmful for public health. Soot has to be read as PM10 in former Yugoslavia methodology. The annual average standard is 30/50 µg/m\(^3\), according to former Yugoslavia legislation, and 50/100 µg/m\(^3\), according to WB Guidelines. EU standards have an annual average limit of 40 µg/m\(^3\) and a daily limit of 50 µg/m\(^3\) not to be exceeded more than 35 days per year.

(3) Data available only for the months from January to May

\textbf{Table 6. Average Monthly Values of Total Deposited Particulate (mg/m\(^2\)d) – (2006)}

<table>
<thead>
<tr>
<th>Separation Location</th>
<th>Total dust (1)</th>
<th>Inorganic matters</th>
<th>Dissolvable matters</th>
<th>pH</th>
<th>Chloride</th>
<th>Sulfates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1798.23</td>
<td>1573.70</td>
<td>224.52</td>
<td>7.77</td>
<td>3.37</td>
<td>4.182</td>
</tr>
<tr>
<td>Bardh Location</td>
<td>225.53</td>
<td>140.68</td>
<td>84.84</td>
<td>7.14</td>
<td>2.49</td>
<td>2.49</td>
</tr>
</tbody>
</table>

(1) Total suspended matter as monthly maximum for rural and recreational areas, according to Official Gazette of Serbia, N. 54/99, is 300 mg/m\(^2\)/day.
Compared to air quality standards, the situation recorded at the monitoring stations does not appear critical. Nevertheless, not all relevant parameters are recorded and the reliability of the recorded values is uncertain. Other air quality measurements, reported from other sources, indicate that the situation is even. However, not enough information is available about the reliability and details of these measurements.

The KEK Environmental Report also contains information on particulate deposition rates from two locations in 2006: the first close to the separation facility and the second at Bardh mine. See Table 6.

At the separation facility, the deposition rate consistently exceeds the limit of 300 mg/m²d set by former Yugoslavia and WHO legislation. At Bardh mine, the situation is slightly better but still critical: values exceeded the limits for three months in 2006, even if the average annual value remains below the limit.

### Soil and Groundwater

Degraded Land, Sources of Soil and Groundwater Contamination. In mining activities, as a result of removal of top soil and other layers covering the lignite deposits, large areas of land are covered with these materials (“overburden”) and have degraded. The materials have been distributed in several areas, in the form of heaps, which are often called “overburden dumps.”

The main potential sources of soil and groundwater contamination identified include:

- Wet or dry deposition of air pollutants from the power plants, particulate from mining activity and from the ash dumps; previously there was also pollutant deposition from the gasification and fertilizer plants;
- Leakages of oily substances and other chemicals, in particular at the former gasification and fertilizer plant sites;
- Past dumping of chemicals in former underground mines;
- Past and current waste dumping at the ash dumps, in particular at the Kosovo A ash dump and in the old mine (municipal waste landfill); and
- Past and current discharge of untreated wastewat er effluents in rivers that is a likely source of sediment contamination in the Sitnica River.

A “Site Investigation, Technical and Organisational Planning and Determination of Environmental Impact” was initiated in July 2007 as part of the Clean up and Land Reclamation Project (CLRP), which is intended to identify the extent of contamination and improve the environment around and in the KEK mines and power plants, by reducing particulate emissions from the existing Kosovo A ash dump.

The investigation found hot spots with a high level of phenolic residuals, phenolic waters and tars in the Kosovo A ash dump although the dump was not used on a regular basis for dumping of these materials. Two basins on top of the mid-part of the Kosovo A ash dump and some drill holes beside one of these basins have been identified as dumping areas. The total amount of these residuals is very limited and they supposedly seem to be acceptably contained. The ash stored at the ash dump contains elevated levels of heavy metals, but due to the chemical composition of the ash the potential for leaching processes is limited. Elevated levels for some heavy metals were also found at the overburden dumps but these were similar to those found naturally in the area. In the area around the nearby Dragodan overburden dump as well as at the ash dump close to Kosovo A, many illegal garbage dumpsites were found containing municipal waste, building waste, other wastes from power plants, old rubber belts, metal scrap, etc.

The geochemical analysis included analysis of soil samples taken at different depths (from 0.50 to 80 meter) in 11 new boreholes for the detection of pH, calcium, magnesium, potassium, sodium and metals. Referring to Italian regulations on threshold values for soil quality, the analysis found several exceedances for some metals, especially Hg and Cr, and limited exceedances for Ni and Cd.

To the west of the ash dump, some 200 meters from the village of Dardhishte, a former ventilation shaft has
been used for dumping tar and phenol residuals. This same practice has taken place at other former underground mines. Moreover, the open dumps do not have adequate lining or other soil protection devices and no mitigation measures are in place to avoid storm water runoff contamination.

While results of the study indicated contaminated groundwater, there was no clear connection to the waste materials from the ash dump. Polluted mining galleries also may pose a serious risk to local groundwater systems and wells, but this requires further investigation.

The underground of the old fertilizer and gasification plant is likely to be contaminated. Under the CLRP a survey is scheduled to start in 2008 to identify contamination extent.

Also under the CLRP, investments for remediation works at Kosovo A ash dump and overburden dumps have been included in a draft final design (April 2008). After formal approval, the proposed measures for reshaping, partial removal of unstable parts, coverage and re-vegetation should provide an adequate solution against particulate generation, possible soil/groundwater pollution and contamination of runoff water.

No information about composition of the ash dump at Kosovo B is available. It is likely that it contains other types of solid waste, such as old tires and other industrial residues. The ash dump is often flooded. This condition has likely caused contamination of Sitnica sediments. Kosovo B ash dump generates substantially less particulate than Kosovo A but limited data is available on local groundwater conditions. A survey is needed.

Detailed mapping of the site, systematic soil and groundwater sampling and analyses are urgently required.

Geology, Hydrogeology and Quality of Groundwater and Soil. Kosovo geology is varied and its evolution over time has been dictated by its location in an active tectonic zone. That tectonic activity has seen the formation and subsequent closure of an oceanic basin, leading to the development and preservation of a variety of economically exploitable mineral deposits.

The testing of groundwater and free surface water in the CLRP site investigation phase showed slightly elevated levels of BTEX (Benzene, Toluene, Ethylbenzene, and Xylenes) and PAH (polycyclic aromatic hydrocarbons) in some samples. Metals were within drinking water standards (WHO, EU) except for arsenic, which was found at concentrations (12 and 13 microgram/L) marginally above drinking water standards (10 microgram/L) in samples west of the Kosovo A ash dump. These arsenic concentrations could very well be related to the natural occurrence of this element in the area’s geology. The conclusion is that test results could not identify any significant contamination of groundwater downstream of the ash dump. There is verbal reporting of contaminated groundwater in wells, this seems now more likely to be related to the disposal of chemicals in old mine galleries but this needs further investigation. Some shallow wells showed elevated levels of electric conductivity (from salts) suggesting influence from ash dust or ash dump surface water run-off.

Based on available information from hydrogeological maps (e.g., Rudarski Institute, 1985) as well as studies carried out in the mining site and surroundings, the groundwater flow is generally northeast to west (or southwest) to the Sitnica River. Review of the older documents and field observations shows that the quantity of groundwater descending the overburden at the mines is rather small. Use of groundwater is mainly through private wells about 10 to 15 m deep in the overburden clay.

No data are available for soil or groundwater properties for the existing mines. Within the New Mining Field, vertisol soil types covering nearly 100 percent of the area. Only some 0.4 ha at the outer northwestern edge contains reddish sediments at the geological rim of the coal basin. Vertisol soil types are generally used for grazing of cattle or sheep. It is not unknown for livestock to be injured through falling into cracks in dry periods. Site visits showed that the New Mining Field area is constituted mainly of uncultivated land, with some subsistence farming.

Soil in old plant areas does not show visual evidence of being heavily contaminated, but the presence of tanks related to former operations not properly decommissioned.
and limited waste storage areas represent important issues. The old industrial area at Kosovo A will require clean-up and a soil quality monitoring program is needed.

Surface Water and Wastewater

Surface Water Consumption and Generation of Waste Water. Water uses for the mines include the following: firefighting; sanitary uses in repair stations; washing of trucks, etc. Water is supplied by public mains and is transported by tank trucks to the sites and repair stations.

Main water uses in Kosovo A and Kosovo B power plants include:

- Cooling water make up;
- Boiler make up;
- Sanitary use;
- Washing water;
- Water added to ashes to minimize particulate emission at Kosovo A; and
- Slurry preparation for ash transportation at Kosovo B (the ratio between ash and water is 1:1).

Kosovo A water is supplied by the Llapı River; the Iber-Lepenc canal supplies Kosovo B. In emergency conditions (especially during dry season), the canal is opened to let additional water flow to the river to supply Kosovo A. Both plants discharge to the Sitnica River.

As stated in the KEK Environmental Report 2006, calculated water consumption is high: while Kosovo B uses around 2.7 m³/MWh, Kosovo A water demand may reach up to 5.3 m³/MWh. Since the power plant does not have a flow rate measurement system, total water consumption is not known. Water consumption for the existing TPPs is estimated in the study, Water supply from the Iber-Lepenc hydro system for the proposed Kosovo C power plant (February 2008), funded by the European Agency for Reconstruction (EAR) and developed by COWI consortium, at 18.4 MCM per year, with a return from the cooling towers of 60%, or 11 MCM per year.

There are no water flow rate measurements at the intakes or outfalls of the plants; a monitoring system should be implemented, in order to measure both water intake and wastewater discharge.

Wastewater Treatment. Kosovo does not have proper municipal or industrial wastewater treatment systems. The number of households connected to a sewage system is very limited (28 %). In villages and other small settlements, wastewater is disposed of in open channels, which leads to contamination of surface and groundwater. Poor quality drinking water (from wells) and inadequate waste disposal are common complaints of the communities living in the area of interest.

No wastewater treatment plants are installed at the mines or power plants; industrial effluents are discharged directly into the rivers. The main sources of surface water contamination in the area of interest are wastewater discharges from KEK facilities and contaminated run-off from the ash dumps. In addition, wastewater from urban areas (Municipalities of Lipjan, Fushe Kosova, Prishtina) and other industries are discharged upstream of the KEK facilities.

Wastewater discharges from the power plants are monitored by INKOS through 17 surface water and 5 underground water monitoring points (5 piezometers, installed around the ash dump at Kosovo B to monitor groundwater quality). Results of wastewater monitoring are included in the KEK monthly environmental report. Existing monitoring programs appear insufficient in terms of monitoring points, frequencies and investigated parameters (heavy and rare metals are not included, for example). The map of wastewater discharge monitoring points for KEK existing facilities, as reported in KEK Environmental Report 2006, is presented in Map 2 below.
Map 2. Wastewater Discharges Monitoring Points for KEK Existing Facilities

Effluents Sample sites:
2.1 - TPP A
2.2 - TPP A Ash Dump
3.1 - TPP A technological waters
3.2 - Cooling tower waters
3.3 - Technological waters main collector
3.4 - Gasification plant
3.5 - Heating plant
4.1 - TPP B Eastern side of Ash dump
4.2 - Discharged technological waters from units and sanitary waters
4.3 - Water discharges from PKU, Cooling towers and B1 draining
4.4 - TPP B Open canal collector of polluted waters
4.5 - Collector of all waters discharged by TPP B
**Figure 1** from the KEK report contains the results of the monitoring program carried out between January and June 2007. It also shows discharge limits established by former Yugoslavia for the different classes of rivers. Based on the results of the analysis reported in the table, Sitnica River probably falls into class 4; some parameters of river water exceed the discharge limits (suspended solids, KMnO₄ etc).

**Figure 1. Monitoring Wastewater Discharges from TPP A and TPP B to the Recipient Sitnica (Average Values for Period January-June 2007)**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>TPP A Ash Dump</th>
<th>TPP Kosovo A heating plant</th>
<th>Gasification</th>
<th>River Sitnica and river Llapi</th>
<th>TPP Kosovo B Surface waters and underground waters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow of water from ash dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White waters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water from cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharged waters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lajmski bridge</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Palaj</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sitnica river before TPP B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharged waters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lismir bridge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location of sampling and no. of parameters and unit (mg/litre)</td>
<td>2.2</td>
<td>3.2</td>
<td>3.2</td>
<td>3.4</td>
<td>3.5</td>
</tr>
<tr>
<td>Flow of water from ash dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White waters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water from cooling</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Discharged waters</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Lajmski bridge</td>
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<tr>
<td>Palaj</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sitnica river before TPP B</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discharged waters</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Lismir bridge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Class I:** water that, in its natural state or after disinfection, can be used for drinking water supply, food industry and fine fish (salmonidae) breeding.

**Class II:** water appropriate for bathing, recreation, water sports, less fine fish (cyprinidae) breeding, including water that, after basic treatment methods (coagulation, filtration and disinfection), can be used for drinking water supply and food industry. Class II is then divided in two further subclasses: sub-class IIa and sub-class IIb.

**Class III:** water that can be used for irrigation and industries except food industry.

**Class IV:** water that can be used only after special treatment.

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1. Class I: water that, in its natural state or after disinfection, can be used for drinking water supply, food industry and fine fish (salmonidae) breeding.

2. Class II: water appropriate for bathing, recreation, water sports, less fine fish (cyprinidae) breeding, including water that, after basic treatment methods (coagulation, filtration and disinfection), can be used for drinking water supply and food industry. Class II is then divided in two further subclasses: sub-class IIa and sub-class IIb.

3. Class III: water that can be used for irrigation and industries except food industry.

4. Class IV: water that can be used only after special treatment.
River System and Flood Risk. The Kosovo C TPP project will be located in the Kosovo river basin. The Kosovo basin forms a smoothly shaped plain that is bordered by hills and mountains. This basin includes a well developed hydrological network, with the Sitnica River as its main collector. This river crosses the basin from south to north and drains about 80% of the accumulating surface water in a northern direction. Major tributary rivers are the Drenica River in the west and the Llapi River in the east. Map 2 shows the areas with potential for flooding.

As noted earlier, part of Kosovo A water and all of the water for Kosovo B comes from the Iber-Lepenc canal, which runs parallel to the Iber and Sitnica Rivers. The Iber-Lepenc canal is part of the Iber-Lepenc system, administered by the publicly-owned Iber-Lepenc Enterprise (ILE), which is comprised of the Ujman/Gazivoda reservoir, dam and hydroelectric installation, discharging into the lower Pridvorice reservoir, which acts as a regulator for releases into the Iber River and the 52 km Iber-Lepenc canal.

Current Water Consumption. A number of water users currently obtain their water from the Iber-Lepenc system.

- Domestic water use includes the urban population of four municipalities:
  - Mitrovica, Skenderaj and Vushtrri supplied by Mitrovica Water Supply Company;
  - Gligogovc supplied by Prishtina Water Supply Company;
- Mitrovica’s domestic water consumption, and emergency supplies for Pristina in case of water shortages;
- Prishtina’s domestic water consumption from the Gazivoda;
- Industrial consumption from the Trepca factory. Although the factory is not in use at present, it is unclear what the future industrial water consumption will be for that area;
- Industrial consumption by the Feronikeli factory;
- Kosovo A and B use;
- Irrigation water: in 2006, the amount of irrigated land was 668 ha out of a total of 20,000 ha (against 547 ha in 2005 and 526 ha in 2004). Studies and other documents of the Ministry of Agriculture report that the land area that could be irrigated in the near future is much greater (between 5,000 and 10,000 ha);

- Environmental flows;
- In addition, losses from abstractions from the system along the 52 km of the Iber-Lepenc canal are estimated at around 50% of canal flow.

Based on Iber-Lepenc data, the average yearly water use in 2006 was 2.39 m³/s (about 75 million m³/year), while maximum water use registered in July 2006 was around 6 m³/s.

Domestic water supply is further hampered by several problems, including pipe failures, interrupted power supply and limited storage capacity; the result is very high per capita water consumption of around 340 l/day. Water distribution networks are generally very old and in poor condition as they suffer from a lack of investment and maintenance. Few utilities are able to provide adequate amounts of water to the population. There is an ongoing problem with the collection of fees for water use, owing, in large part, to the lack of functioning water meters.

Current Water Demand. Estimation of current water demand is a very difficult exercise: it depends on the real and urgent needs of the different competing users of the Iber-Lepenc System. The EAR report assumes the figures shown in the following table for water demand in the area. The estimation reported in Table 7 is based on the assumption that irrigation water need is 10,000 ha; that industry needs will in the near future average 1 m³/s; and that potable water needs will not change in the near future. Estimated current losses are also shown although it is recommended that works be carried to lessen them.

<table>
<thead>
<tr>
<th>User</th>
<th>Flow rate m³/s</th>
<th>Volume/Year m³*10⁶</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
<td>0.46</td>
<td>14.6</td>
</tr>
<tr>
<td>Irrigation</td>
<td>0.95</td>
<td>30</td>
</tr>
<tr>
<td>Industry</td>
<td>1.00</td>
<td>31.54</td>
</tr>
<tr>
<td>KosovoA</td>
<td>0.08</td>
<td>2.63</td>
</tr>
<tr>
<td>KosovoB</td>
<td>0.50</td>
<td>15.77</td>
</tr>
<tr>
<td>Total Users</td>
<td>2.99</td>
<td>94.54</td>
</tr>
<tr>
<td>Min.Biol. flow</td>
<td>0.5</td>
<td>15.77</td>
</tr>
<tr>
<td>Losses</td>
<td>2.99</td>
<td>94.54</td>
</tr>
<tr>
<td><strong>Total demand</strong></td>
<td><strong>6.48</strong></td>
<td><strong>204.85</strong></td>
</tr>
</tbody>
</table>
The EAR study evaluation probably underestimates potable water requirements and overestimates industrial utilization.

Water Availability. Water availability in the Iber-Lepenc system is dependent on the the water balance in the Gazivoda reservoir. In the EAR water supply study, total inflow to the Gazivoda lake was determined on the basis of the statistical water inflow data for the period 1948-1972 (only available data), provided by ILE. Table 8 summarizes the average and worst year (1950) values for the set of water inflow data.

Therefore, in average, median and worst year, total water availability remains higher than water demand. However, the system is under stress from potentially competing demands, as indicated by the water exploitation index (WEI), an indicator used by the European Environmental Agency to identify water stressed regions or river basins. The warning threshold for the WEI, which distinguishes a non-stressed from a stressed region, is around 20%. Severe water stress can occur where the WEI exceeds 40%, indicating unsustainable water use. According to the EAR estimation, the WEI (calculated on the present water demand as shown in the previous table is ) around 50% for the average year. This high WEI indicates the potential for conflicting demands from various water users and stresses the need for a comprehensive policy, institutional and planning framework for water resource management in the Iber-Lepenc system.

Water stress already occurs, as there are frequent shortages in summer in the potable water supply to Prishtina and other municipalities supplied by the Prishtina Water Supply Company.

As a consequence more information has to be collected on water availability in Kosovo and water resource management plans have to be prepared taking into account the Kosovo Water Law (Law No. 2004/24).

Surface Water Quality. Contamination of rivers and streams is high all over the project sites. Although chemical-industrial, mineral and metallurgical production, previously discharging into surface water, has decreased in the area of interest, no significant improvement in river water quality has been reported. Based on MESP Water Surface Quality Report, Sitnica River and its tributaries are highly polluted, principally due to the large amount of sewage and industrial discharges, making the Sitnica-Iber river system an open drain of industrial effluent. Data on water quality are available. Nevertheless the monitoring system should be improved and the analysis should be carried out on a periodic (and more frequent) basis (see Table presented above, under “Wastewater treatment”).

Quality of Potable Water Supply. People in rural areas rely on village water-supply systems, their own wells or on springs and surface water. Rural wells are generally in bad condition and the water quality is poor, due to organic contamination.

Twenty percent of Obiliq town is supplied by Prishtina Water Supply Company through the potable water supply network, which gets its water from Batllava and Badovci Lakes. Water quality samples are taken in Obiliq, both from raw water and from the network. The monthly results of 2006 show an exceedance of the limit for total coliform during three months (January, July and December) in waters from the network.

In Obiliq Municipality, the National Public Health Institute has carried out measurements of the quality of

Table 8. Water Inflow to the Gazivoda Lake in million m³ (1948 – 1972, EAR Water Supply Study)

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Year (MCM)</th>
<th>Year in m³/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>27.0</td>
<td>36.2</td>
<td>51.8</td>
<td>69.7</td>
<td>61.6</td>
<td>33.5</td>
<td>21.1</td>
<td>11.5</td>
<td>13.6</td>
<td>17.0</td>
<td>29.0</td>
<td>38.8</td>
<td>410</td>
<td>13.02</td>
</tr>
<tr>
<td>Median</td>
<td>19.9</td>
<td>32.8</td>
<td>50.0</td>
<td>71.9</td>
<td>60.3</td>
<td>28.7</td>
<td>16.5</td>
<td>9.7</td>
<td>8.6</td>
<td>10.7</td>
<td>20.8</td>
<td>28.3</td>
<td>358</td>
<td>11.36</td>
</tr>
<tr>
<td>Worst year</td>
<td>19.7</td>
<td>47.7</td>
<td>44.0</td>
<td>43.0</td>
<td>11.0</td>
<td>5.9</td>
<td>4.7</td>
<td>3.7</td>
<td>3.7</td>
<td>15.7</td>
<td>22.4</td>
<td>28.3</td>
<td>249</td>
<td>7.92</td>
</tr>
</tbody>
</table>

6 The water exploitation index (WEI) is part of the Core Set of Indicators of the European Environmental Agency and is defined as the mean annual total abstraction of freshwater divided by the mean annual total renewable freshwater resource at the country level, expressed in percentage terms.
drinking water from wells in rural areas, based on the Regulation on drinking water quality monitoring. Two samples of drinking water have been collected in each of the following villages: Shipitulle, Hade, Bakshi, Millosheve, Hamidi, Lajthishte, Sibovc, Babimoc/Babin Most, Breznice and Kozarice. Results consistently show a high level of contamination.

Noise

Noise Emissions. Noise is a serious concern for the health and safety of workers at the plants and mines. Key noise sources at mines include vehicles, excavation and transport equipment, and belt conveyors. People living in villages and towns close to the mines report noise as one of the main environmental problems: whereas workers may wear personal protection equipment, residents do not have the means to protect themselves from mine-related noise.

Power plant noise comes from belt conveyors, crushing equipment, burners, turbines, generator, ventilators, compressors, pumps, cooling towers and stacks. In several places inside power plant areas, noise emissions likely exceed 85 dB(A), which is generally considered the limit not to be exceeded at 1 m distant. However, since power plants are not positioned in the immediate vicinity of sensitive receptors such as houses, significant noise impact from them is considered unlikely.

There is currently no noise monitoring data: based on limited information available and ERM experience, noise emission has to be considered a key aspect to be addressed for mine development. A noise survey should be undertaken and comparison made with applicable standards, to ascertain potential non compliance and necessary mitigation measures for the protection of both workers and residents.

Noise Immissions. A number of residents from villages close to the existing mining facilities have raised concerns about noise levels. However, detailed noise mapping has not been carried out. During the public consultation meetings, residents of settlements located close to the mines, especially Grabovc i Poshtem, raised concerns about the noise emitted by conveyor belts and mining operations. The scarce indications available do show very probable exceedance of noise immission standards (EU, World Bank) in the residential areas around mine boundaries and sometimes in the residential areas near Kosovo B. Monitoring of environmental noise should be undertaken and appropriate mitigation measures designed.

Solid Waste

Production of Ash, Industrial and Municipal Waste. Waste, both municipal and industrial, is a major environmental challenge in Kosovo, especially mine tailings and flotation sludge. Old waste sites did not have waterproof lining to prevent seepage from polluting groundwater; they were not covered with inert material to keep rainwater out nor did they have gas extraction systems to prevent methane explosions.

Lignite contains non-combustible materials that form ash during the combustion process. The quantity of residuals becomes higher if combustion efficiency drops, or the quality of the lignite is poor.

Two disposal sites for ash are used near the Kosovo A and B power plants. Kosovo B ash is hydraulically transported in a slurry and disposed of in a depleted area of the Mirash-East mine, which serves as an ash landfill. Ash from Kosovo A is transported to the landfill by means of belt conveyors after humidification. The ash landfills have exceeded the originally intended volume and heaps of ash form a visually dominant element of the landscape. Both landfills have at certain times in the past been used to dispose of other solid and liquid waste (for example in the Kosovo A landfill, oil and phenol ponds were identified; see Soil component for details).

The ash contains salts and trace metals, which, once wet, can leach out to infiltrate groundwater and surface water. The ash from both plants is either slurry or damp, and is disposed of without protection against rainfall. Amounts of ash produced by the plants in 2006 (as per the KEK report) are presented in the following Table 9. The methods used to determine these quantities are not known and the exact quantity is not confirmed.

Table 9. Ash Amounts Produced by Kosovo A and B Power Plants

<table>
<thead>
<tr>
<th>Generation Division</th>
<th>Unit</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPP Kosovo A</td>
<td>t/y</td>
<td>321577</td>
</tr>
<tr>
<td></td>
<td>t/MWh</td>
<td>0.3109</td>
</tr>
<tr>
<td>TPP Kosovo B</td>
<td>t/y</td>
<td>726559.4</td>
</tr>
<tr>
<td></td>
<td>t/MWh</td>
<td>0.227</td>
</tr>
<tr>
<td>TOTAL</td>
<td>t/y</td>
<td>1048136.4</td>
</tr>
<tr>
<td></td>
<td>t/MWh</td>
<td>0.24241</td>
</tr>
</tbody>
</table>

7 Noise immissions means noise perceived by receptors.
Waste inventory for Kosovo includes 32 waste types; ashes are by far the largest problem in terms of quantity. Waste management in general needs improvement in Kosovo, particularly for industrial facilities. Data on solid waste production (urban and industrial) are not easily available due to a lack of waste policies. No inventory of wastes generated by the mines exists. Apart from ash, solid wastes come from mine offices and repair stations, which are collected by the municipal waste collection and disposal services.

Other than ash, the main sources of solid waste from the power plants are: worn out equipment and materials; residue from water treatment; used machinery oil and other hazardous waste. Waste from both the power plants is managed by a special division within Central Maintenance Department. Metals are the only waste separately collected and sold to METALKOS. Spent oil reportedly is recycled by specialized companies.

Like ash, solid waste residues from the water treatment processes may contain trace metals and salts. Quantities are estimated at about 6 m³/d from Kosovo A and 3 m³/d from Kosovo B. As dry material this equals about 2,100 m³/y of solid waste. The waste is removed as mud and disposed of together with the ash.

Hazardous materials and waste are currently stored in deplorable conditions at many sites in Kosovo, mainly in the industrial complexes where they were used or produced. There are no proper storage facilities for hazardous waste, although there is a plan to build temporary storage facilities. Asbestos was used mainly for installation during construction of Kosovo A, the drying plant and the gasification plant and can be found all over the plants. No asbestos was used for Kosovo B. Reportedly, no asbestos is present in the mining area and none was identified during the site visit. According to the data available, oil containing PCBs (polychlorinated biphenyls) is not a significant issue at the power plants. The KEK Environmental Report mentions 5 transformers that contain PCBs but are out of operation, and 14 transformers containing PCBs that are still functioning at Kosovo B. These transformers should be replaced and properly disposed of in near future.

Services for the collection, transport and disposal of municipal waste predominantly cover urban areas, but are now being expanded into rural areas. There are 30 municipalities in Kosovo, and waste is dumped at either municipal or regional landfills. In a number of municipalities, dumpsites have been rehabilitated and are being used by waste companies until regional or new landfills can be completed. Prishtina Regional Waste Company manages the Municipal Landfill of Prishtina located in the northeastern corner of Mirash East mine. The landfill is equipped with a leachate pond.

There are no recycling facilities in Kosovo except for some minor initiatives for aluminum cans, collected for a small smelter in Janjeva/Janjevo, and a nonfunctioning paper and plastic recycling plant. There is a lack of awareness of waste management issues such as waste minimization, safe storage and handling of waste, waste labeling or segregated collection. Actions to prevent open dumping at industrial sites should be taken and generated waste should be adequately stored in order to prevent soil and groundwater runoff contamination, and to allow recycling/reuse of secondary raw materials. Existing open dumps need to be reclaimed.

Natural Environment

Table 10 contains the number of hectares (and percentage) for each type of land use, and Map 3 shows land use in the area of interest.

### Table 10. Land Use Types in the Area of Interest

<table>
<thead>
<tr>
<th>Land use Types</th>
<th>Area (ha)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Areas (without existing mines)</td>
<td>545</td>
<td>2.12</td>
</tr>
<tr>
<td>Residential Areas</td>
<td>3,103</td>
<td>12.10</td>
</tr>
<tr>
<td>Overburden Areas</td>
<td>1,160</td>
<td>4.52</td>
</tr>
<tr>
<td>Existing Mines</td>
<td>1,003</td>
<td>3.91</td>
</tr>
<tr>
<td>Ash Dumps</td>
<td>215</td>
<td>0.84</td>
</tr>
<tr>
<td>Forest</td>
<td>4,613</td>
<td>17.99</td>
</tr>
<tr>
<td>Potential Agricultural Areas</td>
<td>15,009</td>
<td>58.52</td>
</tr>
<tr>
<td>Total</td>
<td>25,648</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Agriculture is the prevalent land use, followed by forest and then industrial areas.

The distribution of land use is therefore as presented in Figure 2.

**Figure 2. Land Use**
Map 3. Actual land use

- **Settlements**
- **Residential area**
- **Overburden dump**
- **Ash dump**
- **Industrial area**
- **Forest**

- **Main road**
- **Railways**
- **Water body**
- **Floodplain**

- **Rivers**
- **Streams**
- **IL canal**

- **TPP Kosovo A**
- **TPP Kosovo B**
- **KEK mining license**
- **New KEK mining license**

- **Coal belt conveyor**

Legend: [Image of a map with various symbols and labels indicating different land uses and features.]
Natural Habitats and Landscape Impacts. At present, environmental impacts from agriculture are not significant, because fertilizer and agrochemical use is low. This will change as the rural economy improves and fertilizer and pesticide use increases. Likewise, there is not much pollution from industry because of lack of activity. Nevertheless, former sites of heavy industry remain a source of environmental pollution, since they are contaminated with metal processing wastes and various chemicals, which leach into surface and groundwater. Particulate from the mines is discussed elsewhere.

In terms of visual impacts, there are seven dumps located NW, SW, S and SE of Bardh and Mirash mines, which occupy an area of 10 km². The environmental damage caused by dumps located outside the mine area is mainly due to lack of dump management, questionable long-term geo-technical stability, and lack of revegetation. Landslides have occurred in the Mirash West pit due to dump slope instability. Visual estimations show that no more than 10 % of the outside dumps have been recultivated. These dumps constitute a potential source of particulate for mining workers and the villages of Bardh and Hade, notably during the summer.

Uncontrolled land use and illegal construction also have a marked impact on biodiversity. Illegal houses have been built on forestland and protected areas, including in the Sharr/Sar Mountains National Park. In addition, illegal quarrying is still taking place on a large scale. An overview of the area of interest should be carried out, to include these illegal activities.

Protected Areas, Flora and Fauna, Land Use. Kosovo has a high diversity of ecosystems and habitats. The MESP has provided information on valuable natural sites in Obiliq and Vushtrri: these are mostly trees or springs, and were identified in surveys in 2003-2004. None are located within or in the vicinity of the TPP sites. In general, data on natural and protected areas are quite old, and should be updated.

A field survey of the fauna, flora and habitats in the area of interest was carried out by two biologists in the period 11-15 April 2007. Several excursions were undertaken to the three potential plant sites, at different times of day to observe as many vertebrates as possible. The flora and vegetation was mapped at the same time, although the time of year was not optimal for this task. In order to compare and assess the value of the three sites on a national level, visits were made to areas outside of the area of interest as well. In addition, the vegetation of the following alternative potential sites was investigated more thoroughly: the south-west side of Plemetin (including Kosovo B site); environs of Bivolak and Berisha villages (including Bivolak site). The Kosovo A site was not investigated as it is a wholly industrial area with no natural values.

Most species of plants (trees, bushes and herbs) were identified. The natural plant communities and those resulting from anthropogenic factors were noted, as were their biotopes. The fauna, vegetation and biotopes for the Kosovo B site and the Bivolak site were described, including prevalence of typical habitats and environs and their ecological value (biodiversity, endangered species and habitats as indicators on a national and European level).

The biotopes have a high biodiversity of fauna and flora, indicated by protected and endangered species at a national level (fide Dr. Schneider-Jacoby, Euronature), such as the White Stork (Ciconia ciconia), Garganey (Anas querquedula), Redshank (Tringa totanus), and the likelihood of the especially endangered Corncrake (Crex crex) and Little Bittern (Ixobrychus minutus). The White Stork, Little Bittern and Corncrake, which are listed in Annex I of the EU-Wild Birds Directive as endangered species, are not endemic; all three are found across Europe and parts of Asia as well as elsewhere.

Most of the locations investigated are under anthropogenic influence, i.e. influenced by man. The majority
of meadows and forest vegetation are managed by agricultural associations. In the vicinity of villages there is evidence of ruderal vegetation. Natural biotopes are found close to the Sitnica River and include wet meadows between Bivolak and Prelluzha, willow forests around the river and other wet places; other natural biotopes include bushland around Bivolak and the oak forest west of Bivolak.

A more complete survey of flora and fauna in the area of interest as well as a specific catalogue of endangered species should be prepared.

Social Baseline

Context

Kosovo is a post conflict country that is still undergoing a process of rehabilitation and reconstruction. As such, comprehensive and recent census information on the New Mining Field area was not available. The information gathered for the social baseline was drawn from reports and discussions with Kosovo government ministries, non-governmental organizations (NGOs), donor organizations and affected communities.

Area of Interest and Population

Obiliq municipality is located immediately northwest of Prishtina on the main road to Mitrovica. It was part of the Prishtina municipality until 1989. The municipality now comprises a total of 20 villages including the town of Obiliq itself. Primary data has been gathered from ten of the twenty settlements in Obiliq municipality. These are Hade, Lajthishte, Dardhishte, Sibovc, Grabovci Poshtem, Shipitulle, Hamidi, Palaj/Crkvena Vodica and Obiliq.

As noted earlier, there are around 5,300 inhabitants in the town of Obiliq, and around 27,000 inhabitants in rural areas. Population density is variable from one settlement to the other. A large proportion of the population are young and settlements are divided by ethnicity. Although the majority of the population is Kosovo Albanian, villages such as Babimoc/Babin Most, Millosheve/Milosevo, Plemetin/Plemetina and Palaj/Crkvena Vodica are mostly inhabited by Kosovo Serbs and other non-Albanian ethnic minorities. Obiliq town was also a multi-ethnic area before mid-March 2005, but all remaining Kosovo Serbs and some Roma have left the town and settled in Plemetin/Plemetina and other villages.

Box 1. Key Results from Settlement Surveys

<table>
<thead>
<tr>
<th>Settlement</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hade</td>
<td>48% of respondents strongly support the project and 46% think it will have a positive economic impact.</td>
</tr>
<tr>
<td>Lajthishte</td>
<td>46% of the population strongly support the project and 44% believe that the project will result in a positive economic impact for them.</td>
</tr>
<tr>
<td>Dardhishte</td>
<td>23% of the population strongly oppose the project and believe it will increase pollution and industrial water waste.</td>
</tr>
<tr>
<td>Sibovc</td>
<td>The main concerns were fears that the survey questionnaire would be misused and future employment.</td>
</tr>
<tr>
<td>Grabovc i Poshtem</td>
<td>The main concerns were environmental pollution, noise, lack of potable water (pollution has damaged the local supply of spring water), health and displacement.</td>
</tr>
<tr>
<td>Shipitulle</td>
<td>The main concerns related to resettlement. 60% believe the project will create new employment opportunities for residents and result in poor public transport.</td>
</tr>
<tr>
<td>Hamidi</td>
<td>46% believe the project will have a positive impact on the economy. 77% believe the project will have a very negative impact on the environment.</td>
</tr>
<tr>
<td>Palaj/Crkvena Vodica</td>
<td>67% believe the project will have a very positive impact on the municipality. The communities’ main project concerns were unemployment, pollution and health.</td>
</tr>
<tr>
<td>Obiliq</td>
<td>The communities’ main project concerns were environmental pollution.</td>
</tr>
</tbody>
</table>

Source: Prism Research, April 2008.

The definition of stakeholder used for identification purposes was taken from the Kosovo-based organization’s Riinvest/IIED report – Community Consultation Guidelines for Mining in Kosovo. It states that: “Stakeholders refers to people who have an interest in mining activities. This includes people who can influence activities, as well as those affected by them. Local communities are themselves stakeholders, but stakeholders also include others from outside the local area, such as non-governmental organisations, businesses, national government, municipalities and employees from outside the community. These broader stakeholders need to be involved in the consultation because they may...be responsible for delivering commitments made through consultation to ensure that the community has sufficient capacity to get involved, or verifying information to ensure that it’s credible.”
Public Consultation and Stakeholder Identification

During the preparation of the LPTAP there was considerable public consultation of key stakeholders, based upon an Environmental and Social Safeguards Framework, in order to introduce the project to communities in the area of interest. The project has followed a three stage process:

1. Initial key stakeholder definition and identification;

2. Initial consultation of key stakeholders, including affected villages and communities, to identify potential project impacts and concerns of communities; and

3. Extensive household survey of affected communities and detailed consultation and focus groups to provide a robust and up to date social baseline and to explore further the impacts identified during the first phase of the consultation.

Village Consultations. As a first step, a series of village consultation meetings was held from October 22 to November 1, 2007 in Shipitulle, Grabovc i Poshtem, Hade, Sibovc, Lajthishte, Plemetin, Dardhishte, Hamidi, and Obiliq. In addition to the individual village meetings, the project office held a final meeting with village representatives to disclose the findings of the nine village meetings, to verify information and to discuss key requests of residents. Attendance was high, with an average number of seventy people at each meeting. The meetings identified key issues that were further explored for the social assessment baseline and have informed the methodology of subsequent consultations with village communities in the area of interest.

Household Surveys and Focused Community Consultation. In order to address data gaps, LPTAP commissioned two Kosovo-based companies (Prism Research and Community Development Fund-CDF) to carry out a detailed household survey and ongoing consultation with affected communities and villages. The purpose of the household survey was to provide accurate and up to date primary social data. Information from the household survey was used to supplement the secondary data and to provide qualitative information on people’s attitudes, perceptions and concerns about current and future mine and plant development.

<table>
<thead>
<tr>
<th>Village</th>
<th>Number of people per village</th>
<th>Number of households participating in survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hade</td>
<td>1156</td>
<td>334</td>
</tr>
<tr>
<td>Palaj</td>
<td>484</td>
<td>104</td>
</tr>
<tr>
<td>Grabovc i Poshtem</td>
<td>85</td>
<td>15</td>
</tr>
<tr>
<td>Hamidi</td>
<td>88</td>
<td>14</td>
</tr>
<tr>
<td>Dardhishte</td>
<td>987</td>
<td>209</td>
</tr>
<tr>
<td>Lajthishte</td>
<td>921</td>
<td>208</td>
</tr>
<tr>
<td>Plemetin</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sibovc</td>
<td>1114</td>
<td>259</td>
</tr>
<tr>
<td>Shipitulle</td>
<td>91</td>
<td>25</td>
</tr>
<tr>
<td>Obiliq</td>
<td>1741</td>
<td>412</td>
</tr>
</tbody>
</table>

Participants frequently identified community meetings that would represent their village’s concerns and act as a point of contact between the project and the community as good mechanisms for ongoing consultation. In line with this expressed interest and with the Community Consultation Guidelines (see footnote 8), Community Development Forums have been established for the majority of affected communities and have had active participation from community members.

Economic Environment

Prior to the 1999 conflict, KEK was the main source of employment in the area, through its two main power stations, service provision, and facility building and maintenance. KEK is still an important employer in the municipality and owns the Ambulance, Culture House, Sports Ground, Fire Station, and other properties.

Based on the number of jobseekers registered by the municipal employment office, the unemployment rate in Obiliq is around 16%. However, this figure only rep-

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8 A complete attendance list for each meeting is available from the LPTAP project office. Specifically, the objectives of these initial meetings were to: establish a two-way dialogue; identify key issues of concern and the most appropriate methods for future consultations with these communities; identify specific issues for different community groups, especially those who may have been excluded from traditional consultation methods on the basis of ethnicity, age or gender; and discuss the key issues and potential impacts of the project.
resents those registered and is based on available population figures, which are not up to date. The real figure is likely to be higher as the majority of jobseekers do not register (2006: MESP, “Spatial Analysis of Obiliq”). Evidence suggests that the municipal figure is as high if not higher than the national average (41.4%, as reported in 2006 Report of the Statistical Office of Kosovo), and the figure differs across settlements.

Information gathered from the ten surveyed settlements showed that 21% of the population are permanently employed and 13% of those employed work for KEK. 19% of the population are housewives and 17% were unemployed. The economic base of Obiliq is sustained by the large mine. However, levels of employment and support by KEK have been reduced and the municipality has suffered economically as a result, particularly Kosovo Serbs who have been unable to resume work since the conflict. According to the household survey, alternative income generation in the area is limited. A quarter of all residents earn extra income cutting and selling wood for heating. Agricultural production for income generation is focused on a small number of settlements.

As a result of poor economic and employment opportunities in the area 23% of the surveyed population reported that they do not have enough money to buy food and 16% consider that they live a “hand to mouth” existence, which equates to living on the poverty line. A further 40% stated that they have enough food, but do not have enough income to buy clothes. There were few differences noted between the urban and rural population, the only marked difference is in the perception of income generation: 42% of the urban population believed they earn below the average income, whereas this figure is 36% for the rural population. However, the rural population is more likely to live at or near the poverty line. Incomes vary, but the highest proportion of the population (33%) earn between 101-250 Euros a month. The remaining 22% earn 251-500 Euros/month, 16% earn 51-100 Euros/month, 11% earn over 501 Euros and month and the remaining 8% earn between 30-50 Euros a month.

Health

A quarter of respondents to the community survey (26%) reported that they or other members of their households have had some “serious” health problems over the past five years with the most common illnesses being respiratory, heart and lung diseases, cancer, mental problems and diabetes. Households in Shipitulle, Grabovc i Poshtem, Palaj, Dardhishte and Hamidi were the most likely, and those in Hade the least likely to report health problems experienced by their members.

Health care facilities are divided along ethnic lines. Three health centers cover the Kosovo Serb population from the villages of Babimoc/Babin Most, Plemetina, and Palaj/Crkvena Vodica. An additional three health centers cover the Kosovo Albanian population from the villages of Breznice/Breznica, Sibovc/Sibovac and Millosheve/Milosevo. The main primary family health center in Obiliq/Obilić Municipality provides health care services for all patients from the whole population of the municipal geographical area (2005: OSCE Municipal Profile – Obiliq).

The survey noted that in the past five years, respiratory diseases were the most prevalent health issue in Hade, Palaj and Grabovc i Poshtem, all of which are in close proximity to the existing mines and Kosovo A and B sites. However, 38% of all respondents are smokers. Cancer was cited as being the most common cause of death for residents of Dardhishte and Sibovc. Twenty-six per cent of all respondents stated that they or members of their household had experienced serious health problems in the last 5 years.
The surveyed communities reported that when experiencing health problems (of any kind) 50% visited a doctor in the local medical facility, 39% were treated at a hospital and 21% received treatment from a private doctor. The reasons cited for limited access and not seeking health care were the cost of transport, mistrust of health care providers, previously received poor service and cost.

In the community forum focus groups, health care and disease were significant concerns in Hade, Lajthishte, Dardhishte, Grabovc i Poshtem, Shipitulle, Hamidi, and Palaj/Crkvena Vodica.

Land Use and Resettlement

The New Mining Field area is mainly inhabited by large families who work in agricultural enterprises or independently as subsistence farmers. Approximately 60% of the population living in the region are farmers. The production and sale of agricultural products is cited as an important source of income support by local residents. The area of interest is representative of the municipality as agriculture and forestry are the most important forms of land use, although their importance is decreasing.

The new mine will acquire approximately 13% of the territory of the Obiliq Municipality. This area, planned for mining development, is largely composed of fertile land, while the remaining parts are settlements, roads or forests (2006: MESP, “Spatial Analysis of Obiliq”).

Respondents who saw the possible need to move away from the area due to the project as a problem were the most numerous in Hamidi (43%) and Obiliq (39%) and least numerous in Dardhishte (16%). Also, Palaj/Crkvena Vodica and Hade had the greatest number of respondents who said that introduction of significant limitations on construction of new or reconstruction of old buildings related to the building of Kosovo C would be a problem (54% and 49%). Shipitulle had the least number of respondents supporting the latter opinion (12%).

Most participants in the focus groups supported the idea of resettlement, as all the villages included in the focus groups experience negative impacts from the current power plant on their lives. In this regard, the explicit request coming from the majority of focus group respondents in two settlements, Hade and the Serb community living in Crkvena Vodica, was immediate relocation of all households living in these two villages. Their request comes as a result of current pollution levels, extensive noise coming from current activities at the power plant and insecurity about the future progress of the new mine. Respondents from Grabovc i Poshtem/Lagja e Berisheve also indicated a great need for immediate action, as KEK’s excavator is operating very near their houses and the noise coming from this operation is continuous and causes frustration.

Infrastructure

Roads. Regional roads connect larger settlements and the majority are asphalted. Due to the high level of usage they constantly require maintenance. Only a small number of regional roads connect to the Municipality of Obiliq (2006: MESP, “Spatial Analysis of Obiliq”).

The local road network is good with 150 kilometers of roads connecting villages and towns throughout the municipality. However, road conditions are poor, with only 30 paved roads and the majority of these heavily potholed. Out of a total of 20 settlements in the municipality, only 8 have asphalted roads, or 40%. Outside Obiliq town, paved roads are only found near other population centers while the rest are connected by dirt and gravel roads. At least three villages are effectively cut off during periods of extended rain and heavy snow.

A further issue arose during the consultations and household surveys concerning KEK related traffic. Respondents complained that local roads are not safe to

<table>
<thead>
<tr>
<th>Box 2. Resettlement – The Case of Hade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due to potential slope failure, part of the village of Hade had to be urgently evacuated. There are 85 resettled families living in temporary accommodation in Obiliq town; others (mainly landowning non-residents) have been compensated in the form of a cash payment. There are 495 families remaining on the site who will need to be resettled before the planned mining works and safety measures can continue. Group discussions showed that the remaining residents of Hade are keen to be resettled as a group. Conditions for those still occupying the village are poor, with 26% earning significantly below average income and 21% living on less than 30 Euros a month. Environmental conditions are also a leading factor. The close proximity of the mine results in impacts from noise, particulate and safety issues related to the large trucks traveling on local roads.</td>
</tr>
</tbody>
</table>
travel on as they are frequently used by KEK transport vehicles. They considered that the condition of the roads is not suitable for this type of vehicle and the level of usage.

Public transport services by bus and mini-van are provided to 14 settlements, while 7 settlements do not have access to public transport. Where it exists, public transport service for the municipal territory is considered relatively satisfactory. The settlements with access to public transport are: Obiliq (New and Old Obiliq), Palaj, Hade, Lajthishte, Sibovc, Hamidi, Millosheve, Raskove, Bakshi, Llazareve, Breznice, Kozarice, and Shkabaj. Settlements without access to public transport are: Mazgit I, Mazgit II, Dardhishte, Shipitulle, Grabovc i Poshtem, Plemetin, Babimoc/Babin Most. (2006: MESP, “Spatial Analysis of Obiliq”).

The most frequent shortages occur during the summer season and villagers are often reluctant to drink well water for fear of contamination. Contamination is also an issue for city inhabitants due to the age of the water supply network. Well water is used in 7 settlements, or 35% of settlements. These are: Shipitulle, Grabovc i Poshtem, Sibovc, Hamidi, Kozarice, and Babimoc/Babin Most and Breznice. Water supply from wells is often of a poor standard as local groundwater can be contaminated. This applies in particular to the settlements close to KEK facilities, such as Dardhishte, Hade, Lajthishte and Hamidi. Improvements to the local water supply system are a priority for the municipality.

Community Aspirations, Attitudes and Concerns and Consultation

Initial village community meetings were held during October 2007 aimed at gathering some preliminary information about the concerns and current situation of people living and working in the New Mining Field development area. The CDF conducted focus group meetings and other meetings with affected communities in March 2008. Main findings from all these meetings in terms of most frequently mentioned issues and concerns are reported in Table 12.

Table 12. Key Issues for All Villages

<table>
<thead>
<tr>
<th>Most Frequently Mentioned Issues and Concerns</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Employment</td>
</tr>
<tr>
<td>2. Lack of infrastructure (roads, water supply, sewage system)</td>
</tr>
<tr>
<td>3. Pollution: Air, water and soil</td>
</tr>
<tr>
<td>4. Irregular electricity supply</td>
</tr>
<tr>
<td>5. Resettlement: land expropriation, compensaton, legal framework, maintaining the village as whole when resettled</td>
</tr>
</tbody>
</table>
Residents expect that the project will have a positive impact on the local economy and create employment opportunities, but many feel there will be negative impacts. In several consultations, participants expressed the viewpoint that the project was good or necessary for Kosovo as a whole, and then raised their reservations about the impact on them directly. Fifty-eight percent of all residents believe the project will have a negative impact on the environment and in Hamidi this figure rises to 77%.

There is concern that current pollution problems will increase, rendering the area uninhabitable. 23% of the Dardhishtë population strongly opposes the project and a further 27% views the project as very negative. Other issues brought up during focus group meetings include concerns that employment opportunities will not favor local workers and that they will have to put up with pollution and poor environmental conditions without gaining any benefits. In this context, residents also referred to the negative impact on their health due to emissions.

Participants in consultations also expressed frustration with the inadequate power supply and power outages. A perspective repeatedly articulated was that as residents of these villages experience most of the impact of having a power plant in their vicinity, they should at least receive regular power from it.

During consultations, residents of villages other than Hade made reference to the preference to have villages resettled as a unit and to avoid “what happened to Hade.” Participants wanted information about compensation and were concerned that compensation be paid prior to resettlement.
In considering alternative development scenarios for the proposed Kosovo C power plant and new mining field development, sector strategies and studies were reviewed in terms of energy production and demand, role of lignite and economic justification for its development.

Background

The most comprehensive forecasts of electricity demand in Kosovo are available in key publications such as the ESTAP\(^\text{\textsuperscript{10}}\) and GIS\(^\text{\textsuperscript{11}}\) studies. The forecasts from each of these sources have been used to put in context the supply/demand balance for the coming years. The Poyry study\(^\text{\textsuperscript{12}}\) represents the most recent forecast, extending to the year 2020, and prepared on the assumption of a medium growth scenario (MGS).

No final decision has been taken yet on the overall capacity of the Kosovo C TPP or on the sequence of installation. Several factors concur in singling out a final capacity of 2,000 MW as the optimum solution in view of the physical, economic and regional context. In particular, as stated in the Energy Strategy,\(^\text{\textsuperscript{13}}\) “electricity production shall be oriented towards fulfilling domestic consumption demands with stable and uninterrupted production and competing prices, as well as export of energy surpluses to regional and wider markets.” In accordance with this objective, by the year 2015 full domestic energy demand should be met, while 30-50 % of available energy could be exported, and net system capacity would be around 1800-2000 MW.

Different potential fields were considered for mining development\(^\text{\textsuperscript{14,15}}\) to serve the Kosovo A and B plants after the Bardh and Mirash Mines are exhausted and to provide lignite for the proposed Kosovo C TPP. In terms of site requirements for the new power plants, the results of the “Pre-Feasibility Studies for New Lignite Fired Power Plant and for Pollution Mitigation Measures at Kosovo B Power Plant” were also taken into consideration.\(^\text{\textsuperscript{16}}\)

The 2,000 MW final capacity is very likely to constitute the optimum option for the following reasons:

- The New Mining Field, singled out as the highest priority for development based on coal quality and overburden, contains adequate coal reserves to feed a new power plant of 2,000 MW for a period in excess of 40 years, which is the timeframe usually assumed for the life of the plant in economic and financial analyses;
- All the technical and economic indications collected to date support the viability of the proposed 2,000 MW new power plant;
- The participation of Kosovo in the Regional Electrical Energy Market in South Eastern Europe poses huge challenges to the Government in terms of adequate development of the energy sector, but at the same time offers important opportunities for a market badly in need of power, as examined in detail in the above mentioned GIS study; and
- A project on the Iber-Lepenc Hydro System aimed at proving that the Iber-Lepenc Hydro system can support the additional water demand from the new thermo power plant Kosovo C has been recently carried out, funded by the EAR. According to this report, 2,000 MW is compatible with water resources availability.
Key Assumptions

In considering alternative development scenarios for the proposed Kosovo C power plant and New Mining Field development, sector strategies were reviewed, in terms of energy production and demand, role of lignite and economic justification for its development, lack of viable local alternatives, size of the planned expansion, and other related development plans. KEK planning for clean up of mines and ash and overburden dumps, as well as future supply, was also reviewed. Based on all the studies noted above, the energy development plans include the following:

- New lignite fired power plant (Kosovo C) using modern technology;
- Up to 2,000 MW of new power generation; and
- New Mining Field development.

Alternative scenarios for development of the Kosovo C TPP were evaluated, with a view to selecting the “preferred option.” The “alternative zero” (no new power plants) was also considered. There are several key assumptions common to all the scenarios:

- Kosovo A and B are both far from achieving environmental compliance with EU standards. In particular, according to the Large Combustion Plants (LCP) Directive (2001/80/EC), existing plants must fully comply with LCP standards after December 31, 2015.

- In order to supply domestic demand, Kosovo A TPP will need to remain in operation until it can be replaced by Kosovo C (with a short overlap for reasons of energy security). It is expected that Kosovo A will undergo some rehabilitation, so that it can remain operational until 2017 with a capacity of 280 MW. Kosovo C will then allow Kosovo A units to be retired completely or used as cold reserve for seasonal peaks; any other continued use of Kosovo A would depend on further rehabilitation based on EU environmental requirements.

- Both units of Kosovo B will undergo rehabilitation (proposed schedule 2014-2016, during which time it will operate at reduced capacity), remaining in operation until 2030 with a nominal net capacity of 2x305 MW.

- The first unit of Kosovo C will begin operation in 2014, with one or two new units to be installed, one every 18 months thereafter. Initial installed capacity will be 900-1,000 MW, depending on the choice of unit size.

Proceeding from the assumption that overall capacity of the TPP will reach 2,000 MW, the principal aspects of the alternative scenarios to be compared are the following:

- Timing of power plant and New Mining Field development;
- Power plant location;
- Unit size; and
- Plant technology.

Table 13 compares the two technologies in terms of compatible sizes and efficiency, whereas Table 14 presents plant configurations and related environmental needs.

### Table 13. Technology vs Sizes and Related Efficiencies

<table>
<thead>
<tr>
<th>Technology</th>
<th>Typical Size (and Maximum) [MW]</th>
<th>Reference Plant Configuration [MW]</th>
<th>Efficiency 1 [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulverized firing (PF)</td>
<td>300-600 (950)</td>
<td>6x300</td>
<td>38</td>
</tr>
<tr>
<td>Circulating fluidized bed (CFB)</td>
<td>100-200 (300)</td>
<td>6x300</td>
<td>39</td>
</tr>
</tbody>
</table>

1 Net efficiency, taking into account self consumption. In case of PF technology, 1% has been deducted due to the necessity to operate the desulphurization plant.
Timing of Power Plant and New Mining Field Development

Two approaches were considered in reaching final capacity of 2,000 MW for Kosovo C TPP:

- **Approach A: Rapid Development.** Under this approach, units are installed in sequence, one after another (construction time about 18 months for each unit), until the final programmed capacity of the TPP is achieved. For example, assuming that 500 MW units are selected and that construction starts in 2010/2011, the first unit would be in operation by January 2014 and the final capacity of 2,000 MW would be achieved by June 30, 2018.

- **Approach B: Phased Development.** Under this approach, the first units are installed as a function of current local demand, with additional units installed (one after the other) on an as-needed basis. Again assuming that 500 MW units are selected and that construction starts in year 2010/2011, 1,000 MW capacity would be achieved by June 30, 2015, with the additional 1,000 MW to be installed as soon as it becomes apparent that the energy/power demand curve in a medium growth scenario will exceed the installed supply (this is tentatively estimated to be between 5 and 10 years from now, depending on the evolution of the local and regional power market).

The rate of development of New Mining Field, which has adequate reserves to supply a 2,000 MW plant for a period in excess of 40 years, depends on the development strategy chosen for Kosovo C TPP and will be linked to progressive phase out of the Bardh and Mirash mines. Adoption of Approach A would imply highly

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**Table 14. Technology and Sizes vs Environmental Requirements**

<table>
<thead>
<tr>
<th>Technology</th>
<th>Plant config. [MW]</th>
<th>Land occupation 1 [m²/MW]</th>
<th>Water consumption 2 [m³/h-MW]</th>
<th>Wastewater production 3 [m³/h-MW]</th>
<th>Raw Material (limestone) 4 [kg/MWh]</th>
<th>Solid Waste (ash and sludge) 5 [kg/MWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF</td>
<td>6x300</td>
<td>290</td>
<td>2.9</td>
<td>0.58</td>
<td>6</td>
<td>205</td>
</tr>
<tr>
<td></td>
<td>4x500</td>
<td>320</td>
<td>2.7</td>
<td>0.58</td>
<td>6</td>
<td>190</td>
</tr>
<tr>
<td>CFB</td>
<td>6x300</td>
<td>310</td>
<td>2.6</td>
<td>0.56</td>
<td>0</td>
<td>200</td>
</tr>
</tbody>
</table>

1 General infrastructure, lignite storage yard and (in the case of PF) desulphurization plant. No CO₂ capture facilities have been considered.
2 The small difference between PF and CFB technologies is due to the water requirements for the desulphurization plant (about 30 m³/h for a 500 MW unit). The estimate is based on the assumption of natural draft cooling towers.
3 Amounts to about 20% of consumed water and corresponds to water coming from the purge of the cooling towers, washing of the sand filters and, in the case of PF, the desulphurization plant.
4 Corresponds to material (limestone) to be introduced into the desulphurization plant for gypsum precipitation.
5 Includes about 20 kg/MWh of gypsum, produced either in the boiler (CFB) or in the desulphurization plant (PF). The small differences in waste production reflect the efficiency variations among different unit sizes and technologies.

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**Table 15. Technology and Sizes vs Emissions**

<table>
<thead>
<tr>
<th>Technology 1</th>
<th>Reference Plant Config. [MW]</th>
<th>NOₓ 2 [kg/MWh]</th>
<th>SO₂ 3 [kg/MWh]</th>
<th>CO₂ 4 [t/MWh]</th>
<th>Particulates 5 [kg/MWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF</td>
<td>6x300</td>
<td>1.0</td>
<td>0.5</td>
<td>0.92</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>4x500</td>
<td>1.0</td>
<td>0.5</td>
<td>0.85</td>
<td>0.14</td>
</tr>
<tr>
<td>CFB</td>
<td>6x300</td>
<td>1.0</td>
<td>1.0</td>
<td>0.89</td>
<td>0.14</td>
</tr>
</tbody>
</table>

1 No particular differences in terms of air emissions are recognized for the various technologies. Both PF and CFB require ash removal equipment and do not need a De-NOₓ plant. Wet flue gas desulphurization (FGD) equipment is required for PF technology and it implies lower emissions. No CO₂ capture equipment has been considered.
2 Based on a concentration of NOₓ of 200 mg/Nm³ in flue gases.
3 Based on a concentration of SO₂ of 200 mg/Nm³ for CFB and of 100 mg/Nm³ for PF.
4 Based on the following lignite characteristics: C content of 22% and 1,980 kcal/kg.
5 Based on a concentration of particulates of 30 mg/Nm³ in flue gases.
accelerated development of the mine, which would have to be capable of producing about 20 million tons/year of lignite by 2019. Major efforts would be required in operational organization and equipment purchase in order to achieve such a goal.

Map 3 shows indicative mine development lines in 2023 and 2033 under the phased Approach B.

Power Plant Location

Requirements for plant sites include the following:

- Unoccupied free land or able to be easily vacated, preferably zoned for industrial activity;
- Relatively flat topography;
- Reasonable soil conditions, no seismic faults nearby, not prone to flooding;
- Downwind from population centers and no large population centers in immediate vicinity;
- No natural parks, wildlife and archaeological sites nearby;
- Not highly visible; and
- Satisfactory economic evaluation.

A prefeasibility study in 2006 initially identified three sites: Kosovo B, Bivolak and Grabovc i Poshtem. In early 2007, another potential site next to Kosovo A TPP was added, replacing Grabovc i Poshtem, which had been found unsuitable. From a technical point of view (morphology, foundation, distance from existing facilities, etc.) the three sites, which are separated by only a few kilometers, are quite similar. As noted in the 2007 Poyry study, however, they have very different environmental and social characteristics. The final choice of location will thus depend on these considerations (see section on “Comparison of alternative scenarios”).

Unit Size

Different sizes of individual units were considered—125, 300, 500 and 750 MW. The smallest unit size of 125 MW was eliminated from consideration because it does not meet the high efficiency standards required to minimize carbon dioxide or other emissions. In addition, such units occupy larger areas per MW installed and have higher unit costs than larger ones.

In principle, the largest possible size is the most efficient. However, other factors influence the decision, in particular, the characteristics of the transmission network and the selected plant technology. In the present case, the existing network cannot support units any larger than 500 MW, in order not to lose synchronicity on the grid in case of transmission line loss. With regard to plant technology, the choice of CFB technology (see below) would mean a unit size of 300 MW.

The final unit size will therefore be either 300 or 500 MW and will depend on the technology chosen.

Plant Technology

Different technologies are potentially applicable for the power plant. Their adoption must take into account, among others, the size of the individual units (see above).

With respect to the technology to be adopted in the plant, in accordance with the Poyry study, the most probable concept is 4x500 MW net PF plant with an efficiency of 42%. As an alternative, a similar plant applying CFB might be adopted, with slightly lower ef-

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17 “Pre-feasibility Studies for New Lignite Fired Power Plant and for Pollution Mitigation Measures at Kosovo B Power Plant – Lot 1, New TPP;” Electrowatt/Ekono, on behalf of EAR, February 2006.
Map 4. Location of future facilities and new mine development stages

- **Settlements**
- **Residential area**
- **Main road**
- **Railways**
- **New TPP sitting alternatives**
- **New TPP area of impact**
- **KEK mining license**
- **New mining area boundary**
- **Mine position at given year**
- **Mine position until:**
  - 2013
  - 2017 Phased
  - 2017 Rapid
  - 2023
  - 2033
  - beyond 2033

**New mine development**

- **New TPP alternative site:**
  - Near village Bivolak
  - New mining area
  - Near TPP Kosovo B
  - Near TPP Kosovo A

**TPP Kosovo A**
- Overburden dump
- Ash dump

**TPP Kosovo B**
- Overburden dump
- Ash dump

**Sites:**
- Zhilivode
- Drenica
- Sitnica
- Hade
- Palaj
- Obiliq
- Sibovc
- Mazgit
- Hamidi
- Lismir
- Bivolak
- Plemetin
- Nakarade
- Zhilivode
- Shipitullë
- Lajthishtë
- Dardhishtë
- Graboc i Epërm
- Graboc i Poshtem
- Fushe Kosove
- Peje
- Prishtine
- Prizren
- Ferizaj
- Mitrovice
- Gjilan
- Gjakove

**Year Ranges:**
- 2013
- 2017
- 2023
- 2033
- beyond 2033
ficiency. However, the largest CFB lignite fired boiler currently in operation has a capacity of 300 MW, thus the applicability of such technology to larger units has not yet been tested.

Environmental and Social Aspects of TPP Development

Two alternatives are considered: no development (alternative zero) or development of Kosovo C (2,000 MW). Two different time sequences are reviewed: short term (2023), when the first unit of Kosovo C will come on line and Kosovo A will have shut down) and long term (2033, when Kosovo C will be fully operational at 2,000 MW, and Kosovo A and B will have shut down), both assuming a phased development.

These scenarios take into account an area dedicated to CO2 capture (see Map 4) and therefore represent the worst case in terms of occupied area (the final layout may or may not include such areas).

The alternative zero is theoretical: in such a case, huge quantities of energy would need to be imported from other countries and the corresponding impacts would begin at the border. Furthermore, the country's economics would be heavily impacted by the need for large expenditures to cover energy imports. This option is thus provided as a touchstone to identify impacts.

There are a number of issues that can affect the project, irrespective of the chosen development option and specific variables (timing of plant and new mine development, location of plants, size of units, plant technology). These should be considered in project design and implementation:

- Kosovo would be energy self sufficient and possibly an electricity exporter;
- Higher total lignite consumption (but lower specific consumption);
- Higher total water consumption (but lower specific consumption);

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Present 2008</th>
<th>Future - Alternative zero 2023</th>
<th>Future - Kosovo C (2,000 MW) 2033</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed capacity [MW] (1)</td>
<td>860</td>
<td>903</td>
<td>2,153</td>
</tr>
<tr>
<td>Electricity production [GWh]</td>
<td>4,385</td>
<td>3,871</td>
<td>13,127</td>
</tr>
<tr>
<td>Electricity Demand [GWh]</td>
<td>4,874</td>
<td>6,566</td>
<td>6,566</td>
</tr>
<tr>
<td>Electricity Surplus [GWh] (2)</td>
<td>-489</td>
<td>-2,695</td>
<td>6,561</td>
</tr>
<tr>
<td>Lignite consumption [Mt/y]</td>
<td>6.4</td>
<td>4.9</td>
<td>15.0</td>
</tr>
<tr>
<td>Water consumption [Mm3/y] (3)</td>
<td>13.4</td>
<td>9.4</td>
<td>31.0</td>
</tr>
<tr>
<td>Occupied land [ha] (4)</td>
<td>2,923</td>
<td>396</td>
<td>756</td>
</tr>
<tr>
<td>Particulate emissions [Mt/y]</td>
<td>7.8</td>
<td>1.7</td>
<td>3.7</td>
</tr>
<tr>
<td>NOx emissions [Mt/y]</td>
<td>20.3</td>
<td>7.0</td>
<td>20.5</td>
</tr>
<tr>
<td>SO2 emissions [Mt/y] (5)</td>
<td>13.8</td>
<td>11.4</td>
<td>24.9</td>
</tr>
<tr>
<td>CO2 emission (Mt/y)</td>
<td>5.2</td>
<td>3.9</td>
<td>12.1</td>
</tr>
<tr>
<td>Waste production (ash and sludge) [Mt/y]</td>
<td>1.2</td>
<td>1.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Waste water production [m3/y*10^3] (6)</td>
<td>9.500</td>
<td>6,511</td>
<td>7,614</td>
</tr>
</tbody>
</table>

Note: the following assumptions have been made:

- Hydropower plant Zhur (future): 293 MW
- TPP B load factor for alternative zero: 0.65; Zhur load factor for alternative zero: 0.155; medium growth scenario (MGS)
- Water consumption has been estimated considering a specific consumption of 2.4 m3/MW
- Occupied land = land occupied by plants and mines (industrial areas) + overburden dumps + ash dumps – reclaimed land
- SO2 concentration in emission of B rehabilitated 400mg/nm3
- Waste water from Power plants
Soil remediation and final reclamation of mining area;

- Lower total atmospheric emissions (NO\textsubscript{x}, SO\textsubscript{2}, particulates);
- Higher total CO\textsubscript{2} emissions (but lower specific CO\textsubscript{2} emissions);
- Lower wastewater production;
- Higher total waste production (ash and sludge) production;
- Hydraulic ash transport system to be implemented with minimal environmental impact;
- Improvement/modification of existing infrastructures (for example, Iber canal, electric grid, roads, etc.);
- Skilled/trained available local labor;
- People/villages to be resettled;
- Conflict between communities; and
- Conflict between local communities and the project.

Table 16 presents a comparison between the present situation (2008), alternative zero (in 2023 and 2033) and the proposed development (in 2023 and 2033), assuming phased development is selected. The numbers presented in the table are purely indicative; a precise estimate will be available only after the final project is designed.

**Environmental Impacts.** The main anticipated issue is connected to water availability and water balances. Another important impact is the increase of CO\textsubscript{2} emissions. At present, the project foresees plants for CO\textsubscript{2} capture; should the final design differ from this, other alternatives would need to be investigated.

**Socio-economic Impacts.** There is no available quantitative data relating to the positive and negative aspects of each project option, therefore, the above table does not include figures for the socio-economic issues. The development project will result in resettlement. As noted in the social baseline section, local communities are willing to be resettled but would prefer to be moved in one phase or at least over a short period of time. The prospect of being resettled in 2033, for example, means for many of them that it is difficult to plan for their future and a number of residents have said that they would move anyway before the proposed date for development. Uncertainty or a protracted period of “planning blight” is likely to exacerbate impacts on communities.

Findings from the consultations and the households survey suggest that the preferred option is to develop Kosovo C; in particular, residents surveyed and consulted believe that the current situation, living near to the existing power plants and mine, is either bad or intolerable (alternative zero). The communities of Hade, Lajthishte and Grabovci Poshtem/Lagje e Berisheve would like to be resettled immediately as they believe that the pollution of air and soil is having a negative impact on their health and agricultural production. As to site options, little difference was noted. Further, since the existing Kosovo A and B do not meet current required EU emission standards, any development that cleans up the existing plants and leads to a new and cleaner plant will have a positive impact. Additionally, all communities consulted believe that the construction and establishment of Kosovo C will bring a number of benefits to them. These include: improved health, cleaner air and employment opportunities.
Impacts related to Significant Variables Common to all Scenarios

As previously detailed, the following aspects may influence choices relevant to the implementation of the new TPP:

- Timing of power plants and associated New Mining Field development;
- Location of the power plants; and
- Size of the units and plant technology.

New Lignite Mine Development and Timing of Power Plants

The development of the mine is linked to the TPP development strategy and coal demand in the existing plants; the additional impact identified, independent of the chosen alternative, is related to the required acquisition of 86% of Obiliq territory, an area of mostly fertile land, for the development of the New Mining Field. During community consultation the lack of fertile land was raised as an issue, however, most residents reported that they were not planning on extending current land ownership by purchasing additional land.

Rapid development is associated with the following potential advantages:

- Significantly improving the currently unfavorable trade balance through electricity export to neighboring countries;
- Cost savings by building the whole plant without having to dismantle the construction organization and completing construction in a shorter time. This would also reduce environmental impacts related to construction activities; and
- Faster employment increase.

On the other hand, the rapid strategy has the following potential disadvantages:

- Accelerated need to organize resettlement and hence
- Accelerated need for financial and economic resources; and
- Accelerated need to identify appropriate solution to issues of access to water resources.

Phased development has the following potential advantages:

- Extended timeframe for funding requirements, with a consequent increase in number of potential private investors;
- Reduction of financial risks, due to ability to adjust timing of installation in response to evolution in electricity market; and
- Possibility to install the second 1,000 MW phase on the site of Kosovo A (which will be out of operation after 2017).

On the other hand, phased development has the following potential disadvantages:

- Need to dismantle construction organization between the two 1,000 MW phases; hence
- Major construction phase impact (longer total construction phase).

Rapid development would reduce the time communities are disrupted by construction impacts (traffic, noise etc) and limit the time between closure of Kosovo A and opening of Kosovo C. This would contribute to limiting further environmental pollution impacts from the plants on local settlements. However, the need for rapid resettlement resulting from this option would exacerbate the current impacts.

The phased development option would increase the disruption to local communities caused by construction and lessen employment levels over the near term. On the other hand, this approach would allow for appropriate levels of forward planning for resettlement of affected communities, including adequate consultation and allocation of alternative accommodation. A care-
fully planned schedule may assist in lowering the impact significance of resettlement on affected communities.

**Size of Units and Plant Technology**

**Size and Technology.** A comparison of different plant technologies (PF or CFB) has been already presented, in terms of efficiency and applicable unit size. In summary the advantages associated with different unit sizes are the following:

- **300 MW:** higher operating flexibility; possibility to use CFB technology and as a consequence avoid large wet desulphurization units (DeSOx); no need for limestone; impacts from lengthy construction phase (for larger space requirements) avoided;

- **500 MW:** more efficient technologies applicable; lower greenhouse gases emissions; supercritical steam production applicable; all units required (to reach 2,000 MW) would fit in a smaller site.

The disadvantages associated with different unit sizes are the following:

- **300 MW:** lower efficiency and as a consequence higher greenhouse gases emissions; more units required (to reach 2,000 MW), larger land take required;

- **500 MW:** lower operating flexibility, need for DeSOx equipment and, as a consequence, major raw material need (limestone) and major waste production (gypsum).

**Cooling System.** There are two options for the cooling system: wet and dry cooling towers. Dry cooling towers, i.e., a cooling system utilizing air instead of water, could drastically reduce water consumption and avoid the need for a pond at the Kosovo C power station. Dry cooling towers are very expensive, however, and significantly increase unit energy consumption and decrease net efficiency. In addition, they occupy larger areas for lower net cooling: condenser pressure is higher and overall efficiency of the power plant is decreased, with higher greenhouse gas emissions.

**Comparison of Alternative Scenarios (Site Location)**

This section refers only to the variables that have an influence on site selection; the parameters analyzed elsewhere are considered not linked to the selection of the site and are therefore not considered here.

Moreover, the social analysis of the potential impacts on affected communities does not lend itself to strict parameters and indicators of significance using a quantitative approach. The majority of the information we have gained from communities is largely subjective and these impacts cannot be directly linked or “de-linked” with the project without further specific assessment. There are two main issues that are having and will continue to have an impact on local communities and these are land acquisition and resettlement and air and noise pollution, which are discussed in detail in other parts of the report. These depend mainly on mining development rather than on power plants location.

The most important environmental and socio-economic parameters/ indicators impacted directly by site selection (and therefore relevant for the comparison of the three different scenarios identified in terms of site location) are:

- Climate and air quality: population downwind of the future power plants;

- Geology: type of soil;

- Morphology: hilly or flat site;

- Quality of groundwater and soil (a contaminated soil is preferred provided that soil is reclaimed before power plant construction);

- Land use: occupation of greenfield or brownfield (brownfield is preferred);

- Surface water reserves: distance from areas at risk of flooding;

- Noise: number of houses less than 1,000 m from the boundary of the power plants (and within 200 m of the belt conveyors);
Landscape – visual impact: distance from nearest village;

Natural and protected areas: vicinity of protected areas;

Flora and fauna: number/quality of impacted species;

Natural resources: distance from lignite mine;

Electric line: vicinity of 400 kV switchyard;

Land ownership: proportion of KEK and privately owned land;

Belt conveyors: existing or new required; and

Connections (railways, roads, water canal): existing or new required.

The SESA has assigned a different weight in terms of significance of the impact to each parameter/indicator, taking into account the area of impact (impacting large or small area and many or few people/households) and the impacted resources (protected/rare or renewable). The relevant environmental and socio-economic parameters/indicators are identified above. Maps 4, 5 and 6 present respectively the three alternative sites and some relevant details:

- Approximate number of houses downwind (considering the prevailing wind direction and a buffer zone of 1 km);
- Flooding area; and
- Approximate number of houses within 1,000 m (buffer zone) from the power plants (and 100 m from belt conveyors).

In terms of limiting factors:

- Kosovo A contains old structures to be dismantled and has several uncertainties regarding environmental liabilities (extensive phenol contamination) due to past operations;
- Kosovo B has a huge ash dump to be removed from the potential location, and the site is inside the area of flooding risk from Sitnica River.

The utilization of the old gasification and fertilizer plant areas for the development of Kosovo C power plants would allow the safe dismantling of old contaminated equipment and cleaning up the soil and the area during the construction of the power plants. Personnel from the Kosovo C power plant would perform monitoring of possible soil contamination and control potential remediation activities.

Should phased development be chosen, the last units for Kosovo C could be constructed on the site of Kosovo A after proper decommissioning of existing facilities and soil reclamation. This would allow a reduction in overall land occupation as reclaimed land from the old gasification and fertilizer plant area could be used to install the last units of Kosovo C. At least a portion of the noisy equipment would be further away from Plemetin. On the other hand, this solution would increase the impacts on inhabitants of Obiliq.

The relevant environmental and socio-economic parameters/indicators identified and evaluated are presented in summary in Table 17, in order to compare the likely levels of impact. Given the assumptions and estimates presented in the SESA, the “preferred option” (in terms of site location) would be to build the new power plants close to the existing Kosovo A plant, although the score for the alternative site near Kosovo B is very close. The site at Bivolak should be excluded.
Map 5. Downwind receptors at three alternative sites for new TPP Kosovo C

Number of potential receptors
Inside 1km buffer: 338
Inside downwind area: 140

Number of potential receptors
Inside 1km buffer: 330
Inside downwind area: 0

Number of potential receptors
Inside 1km buffer: 906
Inside downwind area: 31

Settlements
Residential area
Main road
Railways
Receptors
KEK mining license
New mining area boundary
<table>
<thead>
<tr>
<th>Indicator</th>
<th>TPP C close to TPP A</th>
<th>TPP C close to TPP B</th>
<th>TPP C close to Bivolak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate and air quality: approximate number of houses downwind of the future power plant (considering the prevailing wind direction and a buffer zone of 1 km)</td>
<td>31 (see Map 5)</td>
<td>0 (see Map 5)</td>
<td>140 (see Map 5)</td>
</tr>
<tr>
<td>Geology: type of soil (terrain foundation)</td>
<td>Alluvium</td>
<td>Alluvium</td>
<td>Lignite and alluvium</td>
</tr>
<tr>
<td>Seismicity</td>
<td>Same seismic conditions in the three sites (additional geophysics study for micro seismic conditions required)</td>
<td>Same seismic conditions in the three sites (additional geophysics study for micro seismic conditions required)</td>
<td>Same seismic conditions in the three sites (additional geophysics study for micro seismic conditions required)</td>
</tr>
<tr>
<td>Morphology: hilly or flat site</td>
<td>Flat, no significant change in visual aspect</td>
<td>Flat, no significant change in visual aspect</td>
<td>Undulating hilly, significant change in visual aspect</td>
</tr>
<tr>
<td>Quality of groundwater and soil (potential pollution)</td>
<td>Old structures to be dismantled; uncertainties regarding environmental liabilities (extensive phenol contamination)</td>
<td>Presence of a huge ash dump, to be removed</td>
<td>The green area is probably clean</td>
</tr>
<tr>
<td>Land use: occupation of greenfield or brownfield</td>
<td>Industrial site</td>
<td>Industrial site</td>
<td>Agricultural site</td>
</tr>
<tr>
<td>Surface water reserves: distance from Sitnica River flood risk area</td>
<td>Site outside flood risk area</td>
<td>Site inside flood risk area</td>
<td>Small part of layout inside flood risk area</td>
</tr>
<tr>
<td>Noise: approximate number of houses within 1,000 m (buffer zone) from power plants (and 100 m from belt conveyors)</td>
<td>906</td>
<td>330</td>
<td>338</td>
</tr>
<tr>
<td>Landscape – visual impact: distance between center of power plant and center of nearest village</td>
<td>About 1,700 m from Obiliq</td>
<td>About 1,400 m from Obiliq and about 1,700 m from Plemetin</td>
<td>About 700 m from Bivolak</td>
</tr>
<tr>
<td>Natural and protected areas: vicinity of protected areas</td>
<td>No natural or protected area present in area of interest</td>
<td>No natural or protected area present in area of interest</td>
<td>No natural or protected area present in area of interest</td>
</tr>
<tr>
<td>Flora and fauna: number/quality of impacted species</td>
<td>No particular species will be impacted by the project</td>
<td>No particular species will be impacted by the project</td>
<td>No particular species will be impacted by the project. Nevertheless since the site is a greenfield, some disturbance of existing vegetation and fauna probable</td>
</tr>
<tr>
<td>Natural resources: distance from lignite mine</td>
<td>About 5 km from Sibovc SW</td>
<td>About 4 km from Sibovc SW</td>
<td>About 5 km from Sibovc SW</td>
</tr>
<tr>
<td>Electric line: vicinity of 400 kV switchyard</td>
<td>400 kV switchyard located ca 2 km from site</td>
<td>400 kV switchyard located less than 1 km to NE of site</td>
<td>Site is 3 km from switchyard</td>
</tr>
<tr>
<td>Land ownership: KEK owned or private</td>
<td>KEK owned</td>
<td>KEK owned</td>
<td>Private ownership</td>
</tr>
<tr>
<td>Belt conveyors: existing or new required</td>
<td>A double conveyor belt from Bardh/Mirash mines is already in place</td>
<td>A double conveyor belt from Bardh/Mirash mines is already in place</td>
<td>A new belt would be required</td>
</tr>
<tr>
<td>Connections (railways, roads, water canal): existing or new required</td>
<td>Existing good rail and road connection. Site next to Iber-Lepenc canal</td>
<td>Existing good rail and road connection. Site is 1 km from Iber-Lepenc canal and existing connection to canal already available</td>
<td>A new 5-6 km access road with bridge would be required. Iber-Lepenc canal should be extended about 3 km</td>
</tr>
<tr>
<td>Land acquisition and resettlement of communities</td>
<td>Little difference noted for different sites (a part of Obiliq village very close to the site)</td>
<td>Little difference noted for different sites (a part of Plemetin village very close to the site)</td>
<td>Little difference noted for the different sites</td>
</tr>
<tr>
<td>Employment and labor rationalization</td>
<td>Employment opportunities and rationalization will be same independent on site selection</td>
<td>Employment opportunities and rationalization will be same independent of site selection</td>
<td>Employment opportunities and rationalization will be same independent of site selection</td>
</tr>
</tbody>
</table>
The following paragraphs, which follow those in the Baseline section, discuss anticipated environmental and social impacts of the proposed development plans. Impacts focus on the area of mine development but take into consideration the interactions of various activities in nearby areas. Map 3 presents the area of impacts with the location of present and future facilities, including the three potential sites for power plant development.

Environmental Impacts

Air

Air Emissions. Emissions from the new plant will depend on the choice of technology and size of the units, which are still under design, although in general, new power plants, which have higher conversion efficiency, are able to reduce specific emissions (emissions per unit of electrical energy production).

Emissions of NOx, SO2, and particulates will increase slightly in the two to three years, due to the overlapping period in which both Kosovo C and A are in operation, then they will be reduced as soon as the first Kosovo C unit will be put into operation and, as a consequence, the production from Kosovo A, the most impacting power plant, will be reduced and then closed.

The situation could sooner be improved with some intervention on Kosovo A and B power plants.

Particulate emissions from the plants (as already presented in Table 16) will be 2.8 Mt/y, compared to the present value which is about 7.8 Mt/y; NOx emissions will be also slightly reduced from 20.3 Mt/y to 19.1 Mt/y, while SO2 could increase from the present 13.8 Mt/y to 19.1 Mt/y.

Table 16 shows the anticipated increase in CO2 emissions from the present value of about 5.2 Mt/y to about 17.1 Mt/y, when 2,000 MW will be installed. The table shows also that the specific emission will drop from about 1.2 t/MWh to 0.9 t/MWh.

Climate and Air Quality. Local climate conditions influence the impacts of the development, mainly in terms of wind direction (downwind areas are more affected by air emissions). When Kosovo C is fully operational, the air quality will improve (due to the fact that the new power plant will comply with the LCP Directive and the existing plants will be shut down). A detailed air quality monitoring system would also be put in place, allowing identification of hot spots and necessary mitigation measures.

Soil and Groundwater

Degraded Land, Sources of Soil and Groundwater Contamination. The proposed new power plants, new mining development areas and connected infrastructure will require additional land. Nevertheless, areas currently occupied by ash and overburden dumps would be reclaimed. As already presented in Table 16, occupied land would decrease from the existing 2,900 ha to approximately 800 in 2033. Moreover, a large residual pit of about 5 km² will remain in the northern part of the New Mining Field. In the long term (about 40-50 years from now), this pit could be developed as a recreational lake, surrounded by a greenbelt, located within easy reach of Prishtina.

Current and past operations have had an important role as sources of soil and groundwater contamination. When Kosovo C is fully operational, existing facilities will be shut down, allowing the areas they occupy to
be better investigated, cleaned up as necessary and reclaimed.

Modern technologies, which will be adopted for Kosovo C and new mining development, comply with legislative standards and best practices; therefore, the quality of soil and groundwater is not anticipated to be significantly affected by their operation. Deposition of air pollutants should also improve in future, since particulate emissions will sharply decrease, as noted above.

**Geology, Hydrogeology and Quality of Groundwater and Soil.** The proposed new plants and mining development will not have an impact on the hydrogeology of the area, since it is anticipated that the water supply for the new power plants will come from surface water resources and/or canals. As noted above, the areas of the existing plants will then be shut down, which will them to be cleaned up (as necessary) and reclaimed.

**Surface Water and Wastewater**

**Raw Water Consumption and Generation of Wastewater.** Raw water consumption from the Kosovo C TPP will be around 47.93 Mm³ per year. Specific consumption (consumption per unit of generated energy), will improve when Kosovo C is fully operational (2,000 MW) thanks to more modern and efficient technology. Raw water will be taken from Iber-Lepenc Hydro system. A monitoring system will need to be in place to measure water take.

Kosovo C wastewater production will decrease, passing from the present 9.5 Mm³/y to about 7.4 Mm³/y (as noted in Table 16), as a result of recycling and utilization of wastewater for hydraulic ash transport. Kosovo C will need to be fitted with an adequate water treatment plant (WWTP) that collects all polluted streams from the power plant (boiler blow down, oily waters, cooling tower blow down, demineralization effluent etc). Therefore, a significant improvement is anticipated at the discharge point in the Sitnica River. A monitoring system will be needed to measure wastewater quality.

**Surface Water Reserves and Quality of River Water.** The new plant will require additional water, which will be taken from the Iber-Lepenc Hydro system. The total projected future demand from the Iber-Lepenc system for 2016 anticipates an increase in domestic water users and a total area of 10,000 ha to be irrigated, as reported in the EAR water supply study (see Table 18 and Figure 4 below).
to the current situation. The high WEI indicates that conflicting demands from various water users on the system will increase. These are rated as likely to emerge in the medium term (5-10 years) and very likely to emerge in the longer term. Since potable water supply and environmental flows have priority use, the sectors most likely to be competing for water use will be the industrial sector, including Kosovo C TPP, and irrigated agriculture. Emphasis should therefore be placed on development of a comprehensive policy, institutional and planning framework for water resource management in the Iber-Lepenc system. The EAR report concluded that the Iber-Lepenc system can supply the planned development, provided that:

- The main canal is repaired, so as to reduce its losses to 25%. If current estimated losses (50%) remain unchanged, the system will be able to supply enough water to all users, but the annual inflow to the main lake will have to be greater than 271 million m³, otherwise the lake will empty. During the 1948-1972 period, the annual rainfall was lower than this value only twice, in 1950 and 1956;

- A buffer basin is built at the end of the main canal, with a capacity corresponding to 10 days of average consumption for Kosovo C and B (approximately 1,750,000 m³) in order to ensure a regular and permanent supply, even in emergency cases, and to enable necessary repairs to be made to the main canal;

- Water compensation in the secondary reservoir is determined accurately;

- The weather does not change drastically and average rainfall does not decrease dramatically (below the worst year – 1950).

Provided these measures are undertaken and competing demands are managed within a comprehensive framework, the conclusion of the EAR report, that the Iber-Lepenc hydro system will be able to supply water to the Kosovo C power plant in 2016, remains valid.

Concerns about water resources availability were also raised by a World Bank technical mission that took place in March 2008, aimed at assessing water resource issues related to the proposed new Kosovo C power plant and to contribute to the SESA. The main findings of the mission with regard to the water issues were as follows:

- The EAR report does not take into consideration current and planned additional use of water resource for Prishtina water supply by the Prishtina Regional Water Company (around 1 m³/s to reduce water shortage to Prishtina Municipality);

- The study includes two different scenarios for agricultural irrigation developments, i.e. 5,000 and 10,000 ha, a figure much lower than the reference value of 20,000 ha at the time of canal construction. The Ministry of Agriculture, Forestry and Rural Development foresees bringing 18,000 ha under irrigation (with water from the canal) to further develop the agriculture sector in the medium (5-10 years) to long term;

- Competing water demands are likely to emerge in the medium term (5-10 years) and very likely to occur in the longer term; and

- Institutional settings and water strategy development as specified in the Kosovo Water Law (Law No, 2004/24) are in early stages considering that to date no water management plan or river basin management plan has been prepared. As a result, there is limited oversight regarding the availability of water resources in the Iber-Lepenc system, no clear policy for strategic allocation of water to various sectors or issuance of long-term water usage agreements, and no mechanism for resolution of competing water demands.
In conclusion, a number of steps are recommended to ensure the long-term reliability and sustainability of water supply to the Kosovo C TPP and water resources in the Iber-Lepenc system overall. Key steps include:

- Allocating funds to rehabilitation of the Iber-Lepenc canal;
- Developing a river basin management plan for the Iber-Lepenc system along the guidelines specified in the EU Water Framework Directive;
- Development of water infrastructure investment plans and feasibility studies for the Iber-Lepenc system, identified in the river basin management plan.
- Revising the water legal framework to allow for long-term water usage rights for industrial water users and mechanisms for addressing competing water demands; and
- Developing a policy framework and criteria to guide strategic allocation of water resources to various water using sectors with competing water demands.

In addition, based on a more thorough assessment conducted within the framework of a river basin management plan, greater use might be made of more water efficient technologies in Kosovo C, such as a dry cooling tower system, in order to reduce water consumption from the Iber-Lepenc system, making it more available to other uses.

**Water Quality.** Contamination of rivers and streams is high all over the project sites. Modern technologies, which will be adopted for Kosovo C and new mining development, will comply with legislative standards and best practices. In particular, the new plant will monitor and treat wastewaters prior to discharge into rivers. Water quality should therefore improve.

**Noise**

**Noise Emissions.** The planned project would be developed according to legislation in force (all equipment will comply with noise standards and guidelines) and the power plant and mines will be located as far as possible from villages; should the future situation become intolerable, people would be resettled. The houses most affected are those located within 1.000 m from the power plants and 100 m from the belt conveyors. Monitoring activities will be carried out to identify hot spots, mitigate impacts as necessary and verify compliance with applicable standards, both for workers and residents.

**Noise Emissions.** In future, receptors closer to the mines and belt conveyors and to the power plants will be exposed to continuous noise levels. Good equipment design, monitoring before and during project implementation, and use of natural or artificial barriers will need to be adopted for Kosovo C and new mining development, and the development will need to comply with legislative standards and best practices.

**Solid Waste**

**Production of Ashes, Industrial and Municipal Waste.** Waste production in terms of ashes and sludge, when Kosovo C is fully operational (2,000 MW), will increase, passing from the present 1 Mt/y to about 3.2 Mt/y (see Table 16). However, ashes produced by Kosovo C will be used to fill exploited parts of the new mine and will contribute to land reclamation at the end of mine development.

Under Kosovo C, measures will be taken to collect and manage industrial wastes according to best practices as applicable (specific procedures to be defined). Hazardous materials and potentially hazardous waste from the power plant (such as transformer oil, batteries, cables, insulation, chemicals and chemical packaging) will be stored in adequate conditions. Asbestos will not be used in Kosovo C power plants or connected facilities.

Household waste generation will not be impacted by the project. No new landfills are foreseen in the area of interest.
Natural Environment

Impact on Natural Habitats and Landscape Visual Impact. The area in which the development is planned has no special value in terms of natural environment.

Future plans for the area of existing mines, ash dumps and overburden dumps include reclamation and revegetation, which will improve the visual impact of the area of interest.

On the other hand, new power plant units will be built (with a visual impact for neighboring villages) and the New Mining Field will be opened. That said, it is planned that the new mine will be reclaimed in a phased process.

Natural and Protected Areas, Flora and Fauna, Land Use. The project will not interfere with any natural or protected area or with endangered species. The percentage of natural areas in the area of interest will significantly grow after the project, following reclamation.

Social Impacts

Table 19 summarizes the key impacts and areas of concern identified during the SESA process via the community survey, consultation meetings and the meetings of the Community Development Forums. In addition to the issues presented in the table, concerns were also raised about the performance of the current management team of KEK in terms of the relationship between the mine and surrounding communities. There are expectations that this relationship will improve in the future.

Table 19. High Impact Issues (based on Village Surveys and Community Forum Meetings)

<table>
<thead>
<tr>
<th>IMPACT ISSUE</th>
<th>EXTENT OF IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment Opportunities Associated with Development of the Mine and current levels of unemployment</td>
<td>All Communities</td>
</tr>
<tr>
<td>Resettlement of Communities</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Air Pollution/Particulate</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Health Status/Access to Facilities</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Public Transport</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Water Pollution</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Soil Pollution</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Waste Management</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Roads</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Sewerage</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Water Supply</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Compensation</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Power Supply</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Participation in the Project</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Special Status due to Previous Impacts</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Quality of/Access to Agricultural Land</td>
<td>Majority of Communities</td>
</tr>
<tr>
<td>Social Infrastructure (schools, youth facilities, etc)</td>
<td>Majority of Communities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IMPACT ISSUE</th>
<th>EXTENT OF IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dardhishte</td>
</tr>
<tr>
<td></td>
<td>Grabovc i Poshtem</td>
</tr>
<tr>
<td></td>
<td>Hade</td>
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<tr>
<td></td>
<td>Lajhishte</td>
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<tr>
<td></td>
<td>Shipitulle</td>
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<td></td>
<td>Hamidi</td>
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<td></td>
<td>Crkvena Vodica</td>
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<tr>
<td></td>
<td>Palaj/Mirash</td>
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<tr>
<td></td>
<td>Dardhishte</td>
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<tr>
<td></td>
<td>Grabovc i Poshtem (including illegal sites)</td>
</tr>
<tr>
<td></td>
<td>Dardhishte</td>
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<tr>
<td></td>
<td>Lajhishte</td>
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<tr>
<td></td>
<td>Dardhishte</td>
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<td></td>
<td>Crkvena Vodica</td>
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<td>Palaj/Mirash</td>
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<td>Dardhishte</td>
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<td>Dardhishte</td>
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<td>Hamidi</td>
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<td>Grabovc i Poshtem</td>
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<td>Grabovc i Poshtem</td>
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<td>Grabovc i Poshtem</td>
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<td>Shipitulle</td>
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<td>Plemetin</td>
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<td>Grabovc i Poshtem</td>
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<td>Plemetin</td>
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<td>Hamidi</td>
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<td>Grabovc i Poshtem</td>
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<td></td>
<td>Shipitulle</td>
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<td></td>
<td>Plemetin</td>
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<tr>
<td></td>
<td>Hamidi</td>
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</tbody>
</table>
Economic Environment

The impacts of land acquisition involve much more than the loss of housing. In the first place, given that the affected areas are largely rural, it could result in a significant loss of livelihoods. The results of the consultations suggest that there are high levels of unemployment and under-employment in the area; this means that people depend on their farmland for a significant part of their subsistence and cash income. This makes resettlement particularly difficult, since international standards require affected families to be compensated for the loss of their livelihoods and/or subsistence. In addition the land take for the mines and power plant may affect some small businesses and result in people losing employment.

There are very high expectations related to employment issues among the affected communities. This is seen as an important aspect of the project and underpins the positive views of the project in many of the communities. It will be important that current channels of communication are maintained and that information on significant topics, such as the likely levels of employment for local people, is communicated clearly and in sufficient time. The Community Development Forum could fulfill a valuable role in this process.

Regarding employment, the number of people employed in mining activities will decrease (due to modernization of technology), but at least until 2017 this will be more than compensated by the increase in people employed in the new power plants and in induced activities. Currently the Mirash and Bardh mines employ some 3,420 persons. This level of employment is high by world standards; if a private sector company manages the future mines, the employment level will likely be significantly lower. The predictions for the level of employment, assuming a phased development, are as follows:

- Production rising to 21 Mt/year: 2,700 (by 2025);
- Production at 9 Mt/year: 1,420 (by 2015).

These estimates are still higher than what would be expected from an internationally competitive mine; the decrease in jobs in the medium to long term thus may be greater than anticipated. It is likely that these fewer jobs would be better paid given improved productivity. Furthermore, Kosovo C will require both directly and indirectly employed personnel, therefore the total number of employees is likely to be the same (induced activities will bring new employment opportunities and compensate the loss).

On a strategic level there needs to be more collaboration between the education and labor ministries so that young people are better prepared for the current and future labor market in terms of training and technical education. There is a good network of vocational training centers, managed by the Ministry of Labor in Obiliq, which is not fully utilised. The Ministry of Labor has stated that it would welcome more involvement in the analysis of skills in the area and provide relevant training programs where there is a skills deficit.

Land Use and Resettlement

The legacy of the resettlement in 2003-2004 in the area has left both those remaining and those resettled extremely angry about the process. Residents are concerned that the Hade experience will be repeated. In the immediate future, resettlement is an issue that affects the village of Hade. However, discussions with communities and relevant ministries revealed that the social impact of future planned resettlement is already being felt by several communities. For example, in villages such as Lajthishte, which are not scheduled to be moved until 2035, or in others not scheduled until 2038, people are concerned about their property prices and many young people have already left the communities to live abroad or in other parts of Kosovo, as they see no economic future in the area.

The process and timing of resettlement should be clearly communicated and the information on this topic should be regularly updated. Uncertainty over the extent and timing of any resettlement is likely to exacerbate real or perceived economic disadvantage. The potential role of the Community Development Forums in this process should be carefully evaluated. They have the potential to provide a valuable engagement tool on this issue.

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19 Personal communication with Department of Employment.
Health

Health concerns have been raised during consultation with local communities and participants believe that current operations have resulted in direct health problems. It is understood that current levels of air, noise and water pollution in the local area are significant and it is likely that this has had an impact on the health of local communities.

The proposed project aims to improve current levels of pollution in the long term, but there may be some increased pollution in the short term, depending on the chosen option. Associated impacts on the health of local communities should be monitored. Data collected during this assessment is limited; a detailed health baseline showing current conditions is needed. Determining the level of health impact will require further data gathering and monitoring of health conditions, along with noise, air and water quality.

Infrastructure

Roads. As discussed in the baseline section of this report current road conditions around the project site are poor and traffic is an issue. If the road network is not upgraded and regularly maintained, road safety will potentially have a major impact on local communities. It is understood that some improvements are planned; however, this may not be adequate to limit the impact of increased road usage on local communities.

Water Supply. The quality of current local water supply infrastructure is very variable, with some communities connected to the mains and others reliant on other sources. Local surface waters and groundwater are contaminated and unsafe for drinking. A number of communities have raised concerns over current and future access to safe water supply in the area of interest. It is understood that the project will invest in wastewater treatment and address local water pollution with the aim of meeting international standards. This will be a significant improvement and therefore have a positive impact on local communities.

Community Aspirations, Attitudes and Concerns

Consultation with affected communities found that support for the project is mixed. Half the populations of Grabovc i Poshtem, Hade and Lajthishte strongly support the project and believe it will bring positive economic impacts. Eighty-three percent of all participants believe the project will create employment opportunities.

Participants in the focus groups also indicated that their expectations are that job opportunities will increase. However, they are skeptical how the recruitment procedure will be organized, as they mentioned many cases where workers in the power plant are being recruited without any criteria. They see as a project pre-condition that employment will be provided to those who deserve it the most; they hope therefore that the foreign investor will apply appropriate recruitment procedures. In this regard, all agree that they (in each group, all participants presented their own village as being the most negatively affected by mine activities) should be given priority in employment opportunities, as they are the ones who suffer the most from air pollution, or were previously excluded from employment opportunities, or again, municipal authorities failed to provide adequate conditions for living (poor infrastructure).

Although the project has support due to the expectation that it will have a positive impact on the local economy and employment opportunities, many residents feel there will be negative impacts. In terms of the effects of Kosovo C on the environment, the majority of respondents to the household survey expected it to be negative (58.3%), primarily because of the pollution which they fear will destroy the environment, while another 20.8% expected it to be positive. Only 5.8% of the respondents expect the building of Kosovo C not to have any impact on the environment. Rural respondents are more likely to expect the building of Kosovo C to have very positive impacts on the environment, while urban respondents are more likely to expect it to have somewhat positive or somewhat negative effects. There were no differences by other socio-demographic variables.
In terms of the impact of Kosovo C on the natural environment in their settlements, Hade had the greatest number of respondents (24%) who expected it to be very positive, while Hamidi had the greatest number of respondents who expected it to be very negative (77%).

Focus group discussions support the data obtained from the household survey, where most respondents claim that they are skeptical about the environmental impact the new power plant will have. Since all participants complained about current conditions pertaining to the environmental issues in their settlements, the construction of a new power plant is expected to have further impact on the environment. Since it is a coal-based power plant, the belief of these participants is that it is not possible for the power plant to be environmentally friendly.

At household level the survey indicates that most respondents expect the building of Kosovo C to have positive effects (32% somewhat and 36% very positive), a little over a tenth (12%) expect it to have negative effects and 9% expect it not to have any economic effects on their household. Urban respondents are more likely not to expect building of Kosovo C to have any economic effects on their households, while rural participants are more likely to expect negative effects from it. The main reasons why respondents expect positive economic effects of the project include increased employment opportunities and increased quantities of electric power for export.

At present, from the surveys carried out and other stakeholder engagement activities, the project is expected to have both positive (employment and economic) and negative (pollution) impacts on surrounding communities. Resettlement is also an area of potential concern.

Most residents of the area of interest have a generally positive opinion about the plan/activities for the mine and voice their support for it (37% strongly and 35% generally support the plan). Rural respondents were more likely to support (41% strongly and 35% generally support) and urban respondents were more likely to oppose (13% strongly and 16% generally oppose) the plan.

Grabovci Poshtem (53%), Hade (48%) and Lajthishte (46%) had the greatest number of strong supporters of these activities, while Dardhishte had the greatest number of respondents who strongly oppose them (23%).

### Consultation

Past consultation in the area has been poor or nonexistent. The majority of people support the building of Kosovo C and further mine development, but also want to play a meaningful part in the decision-making process of the project. The project provides a good opportunity to establish a comprehensive and representative consultation mechanism. If the project’s current approach to informed consultation continues (through community development forums and communication with key stakeholders, including Obiliq municipality) during mine development, this is likely to be beneficial to the overall sustainability of the project and the communities of the area of interest.
Environmental Mitigation Measures

Proposed preliminary environmental and social mitigation measures are based on the outline of the Environmental and Social Baseline and identified environmental and social non-compliances with international regulations (EU and World Bank).

Table 20. Environmental Mitigation Measures

<table>
<thead>
<tr>
<th>ID</th>
<th>Issue</th>
<th>Proposed Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Human Health</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Burning of open mines and explosion/burning of waste dump sites</td>
<td>Immediate securing (including fencing) of the open mine and waste dump sites to prevent unauthorized access,</td>
</tr>
<tr>
<td>1.2</td>
<td>Risk of exposure to hazardous substances into the open pits/open dumps</td>
<td>Implement access restriction devices and maintain them in operation through a periodic verification service,</td>
</tr>
<tr>
<td>1.3</td>
<td>Direct contact with contaminated soils (with particular reference to TPP B ash dumps, etc.)</td>
<td>Based on available data and potential future monitoring to be undertaken, impacted soil mapping should be prepared and appropriate fencing/labeling should be introduced,</td>
</tr>
<tr>
<td>2</td>
<td>Air Emissions and Quality</td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Air emissions and air quality monitoring</td>
<td>Installation of continuous monitoring devices at TPP A and TPP B stacks and introduction of air quality monitoring in Obiliq Municipality and surrounding affected areas,</td>
</tr>
<tr>
<td>2.2</td>
<td>Particulate emissions from TPP A</td>
<td>Feasibility study to install new electrostatic precipitators. Due to the state of the plant only limited interventions are possible. A feasibility study to reduce particulate emissions could provide support in the identification of most suitable action,</td>
</tr>
<tr>
<td>2.3</td>
<td>NOx, SOx from TPP A</td>
<td>TPP A not in compliance with EU air emission standards. Due to the state of plant only limited interventions are likely possible to allow operation until 2017. A feasibility study is proposed.</td>
</tr>
<tr>
<td>2.4</td>
<td>NOx, SOx, and Particulate emissions from TPP B</td>
<td>Kosovo B in compliance with EU standards. Feasibility study and installation of DeSOx/De NOx and revamping of existing electrostatic precipitator required as soon as possible, after feasibility study and agreement with authority.</td>
</tr>
<tr>
<td>2.5</td>
<td>Particulate emissions from TPP A transport system and from ash dumps</td>
<td>Hydraulic ash transportation, flattening side slopes and establishing vegetation on newly formed surfaces where deposition has been stopped. Refer to CLRP.</td>
</tr>
<tr>
<td>3</td>
<td>Water Supply and Wastewater Effluents</td>
<td>See Point 4.2.</td>
</tr>
<tr>
<td>ID</td>
<td>Issue</td>
<td>Proposed Mitigation Measures</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>3.1</td>
<td>Water recycle and reuse</td>
<td>A water balance should be prepared including quantities of water consumed per each activity, source, use and final discharge. Based on this balance, possible water consumption reduction measures should be identified and implemented (reuse, recycle, etc.).</td>
</tr>
<tr>
<td>3.2</td>
<td>Effluents from TPPs</td>
<td>Wastewater treatment plant at TPP A and TPP B and sewer system revamping, including separation of process water from rain water (to be collected and used as process water to reduce raw water consumption) and recycling of wastewater. For TPP A revamping, see comments above.</td>
</tr>
<tr>
<td>3.3</td>
<td>Mine water</td>
<td>Installation of settling ponds to reduce the load of suspended solids and coal dust in mine water (STEAG 2006).</td>
</tr>
<tr>
<td>3.4</td>
<td>Contaminated stormwater due to leaching of contaminated soils/waste heaps including TPP A and TPP B ash dumps</td>
<td>Leachates from contaminated soils and waste heaps should be collected and treated in dedicated WWTP.</td>
</tr>
<tr>
<td>3.5</td>
<td>As above</td>
<td>In the long term, capping/recycling of contaminated soils/waste heaps to avoid leaching should be addressed.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Waste Management</strong></td>
<td></td>
</tr>
<tr>
<td>4.1</td>
<td>Ash dump at TPP A (including by-products of former gasification plant) and outside overburden dumps</td>
<td>Based on findings of the CLRP investigation phase and Interim Report, plans for: - Conversion of present dry dumping of TPP A ash to wet ash removal and covering ash dump surfaces with cohesive material; - Partial removal of ash and overburden from unstable areas of ash dump TPP A as well as outside overburden dumps; - Implementation of proper measures to avoid washing out of area where high risk contaminants from former gasification and fertilizer plants are located.</td>
</tr>
<tr>
<td>4.2</td>
<td>Ash dump TPP B</td>
<td>Complete ash dump characterization based on waste inventory in terms of types, amount and current location, including chemical characterization by means of waste excavation, sampling and chemical analysis. Risk assessment of potential impacts deriving from presence of waste with regard to release into air, surface water, groundwater and soil. Based on risk assessment results, mitigation measures should be designed and implemented including: - removal of ash from unstable areas; - ash dump capping (waste should be adequately profiled in order to assure stormwater runoff discharge and then capped with geomembranes and cohesive material).</td>
</tr>
<tr>
<td>5</td>
<td><strong>Noise</strong></td>
<td></td>
</tr>
<tr>
<td>5.1</td>
<td>Noise impact</td>
<td>A noise survey should be undertaken both at the work place and at the main receptors to be identified. A proper comparison with applicable standards should be performed in order to ascertain potential non compliance and necessary mitigation measures.</td>
</tr>
<tr>
<td>7</td>
<td><strong>Soil and Groundwater</strong></td>
<td></td>
</tr>
<tr>
<td>7.1</td>
<td>No detailed information is available with regard to local geology and hydrogeology</td>
<td>Specific survey should be undertaken at the site including data review, monitoring wells and borehole drilling, core-logs preparation, phreatimetry elaboration and reporting.</td>
</tr>
<tr>
<td>7.2</td>
<td>Groundwater monitoring at TPP A and TPP B ash dumps</td>
<td>Groundwater monitoring for TPP A and TPP B ash dumps should be carried out through a network of piezometers to be drilled downgradient of the ash dumps.</td>
</tr>
<tr>
<td>7.3</td>
<td>River sediments characterization</td>
<td>Sediment monitoring should be undertaken every 250 m on the two banks of the Sitnica River. Sediment samples should be analyzed for: pH and heavy metals (Pb, Cd, Zn, Cu, Cr, Ni, As, Hg) and phenols.</td>
</tr>
<tr>
<td>7.4</td>
<td>Potential for air pollutants deposition on the soil from power plants</td>
<td>Superficial soil sampling is proposed in an area of 10 km radius from the power plants to ascertain potential risks for human health deriving from direct exposure and/or food chain pathways.</td>
</tr>
<tr>
<td>7.5</td>
<td>Potential for air pollutants deposition on the soil from TPP A and TPP B ash dumps</td>
<td>Top soil sampling and analysis in the areas 1 km downwind of TPP A and TPP B ash dumps is foreseen, aimed at detecting presence of heavy metals and PAHs in the surface soil with particular reference to agriculture lands.</td>
</tr>
<tr>
<td>7.6</td>
<td>Presence of chemicals and waste from old gasification plant</td>
<td>Sampling program should be undertaken, along with analysis for disposal options, geologic/hydrogeologic/hydrologic survey for the site, tank emptying and disposal of hazardous waste (see also CLRP).</td>
</tr>
</tbody>
</table>
Environmental Monitoring Plan

The proposed Environmental Monitoring Plan (EMP) is aimed at monitoring the performance of mitigation measures to be included in the NMFDP for implementation of new investments and rehabilitation of existing facilities. This section provides an outline of monitoring program objectives, identifying the variables of concern and establishing baselines against which the nature, magnitude and significance of future changes can be evaluated. Monitoring activities are detailed below.

Air Quality

- **Installation of continuous monitoring devices at Kosovo A and Kosovo B stacks** – The continuous monitoring system includes the measurement of flow rate, temperature and pollutants concentration of flue gases in the stacks. Complete continuous flue gas analysis of CO, O₂, SO₂, CO₂, NO, NO₂ and Total NO, and particulates is essential for both efficient and environmentally acceptable performance. Data acquisition and analysis software systems would also be installed. The devices would be connected to a computer network which would receive all the data and ascertain their compliance with applicable standards. In case values above permitted limits are detected, an early warning system would inform site management to adopt required measures (reduction of work-load, check of efficiency of abatement system and work stoppage if need be). The data would also be reported on monthly to maintain statistics and provide information to the Kosovo Environmental Protection Agency (KEPA) and the MESP.

- **Spot sampling of air emissions** – In order to complete the description of the air emission scenario, quarterly monitoring is proposed at the main stacks of Kosovo A and Kosovo B to investigate the chemical composition of particulate for trace elements: heavy metal content (vanadium, Nickel, Cadmium, Lead, Copper, Zinc and Arsenic and) and PAH. Sampling would be undertaken by means of a sampling pump according to national and international guidelines. All the stacks would have to be provided with an adequate sampling point to be positioned according to national and international guidelines. Chemical analysis for parameters screening would need to be undertaken by a certified laboratory.

- **Air quality monitoring in Obiliq Municipality and surrounding areas** – An integral ambient air quality monitoring system would need to be established since the existing monitoring system is incomplete (two air quality monitoring stations are currently installed for monitoring of SO₂, soot and deposition rate). The air quality monitoring program includes two further monitoring stations for the detection on a continuous basis of the following substances: CO, NOₓ (NO + NO₂), SOₓ, O₃ and particulates (PM₁₀ and PM₂.₅). The monitoring program also includes a meteorological station and hardware/software equipment for registration/transmission of data. All the monitoring stations would be fitted with a data acquisition and data transmission system capable of transferring data to KEPA for continuous control. Intervention protocols would need to be established in case limits are exceeded. Key personnel within the site management would be trained to adopt required measures to bring pollution under limits (reduction of work-load, check of efficiency of abatement system and work stoppage if need be). The data would also be reported on monthly to maintain statistics and provide information to the public.

Wastewater

- **Flow rates monitoring** – Flow rates of processing wastewater discharged from the power plants would be monitored on a periodical/continuous ba-
sis in order to have reliable data for preliminary design of the WWTP; these effluents include: process waters from the power plants (boilers blow down and other streams); blow down from the cooling towers; and sanitary waters. Storm water flow rates would be evaluated based of precipitation rates, drainage surfaces and soil characteristics. The survey would require close cooperation of water specialists with site personnel, who should give specific input with regard to reliability of data to be collected.

- **Wastewater quality** – Generated wastewater would be analyzed before and after treatment to ascertain quality of effluents discharged and to monitor efficiency of WWTP to be installed. Wastewater monitoring would be undertaken every three months, to ensure that all recorded parameters are in compliance with the legislative limits in force and shall include the following – at a minimum: pH; temperature; dissolved oxygen; chemical oxygen demand; total suspended matter; metals including: at a minimum, Cd, Cr, Cu, Hg, Pb; toxic organics such as phenols and chlorophenols; polynuclear aromatics such as benzo(a)pyrene, carbon tetrachloride, PCBs; and oil and grease.

**Soil and Groundwater**

- **Soil and groundwater investigation at gasification and fertilizer plant area** – A site investigation in the gasification plant area is included in a sub-project funded by the World Bank in the framework of the CLRP. This is scheduled to start shortly, and would include a geological/(hydro)geological survey and environmental site investigation of soil and (ground)water at and around the gasification plant site as well as in the Kosovo A ash dump where tars and phenols, etc., have been dumped. The monitoring of groundwater quality would include drilling of 5 piezometers and water sampling to monitor the actual and potential for contamination of the groundwater. The parameters to be analyzed include BTEX, PAH, phenols and hydrocarbons. groundwater monitoring shall be carried out quarterly until two years after the complete remediation of the gasification and fertilizer plant site.

- **Groundwater investigation at Kosovo A and Kosovo B ash dumps** – The CLRP includes investigation on soil, surface and groundwater for Kosovo A ash dump and overburden dumps located to the southwest of the Kosovo A site and existing Mirash/Bardh mines. A monitoring program on groundwater quality is proposed also, taking into consideration the results of the CLRP soil and groundwater investigation, and includes the following:
  - Groundwater sampling in around 5 upgradient and 10 downgradient piezometers (existing and new one to be drilled) for each Kosovo A and Kosovo B ash dump;
  - The final number and position of the piezometers would be defined: (i) on the basis of an in-depth study on the local hydrogeology and identification of exact groundwater flow direction; and also (ii) considering the results of the first monitoring program for Kosovo A ash dump;
  - Groundwater samples would be collected at two different depths corresponding to the surface yellow/grey clay layer and the lignite layer; an analysis of the aquifers’ interconnection through tracing substances would be performed;
  - The groundwater monitoring campaign would be repeated twice a year; and
  - The groundwater analysis would include, at a minimum: (i) BTEX; (ii) PAH; (iii) phenols; and (iv) metals with particular reference to heavy metals (Pb, Cd, Zn, Cu, Cr, Ni, As, Hg). The final parameters to be detected would be defined on the basis of the results of the first year groundwater analysis program.

- **Topsoil investigation** – A topsoil investigation is recommended as follows:
  - Sampling and analysis of topsoil in the areas downwind of the Kosovo A and Kosovo B ash dumps is planned, aimed at detecting the presence of heavy metals and PAH from ash dispersion, in the surface soil, particularly in agricultural lands. The topsoil sampling shall be conducted starting from the boundaries of the ash dumps to 1 km distant, on the basis of a
regular grid (a representative sample for a 500 x 500 meter grid). The monitoring program would be carried out twice a year until two years after ash dump remediation; and

- A superficial soil sampling is proposed in an area of 10 km radius from the power plants to ascertain potential risks for human health deriving from direct exposure and/or food chain pathways.

- **River sediments characterization** - With regards to the Sitnica River, sediment sampling along river banks should be undertaken and analyzed for detection of pH, heavy metals (Pb, Cd, Zn, Cu, Cr, Ni, As, Hg) and phenols. Sediment samples should be collected every 250 m on the two banks of the river. The distance of sampling locations could be modified depending on the findings of an on site assessment. Monitoring should be repeated once a year to ascertain the self-treatment of the river and to monitor eventual further impacts deriving from the mines and power generation operations.

### Social Mitigation Measures

#### Economic Environment and Employment

As described in the baseline the economic and employment status of the mine development area is very low. Any opportunity for direct and indirect employment in the future mine development will have a positive effect on the economic situation of the area. Direct employment in the project such as technical, engineering and management roles would be the most directly advantageous. Preferential employment practices should be used by the developer, where possible. Contracting local people for jobs such as vehicle maintenance and catering services would also significantly improve the economic and employment profile of the affected communities. The increased income of local people would in turn benefit the local economy as whole, as the multiplier effect would be instigated.

On a wider strategic level there is a serious skills shortage in the area, according to some government officials (source: interviews with Kosovo Ministry of Labor officials). Specifically this means that there is currently a discrepancy between the education that young people receive and the skills that are needed for Kosovo’s economy. The Ministry of Labor has a national network of local vocational training centers, including one in Obiliq, where young and unemployed people are trained in relevant skills. In order to optimize this resource the mine developer should liaise closely with these centers and draft a strategy that would identify skills shortages in the area and provide the relevant training.

### Land Use and Resettlement

In addressing and mitigating the effects of resettlement, there are several issues that need to be part of any planning of future resettlement:

- **Legal Land Title**: It is estimated that a significant number of residents in the rural areas do not have legal title for land and property in Hade and other communities. Under current Kosovo legislation these people would not be entitled to compensation. Whereas under international standards such as the World Bank’s Operational Policy on Involuntary Resettlement (OP 4.12), people without legal title are still entitled to compensation and assistance with moving;

- **Compensation Issues from 2003-2004**: There are still people who have not been compensated for the emergency evacuation in 2003;

- **Availability of agricultural land**: There is not enough replacement agricultural land to resettle people who rely on farming for their livelihoods. Therefore:

  - Revision of current land expropriation law should include clauses on household data collection, census and inventory;

  - The drafting of a Resettlement Action Plan should be a legal requirement when carrying out resettlement;

  - Consultation should be an integral part of the resettlement process;
A government body responsible for resettlement should be established that includes representatives from different ministries in order to harmonize different government policies and approaches; and

To mitigate impacts on social networks, some level of mitigation could be achieved through a sensitive social support program that would take local people’s concerns and expectations into account. This should be closely integrated into any consultation strategy with the communities. It would include measures to remove and restore local historical and cultural sites, such as mosques, cemeteries, churches and war memorials. It should also include assistance to help the most vulnerable people, especially the elderly, readjust to their new homes and new locations, for instance, by facilitating contact with social and health services.

Infrastructure

Roads

The development plans should aim to upgrade roads leading to the project site or that will be used as a result of mining and power plant activities. Improving the local road system would benefit the local community and assist in reducing the impacts caused by large vehicles and additional traffic traveling on local roads. In addition, road safety measures should be adopted including driver training for staff, road safety awareness training for local communities, appropriate road markings and signage and strict rules on vehicle handling for all staff.

Water Supply

As discussed in the baseline and impacts section, the local water supply varies in quality and accessibility between settlements. The planned activities will require substantial amounts of water for operations, which will be sourced from the local water supply infrastructure (Iber-Lepeng system) through pipelines. As noted above in the section on environmental impacts, a number of steps will need to be taken to ensure adequate supply. In addition, improvements to the local water supply infrastructure should be implemented, which will be a major benefit to the local community.

Communication

The majority of respondents to the household survey believe that meetings with municipal authority representatives would be the most effective way to inform the population of the area of interest about planned activities to upgrade the operation of the mine (31%); 22% of respondents opted for meetings with representatives of the mine; 16% for public meetings and gatherings; and 13% for television, while 12% said they did not know or refused to answer when asked about the most effective way to disseminate relevant information. Brochures, leaflets, daily newspapers and radio were the least frequently mentioned information sources. Moving forward effective communication and consultation is a key aspect of impact mitigation for the project. Current initiatives need to be maintained and reinforced.
LEGISLATIVE AND REGULATORY REVIEW

The SESA Report provides a description of the existing legislative and institutional framework related to environmental management and expropriation/resettlement issued at national, regional and local levels and a gap analysis with reference to relevant international standards and regulations.

Legal Review and Gap Analysis

A preliminary gap analysis was undertaken to inform the Project Committee’s Legal and Regulatory Advisors (IPA Hunton & Williams) on development of the legislative framework and was used for preparation of its Interim Diagnostic Report (September 2007).

The legislative and regulatory review took into consideration the laws and instructions on environmental management that have been drafted or approved after February 2007, as well as the main findings of the IPA H&W Revised Interim Diagnostic Survey (January 2008). It also reviewed the existing legislative framework related to expropriation/resettlement issues. The review focused on key environmental, health and safety issues related to the lignite sector and related activities.

The gap analysis showed that the process to develop an environmental health and safety (EHS) regulatory framework in compliance with EU Directives and other international standards is in an early phase. A number of framework laws have been passed (the Environmental Protection Law, the Waste Law and the Water Law) but the regulations to make them operational are not yet in place. In parallel, efforts are needed to build institutional capacity and operational environmental management services.

Regarding social issues, the gap analysis focused on compensation and resettlement. Social assessment and public consultation were also included. Since there is no specific EU directive on resettlement, World Bank OP 4.12 and the International Finance Corporation (IFC) Performance Standards 1 and 5 were used as international benchmarks against which to measure Kosovo legislation and regulations.

As regards resettlement, amendments to the draft Expropriation Law have been prepared by IPA H&W to address the issues identified in the Interim Diagnostic Report and to ensure compliance with World Bank/IFC requirements. IPA H&W has also prepared a first draft of a Resettlement Policy Framework and Action Plan.

The most relevant recommendations in relation to the main issues that have been reviewed are noted below; findings and comments on existing legislation as included in the (IPA H&W) Revised Interim Diagnostic Report are also noted when applicable.

- **Strategic Environmental Assessment and Spatial Planning.** The general principles on assessment of environmental and socio economic impact are indicated in the Spatial Planning Law and the Environmental Protection Law, but no specific regulation has been developed. The Spatial Planning Law indicates that local authorities will decide which plans will need to undergo an environmental and socio-economic impact study. However, such decisions should not be left to individual local authorities, but should be regulated by law on a general, independent basis.

- A draft SEA Law (dated May 2007) has been submitted to the Assembly and is pending approval. Although it was drafted in compliance with the EC SEA Directive, the public consultation procedures are not clearly defined. These should include making SEA reports available to the public for written comments. Guidelines should be prepared to support the SEA process for specific plans and programs (energy, spatial planning, transport, agriculture, etc…) and sectoral environmental regulations (air and water quality standards amongst others) should also be prepared and promulgated to allow for the SEA process to be implemented.

- The institutional framework for the implementation of the SEA process should be defined and
specific training planned and provided for all parties involved at central and local levels.

- The IPA H&W Advisors submitted draft amendments to the Law in November 2007. The draft was finalized in early 2008 and should be approved soon by the Assembly.

- **Environmental Impact Assessment.** The EIA regulations in force include Administrative Directive 9 of July 2004, and Articles 20-21 of the Environmental Protection Law. A new EIA Law approved by the Assembly in June 2007 is awaiting signature to become operational. The new Law has redesigned the EIA procedure, which remains the responsibility of MESP. The IPA H&W Draft Revised Interim Diagnostic Report notes the following:

  This Draft Law would appear to meet all the main requirements of the 1985 EC EIA Directive (as amended) and the technical annexes appear to mirror those included under Community legislation. However, the Draft Law on EIA raises a number of issues relating to the coherence of the entire corpus of existing and proposed Environmental Laws in Kosovo. The report makes particularly reference in this regard to the Draft Law on Environmental Protection, the Draft Integrated Pollution Prevention and Control (IPPC) and Environmental Permitting Law.

  Development of sectoral environmental regulations such as air and water quality standards are fundamental to enable EIA procedures to be implemented.

- **Air Emission and Air Quality.** A draft Administrative Instruction “On the rules and standards of the discharges on air by the stationary sources of pollution” has been approved and signed by the Prime Minister in September 2007. It contains air emission limits for a wide range of industrial activities.

  The instruction states that emission limits for new Large Combustion Plants should be in compliance with EC regulations and that existing plants must comply with these limits by the end of 2017. Limits for air emissions from existing plants are a bit higher than the EC Directive limits. The regulation foresees air emission reduction plans to be negotiated between the single plants and the Ministry. The English version is sometimes not very clear, it should therefore be revised giving clear indications on the timing by which emission limits will come into force.

- **Water.** The Kosovo Water Law under Section 8 calls for coordination of river basin management with upstream and downstream riparians in the case of transboundary river basins system, according to EU policy. Under the Water Law, the right of use of water is given through issuing a Water Permit (subject to review every 5 years) or through a Water Concession (no review period defined). It appears from the Law that industrial complexes, unlike irrigated agriculture and fisheries, are not eligible to apply for a water concession, although the law states that “use of water for technological needs” is eligible to apply for a concession. No provisions are made in the Law for the transfer of water permits or concessions from one permit holder to another.

  Implementing the institutional setting and water strategy development as specified in the law is in its early stages. A basic strategy paper (Water Balance Report, in Albanian) was developed in 2004, based on a 1985 Water Management Plan, but to date no water management plan or river basin management plans have been developed. As a result of the absence of a river basin plan and a comprehensive policy framework, there is limited oversight regarding the availability of water sources in the Iber system, no clear policy for strategic allocation of water for various sectors or the issuing of long-term water usage agreements, nor a well-defined mechanism for the resolution of competing water demands. This will increase the investments risk for the Kosovo C power plant.

- **Wastewater.** The Water Law sets the general principles for sustainable water and water resources management. However, no discharge limits for waste effluents have been set in any existing regulatory document, and no standards for groundwater quality have been developed. Specific regula-
tions governing water quality discharges and assessment and preservation of water body qualities should be developed and put into force.

- **Waste Management.** Waste management tools such as national and local waste management plans to determine the quantities and types of wastes generated in the country and define needs for treatment and disposal facilities, should be developed in parallel to building institutional capacity and operational waste management services.

- **Hazardous Substances Management and Handling.** No regulatory framework has been developed for handling of chemicals and hazardous substances apart from the Waste Law. Specific regulation should therefore be developed to include handling of Asbestos Containing Materials, Polychlorinated Biphenyls, and Ozone Depleting Substances amongst others.

- **Soil and Groundwater Quality.** Specific guidelines should be developed to regulate the following:
  - Soil and groundwater quality standards;
  - Soil protection measures (e.g., technical characteristics of storage facilities, periodic integrity testing of underground storage tanks, etc.);
  - Emergency actions to be undertaken in case of soil and groundwater contamination.

- **Management of Protected Areas.** The Law on Nature Conservation (2004) does not contain specific provisions for institutional arrangements for managing Protected Areas (organizational structure, statute, composition of the management) nor does it clearly indicate how the costs for this (personnel, equipment, facilities, running costs, etc.) would be financed. This should be addressed.

- **Health & Safety Management.** A framework legislation is in place in Kosovo governing health and safety at workplaces. Specific occupational health and safety conditions and risks will be regulated separately by secondary legislation on the basis of this general law, but this legislation has not been issued yet. Aspects that will need to be addressed: detailed procedures for accidents and incidents reporting; a stringent risk evaluation approach, including medical surveillance programs required for specific working activities; personal protective equipment provisions; restrictions applicable to vulnerable workers; and assessment procedures for specific risks (as biological, carcinogenic or mutagenic risks, occupational noise exposure, manual handling of loads and ergonomics, explosion risks).

- **Criteria for categorization of premises and areas with respect to fire prevention and protection measures are yet be implemented, as well as specific procedures for inspections assigned to authorized legal entities and related training of persons performing the controls. Hazardous chemicals substances are required to be stored and used in accordance with European standards; on the other hand, specific standards and threshold limits for indoor asbestos exposure limit at workplaces are missing and should be developed in Kosovo legislation.

### Institutional Capacity

A report on the capacity of Kosovo institutions involved in environmental protection and planning was prepared as part of the Environmental and Social Safeguard Advisory Services for Private Sector Participation in the Development of New Generation Capacity, Related Transmission and the Development of the Sibovc Lignite Field project.

The present structure of public administration in Kosovo (Central Government and municipalities) does not provide a sufficient framework for an effective system of environmental protection. At all levels, the institutional structures for environmental protection, and the resources available to them, are not yet sufficiently developed to address fully the challenges of environmental protection in the country, or of harmonization with the EU Environmental Acquis.

With respect to human resources, at the national level the Department for Environmental Protection employs approximately 24 persons and has KEPA 22.

This situation does not compare favorably with the resources for environment in EU member states; in the case of the new member states, ministries in countries that are of a similar size to Kosovo generally have had at least 3 to 4 times as many staff to deal with the complexities of harmonization and transposition of the Environmental Acquis.
The main facts and recommendations related to significant existing issues are summarized in Table 21 below.

The following activities are aimed at strengthening the capacity of institutions at the national and local levels in environmental management with a particular focus on lignite mining and power plant environmental issues.

- Preparation of a dedicated environmental assessment handbook for the lignite mining and power generation sector (Lignite Sector EA Handbook). The EA Handbook will provide guidance to all actors in the assessment process and will explain required actions on a step-by-step basis. The handbook will present the environmental assessment legislative and procedural framework, discuss typical environmental issues and mitigation measures in the lignite mining and power sector, and will include a detailed table of contents for an EIA report of a typical power project and a typical mining project.

- Arrangements for a training program for relevant authorities at both central and local level (MESP, MEM, Ministry of Culture, Youth, Sports and Non-Residential Issues, Municipality of Prishtina, Obiliq), KEK, local environmental NGOs and associations. The program includes training in: (a) EA procedures and international legislation; (b) typical environmental issues and impacts of lignite power sector activities; (c) environmental component characterization, environmental indicators and prediction methods; (d) case studies; and (e) specific issues for the New Mining Field.

Table 21: Institutional Capacity Building

<table>
<thead>
<tr>
<th>Institutional issue</th>
<th>Proposals to resolve issue</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>Coordination among Ministries and other institutions on issue of environmental protection</td>
<td>1. Establish high-level coordinating body for environment 2. Set up municipal or regional focal points/environmental departments 3. Improve horizontal coordination</td>
<td>1. Environmental strategy and Kosovo Environmental Action Plan define a number of priority actions. 2. Horizontal coordination will avoid other parts of government taking decisions that are environmentally damaging, or consume excessive resources.</td>
</tr>
<tr>
<td>Inadequate capacity within environmental protection institutions to meet responsibilities</td>
<td>1. Improve vertical coordination 2. Decentralize selected environmental protection responsibilities – establish regional offices 3. Provide training to regional/local staff for their new roles 4. Provide equipment to support extended responsibilities of decentralized offices (e.g., vehicles, monitoring equipment)</td>
<td>1. Definition of roles at national/sub-national levels 2. Regional offices should be set up in areas furthest from Prishtina. 3. Capacity building efforts should be strongly focused on the new responsibilities of each administrative level.</td>
</tr>
<tr>
<td>Need for improvement of institutional divisions on environmental protection roles</td>
<td>1. Expand role and build capacity of KEPA 2. Improve separation of environmental roles/functions between different institutions</td>
<td>1. Objective should be to achieve clear distinction between the roles of policy-making, permitting, enforcement, and research and development (where appropriate, dividing into different institutions). 2. Priority should be separation of permitting and enforcement. 3. KEPA currently has a very limited role, and small budget/staff.</td>
</tr>
<tr>
<td>Inadequate monitoring of environmental conditions in the country</td>
<td>1. Define scope of monitoring activities (sectors, locations, parameters) 2. Clarify role of government institutes that collect and analyze monitoring data 3. Set up laboratory accreditation scheme 4. Inter-ministerial coordination on monitoring 5. Increase budgets – funds and staff 6. Build capacity (training, equipment)</td>
<td>1. Transparent definition and rules for the role of institutes in collecting and analyzing data for KEPA need to be defined. 2. Part of the monitoring activities should be carried out at local level (air quality control etc).</td>
</tr>
<tr>
<td>Inadequate capacity to monitor environmental mitigation measures of projects for which EIAs are being prepared.</td>
<td>1. Completion of environmental legislation to define regulatory limits 2. Build capacity of inspectorates both at central and local levels– staff and resources 3. Cooperation and harmonization of environmental inspectorate functions with other inspectorates (sanitary, water, natural resources, construction, etc.) 4. Training for inspectors</td>
<td>1. Effective enforcement is a critical element of policy implementation.</td>
</tr>
<tr>
<td>Inadequate enforcement</td>
<td>1. Carry out a diagnostic to define priorities at municipal levels 2. Set up an action plan to address priorities 3. Budget</td>
<td>Decentralization of monitoring and enforcement capacity is necessary in order to fulfill the requirements of the country.</td>
</tr>
<tr>
<td>Municipalities</td>
<td>1. Carry out a diagnostic to define priorities at municipal levels 2. Set up an action plan to address priorities 3. Budget</td>
<td>Decentralization of monitoring and enforcement capacity is necessary in order to fulfill the requirements of the country.</td>
</tr>
</tbody>
</table>
The Final Draft SESA report looks at the current environmental and social situation in the area of interest “Environmental and Social Baseline Study”, presents and analyses the “Alternative Development Scenarios”, assesses the “Environmental and Social Impacts of the proposed Alternative Development Scenarios”, and proposes a “Mitigation and Monitoring Plan”.

The Environmental and Social Baseline section of the SESA report concludes that the environmental situation in the area of interest is very complex for a number of different reasons:

- The environmental setting has been deeply influenced by historical mining activities with significant terrain modifications;

- Air quality is poor due to existing power plant emissions that are not compliant with EU standards, auto ignition of lignite and particulate emissions from ash dumps that constitute the main source of air pollution;

- Availability of water resources is stressed due to competing demands by various water users, as exemplified by periodic shortages in potable water supply during summer months.

- Soil and ground water quality was largely influenced by ash and other waste disposal and from the previous activities of fertilizer and gasification plants;

- Surface water quality is seriously influenced by untreated wastewater discharges from power plants, mining activities and urban waste water;

- Noise emissions from mine activities disturb people living around the mine border; and

- Absent or inefficient environmental controls (for air or water) are active in the area;

- No formal waste management procedures are in place at the industrial sites.

The consultation process found that the main community issues and concerns are the following:

- Community knowledge of the proposed project is generally high, although the level of detailed knowledge varies;

- There are a number of common concerns, with the most frequent being: employment; lack of infrastructure (roads, water supply, sewage system); pollution of air, water and soil; irregular electricity supply; land expropriation and compensation for resettlement; and

- Generally, communities are in favor of the project and hope that it will bring with it economic and employment opportunities.

The Baseline section of the report also looks at water supply as a potential limiting factor for the development project. Although the water supply has been clearly confirmed as sufficient to support the proposed project, the Iber-Lepenc system is under stress now, and will remain so from potentially competing demands very likely to emerge in the long term. This situation requires urgent development of a comprehensive policy, institutional and planning framework for water resource management in the Iber-Lepenc system.

While the final installed capacity has yet to be decided by the Government of Kosovo, the SESA report builds on the recommendations of the earlier studies and looks at the impacts of the maximum development option. The Alternative Development Scenarios section foresees development of a new lignite fired TPP with a total installed capacity of up to 2,000 MW and development of a new lignite mine in the New Mining Field, an area previously known as “Sibovc mine”.

The alternatives considered relate to the:

- Timing of power plants and mine development (phased or rapid);

- Assessment of three potential locations of the power plants (close to the existing Kosovo A,
close to the existing Kosovo B, or a greenfield in Bivolak);  
- Size of the units (300 MW or 500 MW); and  
- Plant technology –PF or CFB.

The main recommendations of the SESA and the analysis of the possible development scenarios are the following:

- The power plant should be developed in a phased approach, in which a first stage (1,000 MW) would allow for replacement of Kosovo A power plant, meet domestic demand with some export and permit a major overhaul of the Kosovo B power plant to increase reliability and bring it in compliance with EU environmental standards. The second stage (1,000 MW) would meet growing demand and allow for a later retirement of Kosovo B.

- Kosovo A is the preferred site for construction of Kosovo C, although the score of the alternative site close to Kosovo B is very similar. On the other hand, the Bivolak site should be excluded, first because it is a greenfield site rather than brownfield, and second because the project will in any case involve one of the two existing plant sites. Choice of the final site will depend on a political decision in relation to which of the existing power plants will be included in the final tender for the project, and the outcome of the SESA public hearing;

- Both available technologies (PF or CFB) are acceptable and would comply fully with EU standards. The limiting factor from a grid stability perspective is a maximum unit size of 500 MW. With regard to CFB technology, the largest unit size in operation is 300 MW. Smaller unit size translates to slightly higher CO₂ emission due to lower efficiency (39% vs 42% using PF) and higher space requirement (more units). The advantage of CFB technology is that it does not require the FDG (Flue Gas Desulphurization) and thus uses less water. In moving forward to a commercial transaction, the Government will want to consider the trade-offs between the environmental benefits of larger units and the more flexible system operating characteristics of smaller units.

The section on Environmental and Social Impacts of the Alternative Development Scenarios identifies and weights two main issues that are having and will continue to have an impact on local communities: land acquisition and resettlement, and air and noise pollution. These impacts stem primarily from mining development rather than power plant location.

The major anticipated impacts of the project are the following:

- Higher water consumption, within an overall water resource situation where competing demands mainly between industrial and agricultural water uses are likely to emerge in the medium-term (5-10 years) and very likely to emerge in the longer term;

- People/villages to be resettled;

- Land use modification;

- Higher total lignite consumption;

- Higher total CO₂ emissions (but lower specific CO₂/MWh emissions).

Proposed mitigation measures may include:

- Reducing water consumption through recycling of industrial water;

- Development of a river basin management plan for the Iber-Lepenc system along the guidelines of the EU policy as specified in the EU Water Framework Directive;

- Development of water infrastructure investment plans and feasibility studies for the Iber-Lepenc system, identified in the river basin management plan;

- Revision of the water legal framework to allow for long-term water usage rights for industrial water users and mechanisms for addressing competing water demand;

- Development of a policy framework and criteria to guide strategic allocation of water resources to
various water using sectors with competing water demands;

- Installing appropriate noise barriers to reduce noise disturbances;
- Supporting research on best methodology to reduce CO₂ emissions;
- Reclaiming old mine areas;
- Urgently reducing particulate emissions from mines, power plants and ash disposal;
- Revamping Kosovo A and Kosovo B to bring them in line with EU standards;
- Construction of a wastewater treatment plant and sewer system.
- Establishing an adequate monitoring system;
- Adoption of resettlement policy framework
- Adoption of a spatial development plan

The project’s principal benefit will be to make Kosovo self-sufficient in energy, and provide it with the potential for generating revenues from energy export. In addition, it is expected to have the following important benefits, among others:

- Reclamation of mining areas, ash dumps and overburden (at the new mine as well as previously contaminated areas);
- Lower total atmospheric emissions (NOₓ, SO₂, particulates);
- Improvement/modification of existing infrastructure (Iber-Lepenc canal, electricity grid, roads, etc.);
- Soil remediation;
- Employment opportunities and economic development.

The Draft Final SESA report will be the subject of a final public hearing where the affected communities, civil society, NGOs and other stakeholders are encouraged to raise questions and concerns relevant to the proposed project. The findings of the public hearing will be incorporated in the Final SESA Report.

The Final SESA report will provide policymakers with information and analysis to help them evaluate and determine the optimal site for construction, size and number of power plant units; and identify CO₂ mitigation alternatives.