# **Energy for Development**

## HUMAN DEVELOPMENT REPORT 2007



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The views expressed in this report are those of the author and do not necessarily represent those of the United Nations Development Programme or the Swiss Development Cooperation Office.

When this report was researched and written, Kosovo was formally under the administration of the UN, as per UN Security Council Resolution 1244. On 17 February 2008, the Kosovo Assembly declared independence and its commitment to implement the settlement proposal of UN Special Envoy Martti Ahtisaari. That declaration followed two years of negotiations that resulted in no clear agreement between Kosovo and Serbia on Kosovo's future status. However, pending guidance from the Security Council, the UN in Kosovo will continue to consider UN SC Resolution 1244 (1999) as the legal framework for the implementation of its mandate in light of evolving circumstances.

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#### **About this Report**

This report presents the first study undertaken on the impacts of energy on human development in Kosovo. The key objective of the report is to contribute inputs to future policy and management decision-making in the energy sector that will support economically, socially and environmentally sustainable energy development in Kosovo. To this end, the preparation for the report sought to gain a better understanding of the relationship between energy supply and the consumption of energy services in the household sector, which in Kosovo is the main consumer of electricity, firewood and district heating services.

The preparation of the Kosovo Human Development Report 2007 involved three main components. First, a series of 15 policy papers on local energy-related issues were commissioned from local consultants. These papers were originally prepared during August/September 2007 and were finalised, following peer review, in October 2007. The second and arguably the most important component of the research was an independent, commissioned public opinion survey that was carried out in late October 2007. The survey provided comprehensive responses from over 1,300 individuals across Kosovo on individual and household energy consumption, behaviour, beliefs and attitudes. The survey's findings also highlighted many technical issues relating to energy production, supply and distribution that are causing severe negative impacts on the daily lives of the population. The survey's methodology is outlined in Annex 1.

The third and final component of the preparation process was the engagement of an independent international consultant to review and analyse the policy papers, survey data and official documents, and to draft the final report. The international consultant made a short visit to Kosovo in November 2007 to discuss the key issues raised in the policy papers with key stakeholders in government, utilities, business associations and international and bilateral agencies. The first draft of the report was peer reviewed in December 2007 and revised in early January 2008.

One of the main limitations in preparing UNDP's Kosovo Human Development Re-

ports has always been the lack of comprehensive, accurate and up-to-date statistical information. The last full census was undertaken over 30 years ago, and even basic population and demographic information is based on rough estimates. The Statistical Office of Kosovo has been making extensive efforts to collect, collate and disseminate more accurate statistics, but difficulties in data collection systems and procedures persist in many areas.

Particularly problematic for the purposes of this report was the absence of appropriate data relating to health, environmental health and the environment in general. Kosovo's Health Information Systems are still not well-developed or adequately maintained<sup>1</sup>, and environmental monitoring systems have not yet been implemented. Effective systems for monitoring air quality (indoors or out) and water have yet to be designed and put into place. As a result, much of the analysis of the impacts of energy production, supply and consumption on human health and the environment has to be inferred from the broader international knowledge base.

#### **Notes on Text**

#### Spellings of place names

In most cases throughout this report, two different spellings are provided for the names of cities, towns and regions in Kosovo, i.e., Prishtinë/Priština. The first name is in Albanian (the language spoken by the majority of the population), and the second is its equivalent in Serbian (the language spoken by the largest minority population), transliterated from the Cyrillic alphabet.

#### Ethnic groups

Throughout this report the terms "K-Albanian" and "K-Serb" refer to Kosovars of those respective ethnic groups.

#### Currencies

Amounts of money listed in euros are preceded by the "€" symbol. All figures preceded by "\$" are U.S. dollar amounts.

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The Kosovo Human Development Report 2007 'Energy for Development' was written by Kathryn Lisa Stokes, PhD. Numerous other individuals and organizations participated in the research, data gathering, analysis, peer review and editing of the report. They are listed below by relevant group.

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#### Household survey

The survey of households in Kosovo undertaken for this report was conducted by Prism Research.

#### Foreword

Along with the other constituencies of the former Yugoslavia, Kosovo as a province has, since 1989, seen major structural changes that have extended into all areas of society and thus affected the living conditions of its citizens. A destructive and deadly armed conflict in 1999 was ended by NATO intervention and followed by direct UN administration, which was ongoing when this report was finalized in January 2008. UN oversight has aimed primarily at establishing a new, democratic system in Kosovo and laying the groundwork for enhanced political, social and economic engagement by all citizens.

Despite the best intentions of the UN, Kosovo institutions and its people, reconstruction and development have been slow. Persistent capacity and supply problems in the energy sector provide a clear example of the ongoing challenges to renewed economic growth, increased opportunities and enhanced quality of life in Kosovo. Significant improvement in the sector is vital to efforts to boost confidence and establish a strong foundation for economic and human development. For that reason, UNDP's Kosovo Human Development Report (KHDR) 2007 has focused specifically on domestic energy issues.

Kosovo's economy has been based historically on mining, agriculture and the production of electricity. All of these sectors are in poor health today, but policy makers are hoping to boost investment and improve conditions. They are likely to face a difficult road ahead in terms of increasing electricity supplies, which no longer meet even domestic demand as a result of years of inadequate and weak management of the energy sector. Efforts to improve the sector cannot be identified and implemented solely from an economic perspective, however. The impacts of energy and electricity production on human development in general, and on environmental and public health more specifically, also must be considered. With those crucial imperatives in mind, this KHDR raises and discusses the following questions: *How* energy relates to human welfare and development? What are the key trends and factors driving energy consumption, and how do consumer attitudes and behaviours relate to them? What is the relationship between energy demand and supply, and how can it be managed appropriately in the future? What are the impacts of energy use on human development? What are the possible key implications of future energy policies on environment?

Finding constructive answers to those questions is essential to identify appropriate priorities regarding:

- investment in existing infrastructure;
- improvements in electricity supply;

- improvements in relationships between energy consumers and suppliers, by increasing communication and with improved collection rates;
- potential reductions in energy demand, through conservation; and
- increasing public awareness about the existing problems in energy sector as well as energy conservation measures.

It is beyond the scope of this report to analyse each of those wide-ranging issues in depth. Instead, the KHDR 2007 focuses primarily on one key goal: How to link consumers' demands and expectations with the realities of the energy system and the devastating environmental consequences of energy production. To this end, the report contains a thorough analysis of the trends, perceptions, attitudes and behaviours of Kosovo residents related to energy consumption. One overarching conclusion is that sustainable development can be maintained only if three interrelated components are met: economic, environmental and social sustainability. The baseline assumption of all effective policies, including those related to energy, is that social stability cannot be achieved without improving the quality of people's lives. In turn, their lives cannot improve without a better functioning energy system. Therein lies the heart of the relationship between energy and human development.

KHDR 2007 supports a conception of human development that identifies human potential as the keystone of development and views economic growth as a means and not the end of progress. As concluded in this report, perhaps the most important step that policy makers can take is to better explain the current problems to the public and enlist broad citizen support in overcoming them. When people are kept in the dark—whether from power outages or lack of information—they are far less likely to consider or implement changes in their own lives that can have positive impact on development.

Frode Mauring Resident Representative UNDP Kosovo

#### **Executive Summary**

The energy sector in Kosovo is in a critical situation. The existing electricity production and supply systems have suffered from many years of underinvestment, and they cannot meet present and future anticipated demand. There is no reserve capacity, and power outages are frequent at peak demand periods as well as when there are unexpected technical failures in the system. The government is forced to allocate funds to cover the cost of imported electricity in an attempt to meet demand during the winter months.

The current situation is particularly noteworthy given the fact that Kosovo was at one time a net exporter of electricity. Kosovo may not have any oil or natural gas resources, but it has extensive reserves of lignite, a form of coal that is used mainly in the production of electricity. The potential to once again export energy therefore exists, but the capacity to do so is lacking.

In the last eight years Kosovo institutions and international community were focused solely on support to production. On the other hand leniency with regard to bill collection in early days of post-conflict reconstruction has lead to problems in collection and enforcement of rule of law. With this regard there was also a lack of investment in addressing the issues of non-payment, the prepayment metering initiative although discussed in public never took hold and no plans for implementation were foreseen.

Policy makers are under increasing pressure to address the problems. The current energy policy in Kosovo is therefore focused primarily on determining methods and strategies to improve the quality, reliability and scope of the electricity supply. The capacity constraints have numerous negative impacts. The lack of an adequate and reliable supply of electrical power limits business development and reduces the profitability of existing operations, which in turn places serious limitations on the potential for sustained economic growth. The impact of weak energy infrastructure on business development has a significant indirect impact on human development, as it limits the potential for the creation of new employment opportunities. This is a seriously debilitating outcome because Kosovo's industrial base has withered over the past two or three decades because of neglect and the repercussions of the political, social and economic upheavals stemming from the break up of the former Yugoslavia. Partly as a result, the unemployment rate in Kosovo is estimated to be around 43 percent, and continued joblessness is a major contributing factor to the prevailing high rates of poverty.

Almost half the rural population is estimated to be living below the national poverty line, and the lack of prospects in those relatively isolated areas is prompting people to move to cities. Such population shifts exacerbate neglect of rural areas and generally prove unhelpful in some respects to those moving to cities, given that unemployment in urban areas is also high, at around 37 percent. Young people are becoming increasingly concerned about their future in Kosovo, leading to the threat of emigration on a wide scale, as reported in the Kosovo Human Development Report 2006. Job creation, which might staunch that outward flow, is constrained by the high costs associated with the poor supply of energy. Consumers suffer in response in the form of higher prices for local manufactured goods and services.

In addition to these indirect impacts of energy on household incomes, access to reliable and affordable energy services—that is, heat, light and motive power—is a key factor in human development. At the household level, these services are provided in large part by electricity, which is not always available in Kosovo. Imported oil products and gas (in canisters, because there is no gas network in Kosovo) for use in transport and as a source of household energy are generally reliable in supply, but not always in quality. Firewood, the third most widely used source of energy in Kosovo, is used primarily for space heating at the household level. The extensive use of firewood in households is, in itself, an indicator of poverty; it is considered to be at the bottom of the "energy ladder" in terms of human development.

Issues related to energy use and consumption in Kosovo cannot of course be addressed in a vacuum. The impact of energy production, supply and consumption on the human environment is a global concern. Energy-related activities are a major source of the emissions of gases that contribute to global warming, which is already having far-reaching consequences as ecosystems that support all life, including human activities, are destabilised by rapid climatic changes.

At a more localized level, energy production and consumption are major causes of environmental pollution that has negative consequences for human health and well-being. In Kosovo, lignite mining and the production of electricity from this source in old and inefficient thermal power plants are heavily polluting. Emissions of toxic gases and particulate matter in the areas around power stations and lignite mines are at levels that would be unacceptable under EC regulations, and air quality is poor. These activities also contribute to land and water contamination and use large volumes of water resources, which are not abundant in Kosovo. Exhaust emissions from the growing number of private vehicles, many of which use poor quality fuels, is adversely impacting on urban air quality. And finally, there are also concerns about the indoor air quality in dwellings where firewood is burned, and the attendant implications for human health.

This report is the first study undertaken in Kosovo on the relationship between energy and human development. Given the critical situation in the energy sector, and the potential adverse impacts on human development, it is an important issue for Kosovo's UN Administration Mission (UNMIK), the Provisional Institutions of Self-Government (PISG), and other international partners to address at the policy level. In addition to the need to create jobs and protect the environment and human health, a need that is already recognized at the policy level, policy planning must take into account the impacts of human behaviour-for better or worse—on existing and proposed policies in these areas. Moreover, many of the indirect consequences of the poorly performing energy sector are inherently difficult to measure, such as the disincentive to investment, which leads to reduced job creation potential.

Unfortunately, hardly any attempts to measure such impacts have been taken at all to date. Thus planners' ability to develop effective strategies in Kosovo is constrained by a lack of statistical and other data on the human development-related impacts of energy. This report faced many of the same constraints. Furthermore, the absence of monitoring and information systems for both environmental quality and human health was a serious limiting factor. One result was that, unconventionally for a Human Development Report, the study took the energy situation and problems as a starting point, and then sought to gain a better understanding of the human development aspects of these problems. A key element in this regard was a public opinion survey that gathered information on the behaviour and expectations of household and individuals in relation to energy use, and the perceptions and attitudes that shape behaviour and expectations.

#### Key results

The main energy supply problem in Kosovo relates to the electricity sub-sector. The key finding from this study in relation to energy supply is that the majority of household consumers lack awareness about the overriding problems in the electricity production and supply systems. That finding indicates that consumers do not realize the core of the problem: that supply cannot meet consumer demand at peak periods because the physical infrastructure is inadequate, despite regular electricity imports and spending of more than €700 million (\$1.03 billion) of investment in rehabilitation and upgrading of electricity institutions and infrastructure since 1999. There are three major factors at play:

- high non-technical losses caused by (i) theft of electricity from illegal connections to the distribution network and tampering with meters; (ii) inaccurate metering and (in some cases) an absence of meters; and (iii) non-payment of bills by end-users;
- high technical losses in the outdated and overloaded transmission and distribution systems; and
- insufficient production from the existing power plants to meat peak demands, compounded by the relatively frequent losses of entire production units from (i) shutdowns in the system for repair purposes and (ii) lack of back-up capacity.

The insufficient production is being addressed through a proposed project to construct a large new lignite-based thermal power plant in Kosovo, through private investment. Other potential sources of electricity are limited in comparison with lignite, both in terms of supply and costeffectiveness, and are therefore receiving far less attention. Under current plans, the new power station is expected to be partially operational by 2012, but a more likely date is thought to be 2015. Long-term investment programmes have also been instituted to upgrade the transmission network during the period up to 2015.

In the meantime, the loss of revenue to the electricity supply and distribution company, KEK, from non-payment of bills is a key constraint in progress towards corporate financial viability of KEK as well as the stabilization of the electricity sector in Kosovo. Moreover, these losses represent lost investment in the rehabilitation of existing infrastructure and the provision of new capacity. The immediate problem in the electricity sub-sector is therefore widely presented as related to the theft of electricity and the non-payment of bills. In the context of these supply problems, it is acknowledged in official policy documents that the environmental impacts of existing electricity generation are a lesser priority.

The public opinion survey found that public perceptions of the electricity problems focused less on the physical infrastructure problems about which there was limited awareness—and more on the internal management and operational problems within KEK, and the theft of electricity and non-payment of bills. This focus both reflects and reinforces the long-standing hostile relationship that exists between KEK and its customers. The public opinion survey also found that awareness about the plans to build the new power station, together with the alternative options for power generation, was limited, which indicates that the citizens of Kosovo are not participating in decisions about their energy future to any significant extent. The supply situation is unlikely to improve significantly in the immediate future, even if investment funding were available, because the time lag between receipt of investment funding and delivery of improvements to the infrastructure is estimated to be a minimum of 24 months. This means that in addition to paying their bills more regularly, consumers should be facilitated to reduce demand by conservation and by fuel switching.

The data from the household survey suggests that household are responding strongly to energy prices and reliability, but less so to other factors such as impact on comfort and health, and environmental impacts. This is particularly illustrated by the relative unimportance to surveyed households of energy efficiency in transport use. It was found that many people were not fully aware of the problems of fuel quality, and that most privately owned vehicles were old and fuel-inefficient. In addition, there is an increasing trend towards private vehicle use, even for short journeys, and away from public transport use. This trend persists despite the high cost (relative to incomes) of petrol.

Findings from the survey's questions regarding the consumption of energy at the household level indicated that energy conservation, rather than energy efficiency, measures are used to reduce consumption of energy. This is exemplified in respect of behaviour towards space heating in the home. The majority of households heat only one room in winter, but less than half of the households had invested in basic thermal insulation of their homes, which would avoid substantial wastage of the energy consumed. Despite these behaviours, and the perception of the majority of those surveyed that they are not well-informed on energy issues, there are indications that energy consumers believe they are doing all they can to save energy.

The household sector is the major consumer of electricity, firewood and district heating in Kosovo. Therefore, it is at the household level where the most intensive efforts should be made to address the consequences of limited domestic electricity production, the high cost of imported electricity, and high levels of environmental pollution from energy production and use.

The pressing need for energy conservation, energy efficiency, and informed choices at the household level does not, however, easily translate into clearly effective solutions. Consumer behaviour is influenced more by individual perceptions and attitudes than by policy makers' evidence-based exhortations. Where low consumer awareness about the impacts of their behaviour—and about the options, costs and benefits of behaviour change-prevails, the influence of individuals' perceptions and entrenched attitudes is very strong. In order for policy makers and other concerned organisations to initiate activities to encourage payment of bills, energy demand reduction and/or fuel switching, an understanding of consumer perceptions and attitudes is needed. It is notable, for example, that the majority of those who participated in the survey believed that they themselves could contribute little or nothing toward efforts to reduce pollution.

#### Recommendations

Recognizing that scarce human resources and funding are already thinly spread across the energy sector, recommendations emerging from this report concentrated on areas and activities that could ameliorate the current energy and related human development problems in the short term, while also prioritising activities that would contribute towards a sustainable energy future in the longer term. The recommendations relate to:

- improving the long-term viability of the electricity companies, and improving their relationships with their customer base;
- moving forward on the policy agenda on renewable energy development, energy efficiency and fuel switching at the household level, in order to benefit long-term sustainable social, economic and environmental development;
- addressing, simultaneously, the (i) potential for the development of district level energy supplies to support local de-

velopment and job creation, and (ii) the improvement of locally provided energy services;

- reinforcing the urgent need to establish environmental monitoring and to gather more data on fuel use and impacts at the household level to inform future policy planning; and
- improving the energy balance by (i) establishing a tariff that finances imports and (ii) enforcing payments from customers.

The key message emerging from this report is that raising awareness, and engaging the participation of, Kosovo's citizens is an integral part of the achievement of a sustainable energy future. The present policy focus on energy as an infrastructure issue warrants clear and transparent reorientation towards meeting the expectations and energy service needs of the people of Kosovo. In turn, the people themselves have a right, and a responsibility, to be active partners in this process.

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#### Abbreviations

СНР	combined heat and power
CO2	carbon dioxide
EAR	European Agency for Reconstruction
ERO	Energy Regulatory Office
EU	European Union
GDP	gross domestic product
GHG	greenhouse gas(es)
GTZ	German Technical Cooperation Agency (Deutsche Gesellschaft für Technische Zusammenarbeit)
GWh	gigawatt hours
HDI	Human Development Index
IEA	International Energy Agency
IMF	International Monetary Fund
KCB	Kosovo Consolidated Budget
KEK	Kosovo Energy Corporation
KOSTT	Kosovo Transmission System and Market Operator
KTA	Kosovo Trust Agency
ktoe	kilotons of oil equivalent
kV	kilovolt
kWh	kilowatt hours
LPG	liquefied petroleum gas
MAFRD	Ministry of Agriculture, Forestry and Rural Development
MDG	Millennium Development Goal
MEM	Ministry of Energy and Mining
MESP	Ministry of Environment and Spatial Planning
MW	megawatt
MWh	megawatt hours
OEK	Kosovo Chamber of Commerce(Oda Ekonomike e Kosovës)
PISG	Provisional Institutions of Self-Government
POE	publicly owned enterprise
RES	renewable energy sources
SME	small and medium-sized enterprise
SOK	Statistical Office of Kosovo
TPP	thermal power plant
TWh	terawatt hours
UNDP	United Nations Development Programme
UNMIK	United Nations Interim Administration Mission in Kosovo
USAID	United States Agency for International Development





#### INSTITUCIONET E PËRKOHSHME TE VETËQEVERISJES PRIVREMENE INSTITUCIJE SAMOUPRAVLJANJA PROVISIONAL INSTITUTIONS OF SELF-GOVERNMENT

#### ZYRA E KRYEMINISTRIT URED PREMIJERA OFFICE OF THE PRIME MINISTER

#### Energy as imperative for Kosovo's economic growth and human welfare

Ensuring Kosovo is open for business and economic development means we must confront our greatest economic challenges: energy and infrastructure. As the Prime Minister of Kosovo I consider energy as the greatest impediment to economic growth and stability. To improve immediately the situation, the government will work to reorganize KEK and increase energy payments. In addition to this, my government will also study the needed investment in the electricity transmission network.

Our aim shall be to create the necessary infrastructure for the private sector to enter the market, build new power generating capacities, supply consistent energy to our people and be a regional exporter of energy. We must also study the viability of alternative sources of energy to meet current demand. The lack of consistent energy will be considered by this government as a national crisis and we will present a bold reform package that will offset the demand caused by the delay of Kosovo C.

Kosovo government with the support of all our local and international energy experts shall examine the various short-term solutions that exist to improve the situation and let us be even more innovative. From the sun to the wind let us work together and study alternative sources of energy that can be harnessed to meet our demand. And let us see if we can make Kosovo the greenest country in Southeast Europe.

The entire world is now grappling with the question "where will we get the energy to power the global economy of the 21st century without causing irreparable damage to our natural environment?" Let's make Kosovo the place where that defining question is answered. Let's make Kosovo a regional center for clean, renewable energy research, product development and job creation. Let's attract companies from around the world that are developing the clean, renewable energy sources of the future.

Minister of Kosovo



## **Energy and Human Development in Kosovo**

- Overview of key political, economic and social indicators
- Energy and human development
- Environmental consequences of energy production
- Energy in Kosovo
- Energy impacts on human development in Kosovo
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### **Energy and Human Development in Kosovo**

Energy development is associated with both positive and negative outcomes. One the one hand, it is universally recognized that adequate and reliable supplies of energy services—heat, light and motive power—are a precondition of sustainable economic development in the context of the global economy. Moreover, improved access to energy services is closely correlated with increased human welfare.

In recent years, however, the negative outcomes of energy consumption have received widespread attention with growing international recognition of the ongoing process of climate change (also known as "global warming"), probably the most serious threat to the global environment today. The main focus has been on emissions of harmful gases ("greenhouse gases") from the combustion of fossil fuels into the atmosphere. At a global level, such emissions have increased more than four-fold since the middle of the 20th century. In response, the international community negotiated the UN Framework Convention on Climate Change in the early 1990s, and the Convention's Kyoto Protocol for its implementation (which came into force in 2005), to slow down and reverse the high growth in concentrations of GHG<sup>2</sup> in the atmosphere.

Policymakers around the world cannot avoid the tension inherent in such conflicting outcomes. They increasingly face the problem of identifying responses to two priorities that require different and complex solutions. How can or should efforts to increase access to reliable energy sources be integrated with complementary strategies designed to slow climate change?

These questions are particularly relevant in Kosovo, which is engaged in a difficult process of post-conflict reconstruction following years of political upheaval, economic decline and social instability. The energy sector has been described as being in "an acutely critical situation"<sup>3</sup>. Power supply is inadequate and unreliable, a situation that continues to hinder efforts to develop the economy through increased business investment and job creation. Existing infrastructure in general is in poor condition. Such challenges are among the main reasons the industrial, energy and agriculture sectors, once the mainstays of the economy, have severely reduced their pre-conflict output.

Energy for economic and human development in Kosovo is, as a result, a key policy issue during the transition period. The Kosovo Human Development Report for 2007 aims to review the present policies and activities for the development of the energy sector in the context of the complex relationships between energy and human welfare. These include the interrelationship between energy and the environment at both the local and global levels.

#### 1.1 Overview of key political, economic and social indicators

Although an autonomous province of the former Socialist Federal Republic of Yugoslavia, Kosovo was a constitutive part of the federation. It formally remained part of the new Yugoslavia, which comprised only Serbia and Montenegro, after the federation started to break up in 1991. Conflict with the Serbian government over Kosovo's status emerged in the late 1980s and escalated into an armed struggle in the late 1990s. In 1999, a peace agreement was negotiated, under which the security and administration of Kosovo was placed under UN control. Negotiations between Serbian officials in Belgrade and their Kosovar counterparts in Prishtinë/Priština started in 2005, under UN and international supervision. At the time this report was finalized, in January 2008, Kosovo's future status had yet to be determined.

The population, estimated at 2.1 million in 2007, comprises 92 percent ethnic Albanians (K-Albanians), 5.3 percent ethnic Serbs (K-





Table 1.1

Serbs), with the remaining 2.7 percent being made up of other ethnic groups<sup>4</sup>. Areas where the majority of the population are K-Serbs are in the municipalities of Leposaviq/Leposavić, Zubin Potok, Zveçan/Zvećane and the northern part of Mitrovicë/ Mitrovica—all in the far north of the territory—and in the southern municipality of Shtërpc/Strpce. (Figure 1.1 contains a map of Kosovo with key municipalities noted.).

Over the past eight years, the United Nations Interim Administration Mission in Kosovo (UNMIK), together with other international partners, has invested in institution-building for future political and social stability. During this period, UNMIK has gradually transferred parts of its security, governance and administrative remits to local Provisional Institutions of Self-Government (PISG). Even so, interethnic tension persists, a legacy of the conflict. Security in K-Serb enclaves remains a difficult and sensitive issue, and efforts to engage the participation of K-Serbs in the emerging political institutions have been largely unsuccessful.

International and bilateral agencies have worked with UNMIK and the PISG to finance the rehabilitation of damaged and neglected infrastructure, and to try to put Kosovo on a path to sustainable economic growth. There have been some encouraging signs of progress recently (Kosovo's main macroeconomic indicators are shown in Table 1.1). Gross domestic product (GDP) was estimated to have grown by around 3.5 percent in 2007. That occurred despite a reduction in foreign aid, from 21.9 to 20.5 percent of GDP, and a decrease in government spending from 31.2 to 27.7 percent. The growth of GDP has been attributed, in large part, to growth in the local private sector.

According to a recent report from the UN-MIK Economic Policy Office, exports grew by 54 percent in 2006, although it should be noted

	2002	2003	2004	2005	2006	2007
Real increase of GDP (%)	-1.5	0.6	2.0	-1.0	3.1	3.5
Inflation (%)	3.6	1.2	-1.4	-1.4	1.5	3.9
Investment growth (%)	-7.7	-13.3	23.3	-7.5	10.0	15.2
Growth in exports total (%)	-30.9	7.5	-13.0	-5.0	30.8	21.5
Growth in imports total (%)	-9.9	-5.4	5.1	2.2	7.5	12.5
Coverage ratio of exports to imports (%)	19.5	22.1	18.3	17.0	20.7	22.4
Remittances (in millions of euros)	70	140	219	277	352	390
Foreign assistance (in millions of euros)	897.5	698.7	565	491	465	352

Source: IMF Aide Memoire October 2007. Exceptions: Data for inflation (CPI) for 2007 is from the Statistical Office of Kosovo.

Kosovo's main macroeconomic indicators

that data used by the United Nations Development Programme (UNDP) for 2007 indicates a lower growth rate of 21.5 percent (as shown in Table 1.1). The same report estimates that the growth of private investment (other than housing) was 61 percent. Public revenue grew to 31.4 percent of GDP, due not only to the growth in economic activity, but also to administrative improvements in tax collection<sup>5</sup>.

In 2005/6, following stagnation of GDP growth in 2005, it was estimated that 45.1 percent of the population were living below the national poverty line, with 16.7 percent of the population living in extreme poverty<sup>6</sup>. According to data from the Statistical Office of Kosovo, poverty is more prevalent in rural areas than among urban populations, and the gap between them appears to be widening. The proportion of the rural population living in poverty in 2005/6 was estimated to be 49.2 percent, with 18.1 percent in extreme poverty, compared with 44.2 percent and 12.5 percent, respectively, in 2003/4. During the same period, urban poverty decreased, from 42.1 percent in 2003/4 to 37.4 percent in 2005/6. The proportion of the urban population living in extreme poverty also fell, from 15.6 percent to 14 percent<sup>7</sup>. Unemployment remains high; it was estimated at between 42 and 44 percent in 2005. The Ministry of Labour and Social Welfare has reported that the vast majority of unemployed citizens (up to 90 percent) are long-term unemployed who have little prospect of finding work in the near future<sup>8</sup>.



Kosovo is last in the Balkans region in terms of its performance against UNDP's Human Development Index (see Figure 1.2). Recently calculated scores for Kosovo in 2007 indicate that there has been little positive change: Kosovo's overall HDI score for 2007 is 0.745, compared with 0.740 in 2006. (It must be noted that direct comparisons are not available in Figure 1.2. The HDI score for Kosovo is for 2007, while the scores for all other entries are for 2005, the most recent year for which they were available.)

Kosovo is not ranked in the global Human Development Index (HDI), but its overall HDI score would place it in the "medium human development" category. Kosovo's relatively poor HDI score is primarily related to its low relative score on the income (GDP) index—

Table 1.2	Kosovo's main Hu (compared with oth	iman Development Indices er countries in the Balkans reg	for 2007 ion)	
		"GDP index"	"Life expectancy index"	"Education index"
Greece		0.910	0.970	0.898
Slovenia		0.902	0.874	0.974
Croatia		0.813	0.839	0.899
Bulgaria		0.752	0.795	0.926
Romania		0.752	0.782	0.905
B&H		0.710	0.825	0.874
Macedonia		0.663	0.853	0.887
Albania		0.714	0.814	0.875
Turkey		0.740	0.773	0.812
Kosovo		0.625	0.731	0.883

Sources: UNDP Global Human Development Report 2007/8 and (for Kosovo) data computed and provided by UNDP Kosovo, December 2007.

one of the three main indices on which the overall HDI score is based (see Table 1.2). In 2007, Kosovo's GDP index showed the greatest increase of the three main indices since 2006: up to 0.625 from 0.600. Even with that surge, which was attributed largely to movements in exchange rates, the score still lags significantly behind most countries in the region.

#### Life expectancy index

Due to the lack of reliable data, it was impossible to obtain a reasonably accurate value for Kosovo's life expectancy index in 2007 (see Figure 1.3). Therefore, the 2004/2006 value was used for measuring the 2007 HDI. That decision was based on the assumption that no changes occurred during the ensuing year that would have a significant impact in the value of this indicator. Kosovo continued to rank as the last in the Balkans in 2007.



#### **Education index**

The approximate value of the education index for Kosovo is based on data from 2006 regarding attendance in primary, secondary and university education. The calculated value is 0.883 (Figure 1.4); based on this value, Kosovo ranks higher than the Former Yugoslav Republic of Macedonia (FYR Macedonia), Bosnia and Herzegovina and Turkey in the Balkans region.



Source: UNDP Global Human Development Report 2007/8 and (for Kosovo) data computed and provided by UNDP Kosowo, December 2007. Note: "B&H" refers to Bosnia and Herzegovina; "Macedonia" refers to the Former Yugoslav Republic of Macedonia.

## 1.2 Energy and human development

Numerous studies have shown that access to energy services is positively linked to human development, and that access to electricity is particularly important in this respect<sup>9</sup>. A study undertaken by Pasternak in 2000, based on 60 countries, demonstrated a close correlation between per capita electricity consumption and overall HDI score. An analysis of data from UNDP's 2007/8 Human Development Report illustrates this trend (see Figure 1.5).

Pasternak's study, using data for 1997, found that there appeared to be a threshold level of around 4,000 kWh of electricity consumption per capita to achieve an overall HDI score of 0.900 or higher<sup>10</sup>. Data in the 2007/8 Global Human Development Report suggest that this threshold remains valid: none of the countries with an overall HDI score of 0.900 or more had a per capita consumption of electricity less than 4,000 kWh<sup>11</sup>.

Data for countries in South-East Europe in 2004, and recent data for Kosovo, show similar findings to Pasternak's study (see Figure 1.6). Albania has the lowest per capita electricity consumption in the region (1,847 kWh), with Kosovo's only slightly higher at 1,855 kWh; both are less than half the threshold level of countries with high human development scores.



#### Spending priorities: Energy versus health and education

The problems in the energy sector, particularly regarding insufficient electricity, pose a serious threat to the provision of public services in Kosovo. The resulting deficiencies have a negative effect on human development because they limit and decrease capacity and choices. For example, electricity cuts and a lack of back-up systems in most schools greatly hinder students' access to high-level education. The media have also reported that electricity shortfalls in public hospitals have been directly responsible for complications during medical procedures that have led to fatalities.

Although rare, such events are clear examples of the direct negative impact of the lack of reliable electricity on human development. The electricity shortfall's truly pervasive negative effect on human development can also be seen by analyzing allocations from the Kosovo Consolidated Budget (KCB) in recent years. Over last six years, KCB subventions and transfers to the Kosovo Energy Corporation (KEK), the public-sector electricity supplier, totaled some €129 million (\$200 million). Meanwhile, the amount allocated to the health and education sectors totaled just €8 million combined (\$ 12.64 million), which represents a paltry 6 percent of the funds transferred to the energy sector (see Figure 1.7). Those figures offer proof that although the health and education sectors are in urgent need of funds and capital investments, interventions in the energy sector remain the government's main priority by far. Such resource-allocation decisions further impede efforts to improve human development in Kosovo.



#### 1.3 Environmental consequences of energy production

Throughout the world, the production, supply and consumption of energy sources and services is associated with the emissions of pollutants to air, soil and water, causing environmental damage that impacts on the health and well-being of all living things. As noted previously, global concerns about climate change have focused attention particularly on emissions of carbon dioxide ( $CO_2$ ) and other greenhouse gases (GHG) into the atmosphere. Combustion of fossil fuels has historically been, and continues to be, a major cause of the increased concentration of GHG in the atmosphere. Combustion occurs, for example, when petroleum is used to power cars and when fossil fuels are used in the



production of electricity. The latter is of particular concern in terms of GHG concentration.

Relatively abundant and cheap by comparison with other fossil fuels, coal is commonly used for electricity production in many countries. All aspects of its use are environmentally destructive. First, coal mining itself is a highly polluting activity that is also damaging to human health. The exposure of surface areas in mining operations, together with coal waste, can lead, over time, to the production of sediments and toxins that leach into nearby streams and soil. That development is potentially devastating for human, animal and plant habitats and may contaminate water supplies and food crops. Prolonged exposure to, and inhalation of, dust from mining operations is hazardous to those living and working in the vicinities of mines, leading to a high incidence of lung disease at the local level.

Combustion of coal produces higher level of  $CO_2$ , nitrous oxides and sulphur oxides than all other sources. In addition to contributing to increased GHG concentrations, sulphur and nitrous oxides combine with atmospheric moisture to produce sulphuric and nitric acids in the air. This phenomenon, often referred to as "acid rain", can degrade forests and water resources, and their associated plant and animal life, even at great distances from the original pollution source. Coal combustion also produces particulate matter that can be carried in the air across hundreds of kilometres.

Other pollution caused by electricity production includes thermal pollution of water. That occurs when water used as a coolant in thermal power plants is discharged into local water courses, thereby raising the water's temperature to levels that are harmful to fish and other aquatic life. Furthermore, the construction of power plants, transmission and distribution lines impacts on land use and local habitats for people, flora and fauna.

Finally, exhaust fumes from vehicles also contribute to air pollution, particularly in urban areas. Carbon monoxide, nitrogen oxides, and various hydrocarbons are among the compounds emitted from automobile exhausts that can have severe impacts on both human and plant life. Children and the elderly are particularly vulnerable to respiratory diseases caused by these emissions.

Poor environmental performance is characteristic of energy systems in South-East Europe. As a 1999 European Agency for Reconstruction (EAR) report notes, "The power industry in the region is characterized by polluting, inefficient and aging capacity" (see Box 1.1).The use of coal in electricity production, as happens in Kosovo, is particularly damaging to the environment.

#### 1.4 Energy in Kosovo

Kosovo's economy has historically been centred on mining, agriculture and electricity production. While the territory has only a narrow range of energy resources, it has the largest coal reserves in South-East Europe; coal (in the form of lignite) is therefore expected to power

#### Box 1.1

#### .1 Energy in the Balkans region

Countries in South-East Europe are net energy consumers. Energy imports represent around 40 percent of total energy consumed and electricity imports are no exception. During the last decade or so, energy production, including electricity, has fallen in most of these countries as a result of major economic adjustments or war, or both.

The heat waves that swept across the Balkan peninsula the summer of 2007 increased consumption while simultaneously causing water shortages throughout the region which, in turn, decreased the supply of hydropower. The result was an energy crisis across the region; a two-hour blackout in July 2007, for example, hit virtually the entire region.

Supply and use of electricity are also inefficient by modern standards. Such inefficiencies not only have negative economic consequences but also lead to more intensive environmental degradation. Heavily polluting coal is the source of more than 90 percent of electricity produced in Kosovo and 85 percent of that produced in FYR Macedonia. Coal is also the source of around one-third of electricity generation in Bosnia and Herzegovina, Bulgaria and Romania.

Kosovo's electricity problems resemble those of the other regional countries. What makes Kosovo unique, however, is the extent of the challenges. Although during the period between 1960s and 1980s Kosovo's electricity sector benefited from investment and was developed, it was exploited for the benefit of the other republics in the then-Yugoslavia; it was not maintained properly; and it was destroyed even further during the conflict. In the meanwhile, electricity sectors elsewhere in the region—except perhaps for Albania—have been upgraded, modernized and are functioning better. the bulk of domestic electricity production in future<sup>12</sup>. Despite the prevalence of energyintensive industry, including metallurgy and cement manufacture, Kosovo was at one time a net exporter of electricity. Now, though, as reported by the Energy Regulatory Office in Kosovo, "from being a contributor to economic growth, the power sector has become a drain on public resources"<sup>13</sup>.

Nevertheless, the energy sector in Kosovo remains one of the most important sectors of the economy. It is also one of the most polluting: lignite, oil and fuelwood make up 96 percent of Kosovo's energy consumption (see Figure 1.8, based on forecasts for 2007).



Kosovo relies primarily on its large reserves of lignite for the production of electricity. A small proportion of electricity is produced at hydropower plants. Fuelwood, most of which is harvested within Kosovo, is used as a source of heat in households, industry and commerce. Petroleum products, all of which are imported, make up 30 percent of total energy consumption. They are mostly used in transport, but also for powering generators, smelters for industry and for heating, cooking and lighting. In addition to these four main sources, a small amount of solar energy is produced at the household/enterprise level. Kosovo has no natural gas, and the viability of gas imports has yet to be thoroughly assessed.

#### **Energy institutions**

Since 1999, Kosovo's energy has been under the political authority of the UNMIK EU Pillar IV and the Provisional Institutions of Self-Government (PISG). Of the PISG, the Ministry of Energy and Mining (MEM), established in 2004, has the main policy role in energy. In addition, there are independent regulatory bodies for mining and energy: these are, respectively, the Independent Commission on Mines and Minerals and the Energy Regulatory Office. Other important areas of responsibility lie with the Ministries of Trade and Industry, Transport and Telecommunications, Agriculture Forestry and Rural Development, and Environment and Spatial Planning. The Ministry of Trade and Industry is responsible for licensing and quality control in respect of imports of oil products and derivatives, while the Ministry of Agriculture's remit includes all forestry activities, including those related to fuelwood harvesting. The Ministry of Transport and Telecommunication plays the key role in managing energy consumption and monitoring the impacts of energy production and supply that are related to transport.

Much of the effort put into energy development by UNMIK and the PISG since the end of the conflict relates to the drafting and introduction of new legislation. Among the various laws passed regarding energy and electricity was one establishing an independent energy regulator, the Energy Regulatory Office and a Law on District Heating. All legislation conforms to EU directives and standards, and contributes towards meeting the requirements for Kosovo's future integration into the EU. Related to these developments is Kosovo's accession to the Energy Community Treaty, a regional agreement for the development of an integrated single regulatory energy market in South-East Europe (see Box 1.2). That process is currently on hold until Kosovo's legal status is resolved. Because as of January 2008 it was not legally a state in its own right, Kosovo could not become a party to international conventions-and thus was unable to meet all requirements of the treaty, including accession to four international agreement.

Kosovo does not yet have laws on either energy efficiency or on the development and deployment of renewable energy sources. A draft law on energy efficiency, which included provisions for the establishment of an Energy Efficiency Agency, was rejected by the Kosovo Assembly in 2005 because of its budgetary implications<sup>14</sup>. However, a "Kosovo Programme

#### Box 1.2 The Energy Community Treaty

The Energy Community is an initiative that aims to extend the development of the European Union's internal energy market to the South-East Europe region. The key objectives are to develop a single economic and regulatory framework for the region, and to build energy networks to improve regional energy security and efficiency of supply. Regional electricity and gas markets are now being developed under the auspices of the Energy Community.

Compliance with energy, competition and environmental directives of the European Union is an integral component of the Energy Community Treaty, which was signed in October 2005. UNMIK, on behalf of the territory of Kosovo, is a signatory to the treaty, although some of its provisions cannot be fulfilled until Kosovo's future status is finalised. Nevertheless, the current legislative and institutional capacity building that is ongoing in Kosovo's energy sector is being carried out according to the terms of the Energy Community Treaty.

The Energy Community's goals are to:

- create a regionally integrated energy market for electricity and natural gas networks and to integrate that market into the wider EU market;
- establish common rules for generation, transmission and distribution of electricity;
- establish common rules for the transmission, distribution, supply and storage of natural gas;
- establish state level national energy authorities, regulators and transmission system operators;
- establish compatible state and regional electricity and natural gas market action plans;
- establish embryonic regional level dispute resolution mechanisms;
- open markets in line with EU commitments but with a suitable transition period;

- unbundle integrated utilities;
- establish and enforce transparent authorization procedures for new infrastructure;
- develop an anti-corruption program;
- implement grid codes and other technical and commercial codes that are necessary for the functioning of the market; and
- develop regulations governing third party access, tariff systems that encourage trade, and technical codes necessary for the operation of a trade-based regional system.

The timeframe for implementation of the treaty was as following:

- By July 1, 2007: implement the two EU energy market directives and the regulation on cross-border net-work access.
- From 1 January 2008: liberalization of the market for all non-household customers.
- By 31 December 2011: reduction in the sulphur content of certain liquid fuels.
- From 1 January 2015: liberalization of the market for all customers.
- By 31 December 2017: limitation of emissions of certain pollutants into the air from large combustion plants.

Although the same regulations apply to every participant country, conditions vary in terms of how and when they must meet the deadlines. The variations are based on economic conditions and levels of investment needed for energy sectors.

for Energy Efficiency and Renewable Energy Resources for the period 2007-2009" has been drafted by MEM with financial support from the European Agency for Reconstruction (EAR). Under the terms of the Energy Community Treaty, Kosovo must also prepare a timetable for the implementation of the range of EC directives relating to the environment and a position paper on the Kyoto protocol and its implications for the energy sector of Kosovo. It has been pointed out that although the EU directives, backed by the Energy Community Treaty, have led to the establishment of welldesigned legal systems, most treaty members have not been able to implement the directives according to the prescribed timetable<sup>15</sup>.

A key objective for the future development of energy in Kosovo is the liberalisation of the electricity market in line with EU directives. Until 2006, lignite mining and the production, transmission and distribution of electricity were all carried out by KEK, a vertically integrated, publicly owned enterprise (POE). According to a requirement of the Energy Community Treaty, and as the first phase of the unbundling of KEK, a new POE, the Kosovo Transmission System and Market Operator (KOSTT), was established and became operational in mid-2006. KOSTT is now responsible for the transmission system, with KEK remaining in control of operating mines, and electricity production and distribution.

Further unbundling of KEK is expected, but the schedule and outcomes of the ongoing process remain unclear. KEK is now under the authority of the Kosovo Trust Agency (KTA), an independent public body established by UNMIK to oversee the governance of Kosovo's POEs. Several key large infrastructure-related POEs, including KEK, have been incorporated into new joint stock companies. Although they still remain as public-sector companies, that marked a first step toward ending the government's monopoly on energy production and supply.

KTA is also responsible for privatising socially owned enterprises (SOEs) in Kosovo. From 2008, commercial consumers of electricity will be part of the open-market electricity supply system established under the terms of the Energy Community Treaty. Residential customers will not be included in the market system until 2015.

#### **Electricity production**

In the light of the critical situation in Kosovo's electricity supply, it is perhaps not surprising that the current strategy, laid out in the Ministry of Energy and Mining's *Energy Strategy of Kosova 2005–2015*, focuses heavily on this sub-sector of the overall energy field.

Kosovo has exploitable reserves of lignite estimated to be between 10 and 14 billion tons<sup>16</sup>. At present, two mines are operational, at Bardh/Belaćevac and Mirash/Miraš. Together they supply Kosovo's two thermal power plants (Kosovo A and Kosovo B) with 6.5 million tons of lignite per year. The plants are situated in the municipality of Obiliq/Obilič and are only a few kilometres from Kosovo's capital, Prishtinë/Priština. Kosovo A and Kosovo B have a combined installed capacity of 1478 MW, though both plants are running far below installed capacity (between 645 and 710 MW). Together, they produce over 95 percent of the locally generated electricity (see Figure 1.9), with the remainder supplied by the 35 MW Ujmani/Gazivoda hydropower plant in the north-western region of Kosovo, and two other small hydropower plants that feed directly into local distribution systems. In addition, Kosovo imports electricity from neighbouring countries in the Balkan region. Total supplied electricity in 2006 was 4.534 TWh, with imports accounting for around 12 percent of the total.



Despite electricity imports, and over €700 million (\$1.03 billion) of investment in rehabilitation and upgrading of electricity institutions and infrastructure since 1999, supply is unable to meet peak demand. End-users subsequently experience frequent power cuts, especially in the winter months<sup>18</sup>.



As shown in Figure 1.10, KEK has steadily increased electricity production since 1999. However, the increase has not matched the increase in demand, thereby creating a gap between production and consumption. The rise in demand has been driven mainly by an increase in the number of households, migration to urban centres and increased electricity consumption in households (which is also documented by a rise in sales of electricity appliances).

The main overall problem is that Kosovo's electricity system is characterised by extremely high losses (see Figure 1.11). In 2005, losses rose to over 50 percent of supplied electricity, though they fell to 47.1 percent slightly below the 2004 level—in 2006. The poor condition of the system in general is the main factor. The electricity generation, transmission and distribution systems have all suffered from years of underinvestment and neglect, and their substandard quality was further exacerbated by damage caused during the conflict.

Around 18 percent of the total losses in the electricity supply are categorized as technical losses. Transmission losses account for 3 percent, with 15 percent representing losses in the distribution system<sup>19</sup>. Some degree of technical losses is inevitable in transmission and distribution, although 18 percent is higher than average in the region<sup>20</sup>. The technical losses in distribution are high because the network has not been upgraded to meet expansions in demand and is now seriously overloaded.

However, KEK, Kosovo's electricity supplier and distributor, is even more concerned about the level of non-technical losses. Such losses are caused by metering problems, including inaccurate measurements and meter tampering; theft of electricity through illegal connections to distribution networks; and non-payment of electricity bills. Non-technical losses in 2006 amounted to over 30 percent of the electricity supplied to the distribution network<sup>21</sup>. These losses represented a revenue loss to KEK of approximately €64 million (\$94 million) in 2006, based on an average consumer price of 5.12 eurocents per kWh.



The loss of revenue to KEK from non-payment of bills is a key constraint in progress towards corporate financial viability. Moreover, they limit the company's ability to invest in the rehabilitation of existing infrastructure and the provision of new capacity. As a result, KEK's management has, to date, tended to focus on relatively short-term financial objectives.

Future electricity production in Kosovo faces two overriding problems. First, the Bardh/ Belaćevac and Mirash/Miraš mines are almost exhausted. It is expected that lignite extraction will start to fall off in 2008 and that the mines will no longer be operational by 2012<sup>22</sup>. The second problem is the lack of capacity of existing thermal power plants to generate sufficient electricity to meet present and future demand. In response, some of Kosovo's international partners, including the World Bank, EAR and the U.S. Agency for International Development (USAID), are now supporting the Ministry of Energy and Mining in a third phase of technical assistance for energy development (Energy Sector Technical Assistance Project III). The major new proposed project, "The development of a new lignite mining facility and associated new electric generating and related transmission capacity and the rehabilitation of existing generators", has three components:

- the construction of a new lignite mining operation, at the Sibovc/Sibovac field in the Kosovo basin (the same geographic area as the existing operational mines);
- the construction of a new thermal power plant, Kosovo C (see Box 2.1); and
- the rehabilitation of units at the Kosovo A power plant.

Exploitation of lignite is the cheapest and most feasible option for Kosovo to increase electricity production on a large scale<sup>23</sup>. Alternative natural resources in the territory are perceived to be limited. A study has been carried out to assess the potential for the development of new hydropower capacity, both through the construction of new plants and the rehabilitation of a small number of small-scale plants that are now out of operation. The current energy strategy includes the construction of a new 293 MW hydropower plant at Zhur/Žur. The strategy also anticipates that private investors might be attracted for other potential small-scale hydropower operations (see Box 1.3). Feasibility studies have been carried out that indicate a viable potential for the construction of up to 18 new small-scale hydro stations, and the rehabilitation and privatisation of another four small hydropower facilities that are currently owned by KEK<sup>24</sup>

The potential for the development of other renewable energy sources, including wind, biomass, waste and solar, has not yet been assessed. Viability studies for the development of these renewable energy sources are included in the Ministry of Energy and Mining's current programme (2007–2009) for energy efficiency and renewable energy resources<sup>25</sup>. However, the execution of this programme is dependent on securing extra-budgetary resources from donors. Therefore, the extent to which efforts to develop renewable energy and improve energy efficiency will progress at ministry level in the current strategic planning period (up to 2015) remains uncertain.

#### Energy for heating and cooking

Most households in Kosovo rely on individual household heating devices for space heating, water heating, and cooking. These devices use, variously, electricity, firewood, gas or oil. Woodburning stoves, used for both cooking and space heating, are among the most commonly owned durable household goods in Kosovo, according to the Statistical Office of Kosovo. Overall, around 90 percent of households owned a stove in 2005, although there was a sizeable difference between rates of stove ownership in rural and urban areas. Almost all (98 percent) of rural households owned a wood-burning stove, compared with 78 percent in urban areas<sup>26</sup>. Increased electricity consumption during the winter months is also assumed to relate to higher demand for heating in the winter peak period.

A minority of households are served by external heating provision. District heating systems, which rely on heavy fuel oil, exist in three cities. Their contribution is limited because they supply only around 5 percent of Kosovo's total heating demand, and provide space heating only. Some larger buildings, including some multi-unit housing blocks, have central boiler systems. These are usually oil-fired, although some industrial enterprises use fuelwood.

#### Transport fuels

Most oil products and derivatives that are imported into Kosovo are consumed in the trans-

#### Hydropower potential in Kosovo

Box 1.3

Kosovo has limited natural resources to build hydropower plants. According to the Statistical Office of Kosovo (SOK), the options include the following:

- Kosovo's main rivers: Drini i Bardhë/Beli Drim (122 km), Sitnicë/ Sitnica (90 km), Lumbardhi i Pejës/Bistrica Pec (62 km), Morava e Binqës/Binaćka Morava (60 km), Lepenci/Lepenac (53 km), Ereniku/ Erenik (51 km), Ibri/Ibar (42 km), and Lumbardhi i Prizrenit/Bistrica Prizren (31 km).
- The main lakes in Kosovo are: Gazivode (9.1 sq. km) located in Zubin Potok, Batllavë/Batlava (3.27 sq. km) in Podujevë/Podujevo, Badovc (2.57 sq. km) in Prishtinë/Pristina, and Radoniq/Radonić (5.96 sq. km) in Gjakovë/Dakovica. (SOK)

Even taking into account the limitations, building small hydro-electrical power plants can be economically reasonable if, in particular, they are built and run by private investors. One hydropower plant, "Kozhnjer" in Deçan/Dečane, is leased to private investors. This is an indicator that the private sector might be interested in producing energy through small hydropower plants.

port sector. Petrol and diesel are the two most common transport fuels. Most freight is carried by road, and while the number of cars per capita in Kosovo is still low, relative to elsewhere in Europe, there has been a substantial increase in private vehicle ownership since 1999<sup>27</sup>. The Ministry of Environment and Spatial Planning reported in 2006 that some 215,000 vehicles had been registered since the conflict ended in 1999, not including all the Kosovo Force (KFOR) and UNMIK vehicles<sup>28</sup>. By 2002, it was reported that an estimated 36 million litres of petroleum products were sold in Kosovo every month. Petroleum products are imported from various countries in South-East Europe through licensed distributors in Kosovo, who contract purchases through large international oil companies. As a result of the free market approach to oil imports, there have been no problems in balancing supply and demand in the consumer market<sup>29</sup>, although the PISG have not yet managed to secure oil stocks at a level that meets EC regulatory standards.

The sharp rise in oil prices in the global market over the past few years is one major area of concern related to transport fuels. Policy makers in Kosovo also express concern about the quality of the fuel supplied to end-users<sup>30</sup>. In the post-conflict period, hundreds of petrol stations were opened in Kosovo, many of which operate as family-owned micro-enterprises and are unlicensed. This means that they do not

hold an approved environmental permit, which requires that an Environmental Impact Assessment be carried out. The Ministry of Trade and Industry has closed down some petrol stations that were operating illegally, but it does not have the capacity to carry out extensive, continuous monitoring and enforcement throughout the territory. Low quality fuel was imported both legally and illegally (on the black market<sup>31</sup>) until recently.

The lagging performance standards of vehicles in respect of fuel consumption and emissions are also a serious concern. Many vehicles in Kosovo are old and badly maintained, some cars are not fitted with catalytic converters, and the phasing out of lead content in fuels has yet to be implemented. In 2007, the ministry established stringent fuel quality standards and set up a quality testing laboratory, but it is too soon to assess the impact of these initiatives.

## 1.5 Energy impacts on human development in Kosovo

It is expected that the private sector, and especially, small and medium-sized enterprises (SMEs), will drive future economic growth in Kosovo. However, the unreliability of the electricity supply is cited as one of the key constraints on private-sector development in Kosovo<sup>32</sup>. At an economy-wide level, therefore, energy infrastructure and supply have a significant and direct bearing on the potential for sustained economic growth, which in turn can boost employment opportunities and alleviate poverty. In addition, energy shortages and energy inefficiency in industry and services may lead to higher prices for services and consumer products, where the costs of energy inputs are passed on to consumers.

In such ways, energy has an important, though indirect, impact on the lives of the population. However, energy supply problems can also be seen to have significant *direct* impacts on human welfare. These relate, particularly, to personal finances, i.e., the proportion of income spent on household energy, and human health. The potential negative health-related impacts stem from (i) an inadequate supply of energy for heating and cooking and (ii) from the use of polluting energy sources, both at the household level and in local communities for the production of electricity.

## Private-sector development and job creation

The widespread income poverty and high rate of unemployment in Kosovo are pressing economic and social concerns. The alleviation of poverty through sustained economic development growth—specifically, the creation of income-generating opportunities in the private sector—is a key objective of policy makers. Therefore, a potential indirect but positive impact of energy supply on human development relates to the relationship between energy and the establishment and operations of businesses.

Major barriers persist to maximizing the potential of business development, however. As noted previously, the poor service provided by the electricity sub-sector is cited as a key factor in the relatively low levels of private-sector investment, either locally or from abroad. While a small number of large, mostly energy-intensive industrial firms receive a regular uninterrupted supply of electricity through direct high or medium voltage lines, most are subject to the same schedule of power outages under KEK's load-shedding schedules as are households. A study undertaken on behalf of the Ministry of Energy and Mining (see Box 1.4) found that overall, the firms surveyed reported an average total power outage of 1.43 hours per working day, with an average number of 6.7 power cuts each wek<sup>33</sup>.

Firms rely on backup generators in order to continue operating. One study estimated that the use of generators adds up to 10 percent to a firm's overall operating costs<sup>34</sup>. According to that study, the lost investment potential due to the cost of operating generators is equivalent to the employment costs for—on average—3.5 extra workers. It is important to note that those figures do not even take into account other business losses resulting from loss or spoilt production and damaged equipment, for which accurate figures could not be obtained.

While the figures derived from the survey cannot be used reliably to extrapolate the number of lost employment opportunities in Kosovo, they do indicate that a great deal of investment potential is lost within SMEs as a

#### Box 1.4 Financial losses of businesses due to electricity shortages

KEK's "ABC" supply scheme groups customers into three categories. Those in the "A" band include large industrial customers holding pre-paid supply contracts for electricity and all other customers (residential, public and commercial) who pay electricity bills on a regular basis. "B" band customers are those that pay bills irregularly and/or have significant outstanding debt to KEK. "C" band consumers are those that pay bills rarely, or not at all, but who have not yet been disconnected from the supply system.

Under normal supply and demand conditions, "A" band customers are scheduled to receive an uninterrupted supply, with "B" band consumers scheduled to receive supply for 5 hours in every 6 hours, and those in the "C" band receiving a supply on a 4:2 basis or less, depending on availability of supply. A Ministry of Energy and Mining (MEM) survey of 305 businesses in sectors of trade, production and service found that

concluded that 36.9 percent of the businesses operate under supply plan A, 38 percent under supply plan B, and 26 percent under supply plan C.

According to the MEM report, power-supply problems cost individual businesses an average of  $\in 2,188$  (\$3,100) a month . These losses include:

- production and raw material losses;
- equipment damage;
- costs of buying and running generators;
- fuel costs; and
- maintenance costs

In its report, MEM emphasized that the annual energy-insufficiency opportunity cost for an industry is  $\notin$ 4,657, an amount that could have been used for different purposes (including investment).

result of the irregular supply of electricity. This negative development will inevitably have an equally negative impact on the aggregate potential for job creation within the territory. A greater, though incalculable, impact on employment rates may be the loss of new foreign investment in Kosovo. Many foreign investors have undoubtedly based their decision to bypass Kosovo on the poor quality of the local energy infrastructure.

#### Household incomes

The persistent high levels of unemployment are just one indirect outcome from the poor quality of energy supplies. The economic health of many households is also severely constrained by the need of businesses catering to the domestic market to pass along their higher costs, in the form of increased retail prices of consumer goods and services. This is another indirect impact of energy on households.

The key *direct* impact relates to the amount of household income<sup>35</sup> that is needed to pay for energy services, including power, heat, and fuel for private transport. Household survey data collected by the Statistical Office of Kosovo does not separate energy-related expenditure from other housing expenses, and therefore it is not known what proportion of household income is taken up by energy bills. However, data from a recent household energy survey carried out for UNDP indicate that the highest amounts are needed for electricity and heating: the average proportion of household income spent is 15 percent for each.

The government has attempted to assist the poorest households, those that qualify as "social cases", by providing them with electricity subsidies. In the period 2005–2007, the total annual subsidy paid from the Kosovo Consolidated Budget to KEK on behalf of these households amounted to €4.5 million (\$6.6 million). Individual subsidies cover household consumption of the first 200 kWh of electricity per month for eligible households. One major limitation of this scheme is that heating fuels other than electricity are not subsidized. Households that rely on imported heating oils and gas are thus regularly vulnerable to major cost fluctuations in those commodities. With a limited range of alternative affordable domestic resources, electricity and firewood have become the two dominant sources in the provision of household energy services. In both cases, their use has potential adverse impacts on human health and the environment.

#### Human health and the environment

There are close and direct relationships between the production and use of energy and the linked (in such situations) areas of human health and the environment. There are four main aspects to these relationships in Kosovo:

• the aggregated environmental impacts of mining, energy production and energy consumption on emissions to air, water

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courses and soil, and on the conversion or degradation of habitats (human, flora and fauna) through mining and other energyrelated operations;

- exposure to pollution caused by (i) the mining of and production of electricity from lignite, (ii) pollution from vehicle emissions, and (iii) burning of other fossil fuels, such as oil and gas, for heating and other purposes;
- household level exposure to poor air quality relating to the use of certain household fuels, including firewood; and
- ill health resulting from inadequate energy provision in the home—in particular, a lack of sufficient space heating.

To date such impacts are mostly observational and anecdotal. Because official public health statistics in Kosovo do not provide accurate information on such problem areas, it is not currently possible to correlate and analyse health and environmental data. Moreover, environmental monitoring systems are still under development and thus not yet in place.

#### Other potential impacts

Energy has an impact on many different aspects of everyday life, for both richer and poorer regions and peoples. As a result, energy is crucial issue for the achievement of the UN's Millennium Development Goals (MDGs). Although there is no specific MDG for energy, it has been explicitly linked with the achievement of all the key goals, including poverty alleviation, reducing mortality rates among children under five years old, and participation in education. Modern education systems are strongly dependent on power supplies for lighting and equipment, particularly computer equipment. Electricity is also needed to power communications equipment both at work and in the home.

In general, and especially for individuals not employed outside the home, information and entertainment provided by access to television or the Internet is an important aspect of quality of life and can impact, to some extent, on their participation in wider social and political life. Energy is also linked to public safety—for example, the provision of street lighting and traffic control systems. Traffic congestion in Kosovo's cities is exacerbated by the frequent malfunctioning of traffic signals as a result of power outages. Among the numerous negative outcomes are increased petroleum consumption and air pollution.

#### 1.6 Key policy issues

There are three key considerations for energy policy development: supply, demand and impact. Energy supply has a key role in economic development. In Kosovo, the inadequate and unreliable supply of electricity has been identified as a major constraint on private-sector growth. That factor, together with Kosovo's membership in the Energy Community, has focused current energy strategy and policy planning on institutional and physical infrastructure issues. The emphasis is on increasing supply in the centralized electricity system, which, despite eight years of relative political stability, substantial investments and international technical assistance, remains unable to provide adequate and reliable power supplies to businesses, public services and households.

The demand for energy is related to the energy services provided. For end-users, access to those services is more important than the sources of energy used to provide them— whether they are primary sources, such as firewood, or secondary sources, such as electricity. This offers a great deal of as-yet-unexploited potential for demand management through policy and utility company interventions aimed at changing consumer behaviour. Further, the electricity company, KEK, needs to build a partnership with its customer base to become and remain a viable business. Consumer behaviours in energy choices and consumption, and the attitudes and perceptions that underlie them, have been little studied in Kosovo. A better understanding of the factors that motivate consumer behaviour is fundamental to the design of appropriate policy measures and mechanisms to guide the process of change in demand and consumption patterns.

Finally, there are human, social and environmental impacts of behaviour on both the energy supply and demand sides. Environmental impacts in the supply system are now being considered in energy legislation and policy, with a view to future compliance with EU environmental legislation. However, few policies relating to long-term environmental sustainability of the energy sector are under implementation. Impacts on human and social development, and the environmental impacts of consumption, warrant closer attention.



## **Energy Supply: Challenges and Prospects**

- Energy demand forecasts
- Electricity supply
- Other energy supply systems
- Impacts on human development from electricity generation
- Public perceptions
- Key policy implications

## 2 Energy Supply: Challenges and Prospects

The economic, human and environmental impacts of energy use are often not well understood. A similar conclusion can be made regarding the relationship between energy supply and demand—particularly on the demand (consumer) side. Yet an understanding of these impacts is fundamental to informing energy consumption choices and behaviours, which in turn may alter the supply-demand relationship.

In Kosovo and elsewhere, the inherent complexities in projecting and matching supply and demand levels make long-term policy planning for the energy sector problematic. For one thing, there are five main energy supply systems in Kosovo that need to be recognized<sup>36</sup>:

- liquid fuels are imported through international markets;
- gas, in canisters, is imported through international markets;
- electricity produced from domestically mined lignite is supplied and distributed through a publicly owned monopoly;
- monopoly municipal district heating systems run on (free market) imported oil; and
- direct heat provision in individual households and industrial enterprises is obtained from firewood. That commodity, which may originate from private or publicly owned land within Kosovo or be imported, is retailed on the free market.

Each of these supply systems faces different challenges in meeting present and future demand and/or in managing the impacts of supply and, in some cases, their consumption.

#### 2.1 Energy demand forecasts

Total energy demand is forecast to continue to rise significantly across all sectors except agriculture in the current strategic planning period (see Figure 2.1).

Figure 2.1 Forecast growth of total energy demand to 2016, by sector 800 700 600 500 400 ktoe 300 200 100 0 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 - Agriculture

Forecasts for 2007 predicted that Kosovo's energy mix, in terms of the relative shares of different primary energy sources, would remain more or less constant. Coal's share of the total was expected to increase slightly from 55 to 56 percent, and the share of oil to decrease by 1 percent, from 30 to 29 percent. Total energy demand in 2007 was forecast to amount to 2,201 ktoe (kilotons of oil equivalent) of which 789.13 ktoe (35.84 percent of the total) was expected to be imported<sup>37</sup>. Petroleum products were forecast to comprise more than 80 percent of total imports, with the remainder being firewood (8.02 percent), electricity (9.4 percent) and a small amount of coal (0.42 percent). In contrast, only a small amount of energy exports were forecast—19.46 ktoe of coal and 27.42 ktoe of electricity<sup>38</sup>. Price rises were expected for all energy imports because world prices were (accurately) forecast to continue to rise. Increasing dependence on energy imports was expected to add to production costs, thereby reducing the investment potential of businesses and adversely affect the disposable income of households.

Source: MEM 2007

Table 2.1 Energy demand forecast for 2007, by sector (amounts shown in ktoe)

	Transport	Household	Industry	Services	Agriculture	Total
Petroleum products	414.80	24.37	94.47	48.74	30.46	612.84
Electricity		240.68	55.01	44.70	3.45	343.84
Biomass (wood)		123.16	49.25	54.18	19.70	246.29
Coal		4.04	31.44	5.39	4.04	44.91
District heating		7.94		5.30		13.24
Solar energy		0.06		0.03	0.01	0.10
Total sector demand	414.80	400.25	230.17	158.34	57.66	1261.22
Source: MEM 2006a						

Forecast energy demand in Kosovo for 2007 is shown in Table 2.1, categorized by energy source and sector. Table 2.1 excludes demand from the electricity sub-sector itself (self-consumption), which generally consumes most of the coal supplied and around 10 percent<sup>39</sup> of the electricity it produces. Even so, availability of a regular electricity supply is likely to remain as the main energy problem in Kosovo for the foreseeable future.

As of January 2008, MEM, the author of such extensive energy-related forecasts for 2007, had determined their accuracy.

The demand forecast for 2007 highlighted the fact that although the transport sector consumes the greater part of imported petroleum products, the household sector is the largest consumer of electricity, fuelwood and district heating and accounts for almost a third of Kosovo's total energy demand. Price and quality are the two concerns for end-users of petroleum products: at present, there are no constraints on availability. Even so, availability of a regular electricity supply is likely to remain as the main energy problem in Kosovo for the foreseeable future.

A separate report, UNDP's household energy survey, sought to identify the perceived priorities for development at the municipal level. From a predefined list of issues, respondents identified their top three priorities. The two issues most commonly cited in the survey were the supply of electricity and local economic development (see Table 2.2), issues which are intrinsically related. There were slight variations in the top three priorities identified by urban and rural householders, respectively, but both of those issues were cited in the top three by both groups. Further analysis by other variables, including ethnic heritage, produced similar results: electricity and local economic development featured consistently in the top three priorities.

The survey responses confirm that electricity supply is the most important policy issue for energy development in Kosovo.

Table 2.2	Top three priorities at the municipal	leve
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Overall	%	Urban	%	Rural	%
Electricity supply	77.2	Electricity supply	78.1	Electricity supply	76.1
Local economic development	42.8	Local economic development	43.3	Local roads	47.1
Local roads	42.5	Water supply	40.4	Local economic development	42.3
Water supply	36.6	Local roads	38.8	Water supply	31.7
Public hospitals and health facilities	30.0	Public hospitals and health facilities	28.6	Public hospitals and health facilities	31.7
Sewerage	15.0	Solid waste collection	15.8	Sewerage	20.6
Solid waste collection	14.6	Public transport	11.5	Public transport	18.4
Public transport	14.5	Heating	11.0	Solid waste collection	13.2
Heating	9.9	Sewerage	10.5	Heating	8.5
Source: UNDP Human Development Report survey	2007				
### 2.2 Electricity supply

More than 95 percent of Kosovo's domestically produced electricity comes from two large lignite-fired thermal power plants, Kosovo A and Kosovo B. Kosovo B has two generating units and Kosovo A comprises five smaller units. Kosovo A's five units were built over a period of 13 years, from 1962 and 1975. Their outdated and inefficient combustion systems are responsible for emissions at levels that are too high to meet EU standards. At the end of 2007, three of the five units were out of operation due to technical problems and fulfilment of lifespan.

Kosovo B, operational since 1983–84, has two units with a combined installed capacity of 678 MW. It alone produces nearly three-quarters of the total domestic electricity supply. Investment in the past eight years has concentrated more on Kosovo B, which has undergone major refurbishments—including upgrading to reduce emissions in early 2002 and again in 2006<sup>40</sup> and 2007. A major setback occurred in July 2002, when lightning struck the power station, causing extensive damage to both units. The damage negated much of the rehabilitation and upgrading work that had already been carried out. Both units were back in operation by the following year, after repairs costing over €200 million (\$300 million).

The transmission network also suffered damage during the conflict, with high voltage (400 kV) transmission lines especially affected. While the majority of transmission lines (which total 1,187 km in length) are now functioning, many substations continue to be in poor technical condition. Moreover, the carrying capacity of the existing transmission system is only around 850 MW, which is a further serious constraint on the ability of the electricity sub-sector to meet peak demand (1,000–1,200 MW)<sup>41</sup>.

A map of Kosovo's transmission system is shown in Figure 2.2. Work to rehabilitate and expand the transmission network is ongoing or planned, including the construction of a new 400 KV line between Kosovo and Albania to facilitate future electricity imports, exports and exchanges. At present, there are 400 KV very high voltage lines (shown in red) lines between Kosovo and Serbia, Montenegro and FYR Macedonia only. A key objective of present policy is to work towards optimisation of what are perceived to be ideally complementary production systems for the future: thermal power in Kosovo supplying base load for both Kosovo and Albania, with Albania's extensive hydropower capacity being used to supply peak load. The high level of capital investment and increased human resource capacity needed to implement these projects place serious limitations on the rate of progress.

Kosovo's total electricity production in 2006 was just under 4 TWh (see Table 2.3), with the Kosovo B thermal power plant accounting for nearly three-quarters (74.36 percent) of that amount. Kosovo A's three operational units provided around 0.9 TWh (22.5 percent), with the remainder (less than 3 percent) coming from hydropower plants. In addition, over 500 gigawatt hours (GWh) of electricity was imported, representing almost 12 percent of total supply. It must be noted that unit A5, which also accounted for 12 percent of total supply in 2006, was not operational in 2007, although it is expected to come back online early in 2008.



Table 2.3 Electricity supply in 2006

		MWh	% of total production	% of total supply
Thermal Power Plants				
Kosovo A	Unit A1	7,609	0.19	0.17
	Unit A3	347,551	8.69	7.67
	Unit A5	544,416	13.62	12.01
Kosovo B	Unit B1	1,376,516	34.43	30.36
	Unit B2	1,595,667	39.91	35.19
Hydropower plants				
Ujmani		99,562	2.49	2.20
Other (direct distribution)		26,624	0.67	0.59
Total production		3,997,945	100.00	88.17
Intake (imports + exchanges)		536,238		11.83
Total domestic supply		4,534,183		100.00
Offtake (exports + exchanges)		252,527		
Source: ERO 2007				

Domestic energy production fell far short of demand in 2006, and 2007 figures are expected to be similar. The total demand for electricity (net demand plus transmission loss) in 2007 was forecast to be 5,118.460 GWh, with total electricity production expected to be only 4,156.393 GWh (4.16 TWh), according to the Ministry of Energy and Mining<sup>42</sup>.

In general, there is undoubtedly a serious inability to meet net aggregate demand. However, when supply is almost wholly dependent on large-scale thermal power production, the problems become even more complex. Thermal power plants are more suited to meeting base load demand—that is, the minimum constant demand for electricity-than meeting peak period demand. Thermal power plants, including those in Kosovo, are generally kept running (although not at full capacity) even during periods when there is no immediate demand. In this respect, Kosovo A's five relatively small units have some advantage in that it is relatively less inefficient to shut down and start up smaller rather than larger units according to demand fluctuations. However, peak loads are actually best met using mechanical methods of electricity generation, such as hydropower, which are easier and less costly to put on-line. In turn, such flexibility increases the efficiency of an electricity supply system. Domestic hydropower in Kosovo is, however, too small to play this role in the supply system<sup>43</sup>.

Figure 2.3 shows the electricity load profiles in Kosovo over a 24-hour period for summer minimum and maximum demand and winter minimum and maximum demand. Broadly, demand is lowest over a 24-hour period in the early hours of the morning and there are two main peaks in demand: the first is in the morning, when most people are getting up and businesses start their daily operation, and again in the evening as people return from work. The profiles show a summer minimum base load of just over 200 MW, with maximum peak demand reaching over 850 MW in early evening in the winter.



The simple problem is that KEK is not always able to meet demand at these peak times from its own production units. Therefore, in order for KEK to fulfil its Public Service Obligation, the difference between demand and available electricity has to be met through electricity import contracts or favourable electricity exchange agreements with neighbouring electricity systems. If electricity from outside Kosovo is not immediately available for import in case of sudden emergencies (bearing in mind that similar peaks in demand will be occurring in neighbouring countries), or KEK does not have the financial resources to pay for imports, load shedding is inevitable. In fact, it has recently been reported that, in the absence of substantial new funding and/or energy sources, the company must plan to shed load above 700 MW<sup>44</sup> (Load shedding refers to energy providers' planned reductions in power supply). The resulting outages are therefore not the result of unexpected events such as violent weather but load shedding.

In an attempt to schedule load shedding so that regular paying customers are less likely to suffer cuts in supply than those that do not pay regularly, the electricity supply and distribution company, KEK, introduced the "ABC" supply scheme based on three categories of customers. Those in the "A" band include large industrial customers holding pre-paid supply contracts for electricity and all other customers (residential, public and commercial) who pay electricity bills on a regular basis. "B" band customers are those that pay bills irregularly and/or have significant outstanding debt to KEK. "C" band consumers are those that pay bills rarely, or not at all, but who have not yet been disconnected from the supply system. Under normal supply and demand conditions, "A" band customers are scheduled to receive an uninterrupted supply, with "B" band consumers scheduled to receive supply for 5 hours in every 6 hours, and those in the "C" band receiving a supply on a 4:2 basis or less, depending on availability of supply. KEK also provides the exact schedule of load shedding for all neighbourhoods in Kosovo on its website (www.kek-energy.com).

A key problem inherent in the scheme is that KEK is unable to categorise individual customers. Instead, load has to be shed at the level of feeder lines in the distribution system. This means that all consumers receiving their supply through one feeder line have to be categorised in the same band, based on aggregated levels of bill payment. As a result, reliable customers may be placed in the "B" or "C" bands, and consumers who do not pay their bills can be categorised in the "A" band, depending on the aggregated behaviour of their neighbours.

In implementation of the scheduling scheme, another major problem has emerged due to the regularly reduced output caused by interrupted operations at one or more of the power plant units. "Normal conditions" of supply and demand have become less "normal". Consequently, the scheduled load shedding ratios are often reduced for most customers, to 5:1 for the "A" band, 4:2 for the "B" customers, with the "C" group receiving electricity on a 3:3 basis or worse. The exception is the small group of large industrial customers who receive electricity directly through individual distribution lines, and who are guaranteed an uninterrupted supply except in the event of emergency failures in the system.

The result is that nearly every customer in Kosovo has been affected directly by load shedding. More than 80 percent of respondents to UNDP's 2007 household energy survey reported that their power supply is cut at least once every day (see Figure 2.4).



The problems will likely grow as energy demand inevitably increases. Demand forecasts for the period up to 2016 have been carried out by different methods, and for a range of economic growth scenarios. Forecasts for total annual demand by 2016 range from a little under 5 TWh to over 9.5 TWh<sup>45</sup>. Baseline scenarios have a narrower range, between around 6.8 TWh and 7.3 TWh. The lowest baseline scenario, produced by KOSTT, is based on an assumption of an annual growth in GDP of around 3.6 percent<sup>46</sup>. This assumed growth rate is nearly identical to a recent International Monetary Fund (IMF) forecast for a possible growth in GDP in 2007 of 3.5 percent<sup>47</sup>.

In the light of this situation, Kosovo's Ministry of Energy and Mining, supported by international partners, has focused its strategy for the future provision of electricity in Kosovo on a single, large new thermal power plant, Kosovo C (see Box 2.1). Tenders have been received from foreign private investors, although the details of the proposed plant have yet to be finalised. A decision on the size of Kosovo C, in terms of installed capacity, has yet to be finalised<sup>48</sup>, but it expected to be up to 2,100 MW<sup>49</sup>.

#### Box 2.1 Proposed Kosovo C power plant

A feasibility study carried out by an independent consulting firm concluded in favour of the construction of a new lignite-fired thermal power plant in Kosovo, comprising several units of between 300 and 600 MW and with a combined installed capacity of between 1,800–2,100 MW. Construction is expected to be carried out in two phases, with between 900 and 1,000 MW being installed in the first phase. The first unit was originally envisaged to become operational by 2012–2014. A further 1,000–1,200 MW is planned to be installed in phase two, expected to be operational by 2020 at the latest. Kosovo C is favoured by the PISG and international partners because it would provide sufficient additional capacity to meet all domestic demand, and become a major exporter of electricity.

However, the planned construction of another large coal-fired thermal plant in the locality of Kosovo A and B has generated some controversy in Kosovo. While Kosovo C would incorporate much more modern technology and conform to EU performance and environmental standards, the concentration of mining and electricity generation operations in a small region of Kosovo will inevitably result in increased accumulation of pollution in the local area. Further, the plans involve not only an associated loss of land for other purposes, but would necessitate the resettlement of several communities.

Sources: MEM 2006 Pre-Qualification Memorandum, August 15 2006, UNMIK Fact Sheet on Energy Issues in Kosovo.

The other two components of the development programme for future lignite-fired electricity production in Kosovo are the rehabilitation of some of Kosovo A's units and the opening of a new lignite mine to replace the two existing operational mines as they reach the end of their lifespans. The mine at Sibovc/Sibovac is expected to provide sufficient lignite for 2,000 MW of installed generating capacity for a period of up to 25 years<sup>50</sup>. Kosovo B, meanwhile, is expected to be operational until 2024, and rehabilitated units of Kosovo A could be operational until 2016, when it is likely that it will have to close. Under the terms of the Energy Community Treaty, large-scale power plants that do not meet the requirements of EU environmental directives must cease operations by 2016.

The proposed new Kosovo C power plant was envisaged to be operational by 2012. By the end of 2007, however, it was thought that 2015 is a more realistic—though still optimistic earliest date<sup>51</sup>. Therefore, even if the Kosovo C project is launched in 2008, Kosovo faces at least a seven-year period in which the electricity sub-sector will continue to face severe difficulties in meeting the growing demand. There are, essentially, three options to potentially mitigate these difficulties:

- invest in existing infrastructure to raise production/transmission and reduce technical losses;
- 2. increase imports, preferably through long-term planning for import contracts and contracts for emergency energy in case of any failure in the system; and
- 3. reduce demand for electricity through fuel substitution (including, possibly, the introduction of natural gas for the provision of direct heating), energy saving and efficiency measures, and/or the introduction of new demand management techniques at KEK.

These options are not mutually exclusive, but the capacity of different stakeholders to pursue each of them varies. For example, KEK has limited potential in respect of reducing demand, but would of course be a key institutional player in respect of the first two options.

### Investment in existing infrastructure

Investment in the electricity sector has totalled more than €700 million (\$1.03 billion) since 1999. Of that sum, more than €200 million was spent on repairs to the Kosovo B thermal power plant following the lightning strike in 2002. Another estimated €200 million (at least) has been spent on electricity imports. Technical assistance, management support and institutionbuilding activities have accounted for over €50 million. In the end result, therefore, only €280 million, less than half of the €700 million total spent, had been invested in upgrading the existing infrastructure. That sum is insufficient in light of estimates that annual investment of about €200 million is needed to ensure a viable electricity system<sup>52</sup>.

One major project has been planned and preliminary costed nonetheless. It centres on rehabilitating all five units of Kosovo A thermal power plant to restore the plant to its original 800 MW capacity. The plant's current capacity is far less. Unit A2 has been out of action for five years, due to a burned out substation, and Unit A4 has been off-line since 2004 due to breakdowns of the turbine and generator<sup>53</sup>. Unit A4 was partially rehabilitated during 2006 and is now operational. Meanwhile, Unit A5 is currently undergoing repairs.

The rehabilitation project is not cheap; the estimated cost is €154 million (\$225 million) for Units 1, 3, 4 and 5. One reason for the high cost is that the units will be retrofitted to meet contemporary environmental standards. As mandated by the Energy Strategy of Kosovo 2005–2015: "In case of rehabilitation of TPP "Kosovo A" all relevant requirements from National Legislation, Regulations and EU Directives for old plants should apply".

The objective of making these investments in Kosovo A is to meet present and future domestic demand until such time as phase one of Kosovo C is complete. The decision can best be justified by the unresolved technical problems plaguing the main power station, Kosovo B. Both of that station's units were scheduled for shutdowns for repair and maintenance during the warmer summer months of 2007, and during the work period unexpected problems were detected in one of the units. A need for replacement of, or repairs to, low pressure rotors in both units was originally identified in 1997. KEK has estimated that  $\in$ 13 million (\$19 million) is now needed immediately to carry out this work<sup>54</sup>.

At the same time, it is estimated that about €500million (\$750 million) will be needed to rehabilitate and upgrade the transmission and distribution networks over the next 7-10 years<sup>55</sup>. The existing networks can only serve 880 MW without becoming overloaded; the maximum capacity, moreover, has dropped from its peak 2006 load of 916 MW<sup>56</sup>. The transmission company, KOSTT, expects to invest €100 million to expand the capacity of the network in the period up to 2015. Work is ongoing in the south-west of the territory (Peja/Peć) during the first phase of this expansion. Another major project for KOSTT will be the installation of a new high voltage (400 kV) transmission line between Kosovo and Albania. A feasibility study has been carried out, and commercial lenders have been identified to fund the required investment<sup>57</sup>. The new line could reduce the level of net imports of electricity in Kosovo because it offers greater capacity for exchanges between Kosovo and Albania.

Identifying problems and planning solutions is one thing; actually beginning and completing necessary work is quite another. There are three barriers to rapid progress in implementing activities in both KOSTT and KEK. The first is the shortfall in due revenues. For KEK, the main reasons for shortfalls are nonpaying customers in the household sector and theft of electricity. KOSTT's major revenue defaulter is the Serbian utility company, which currently owes around €6 million (\$9 million) in unpaid transit fees (from mid-2004 to date) for exports of electricity through Kosovo's network<sup>58</sup>.

The second barrier is a shortage of skilled human resources, a problem that is shared by many organizations in Kosovo. KOSTT, in association with donor partners, budgeted €250,000 for staff training and development for the period July 2006 to December 2007. The training programme includes components for management training and transmission systems operation. In addition, KOSTT, together with KEK and MEM, has developed a Masters level qualification in Infrastructure Management at the American University in Kosovo. The companies are also planning to offer scholarships and build close relationships with other universities in future. These efforts may bear less fruit than hoped, however, because of the likely difficulties in retaining highly qualified staff on public-sector salaries, especially in the event of increasing private-sector entry into the energy sector.

Finally, both KEK and KOSTT report that the tendering process under the present procurement regulations is slow and costly. In their view, requirements of the current system excessively hinder effective timely implementation of planned projects and, especially, the procurement of emergency spare parts that cannot be planned in advance<sup>59</sup>.

### **Electricity imports**

Kosovo imports, exchanges and exports electricity in cooperation with neighbouring suppliers. However, imports and intake together are more than twice the total of Kosovo's exports and offtake of electricity (as shown in Table 2.2). KEK in November 2007 reported that the price of imported electricity had doubled in the past year<sup>60</sup>. The estimated average cost of imported electricity at present is around €55/MWh, which is approximately double that of local generation<sup>61</sup>. With growth of imports forecast (by 19 percent in the period up to 2015), the future costs of electricity supply in Kosovo are likely to rise steeply. Moreover, revenue from electricity exports does not, in financial terms, net off squarely against costs of imports. KEK is only able to supply a surplus for export when domestic demand is low and, at the same time, there is a regional demand for more electricity. As a result, KEK most often has to buy imports when the price is high-at peak seasonal and daytime peak periods-and sell at off peak periods when the wholesale price is low (see Figure 2.5).

Nevertheless, the import of electricity continues to form a key element in Kosovo's electricity supply policy until such time as Kosovo C comes on-line. Forecast levels of imports do not, of course, take into account any potential



breakdowns in Kosovo B, which supplies the greater part of the domestic electricity supply. Estimates of the cost of compensatory imports, in the event that one of the two units at Kosovo B power plant ceased to be operational, range from between €290 million (\$440 million) to €350 million per year<sup>62</sup>.

### **Reduce demand for electricity**

"Energy efficiency" is a term that is widely used to refer to actions that result in a reduction in energy use. However, a distinction must be made between energy conservation—that is, a simple reduction in the amount of energy used—and energy efficiency, which relates to the achievement of energy conservation without a removal of, or reduction in, energy service provided. For example, switching off a light conserves energy, but with an associated loss of the energy service (lighting) it provides<sup>63</sup>. Replacing an incandescent light bulb with an energy efficient one, on the other hand, provides the same service but uses less energy. Energy efficiency, therefore, relates to the level of service provided by a unit of energy-or, sometimes, the level of service provided by a unit of expenditure<sup>64</sup>.

At the aggregate level, electricity conservation can be achieved in three ways:

- reducing or withdrawing the provision of the service, as is now done through load shedding;
- promoting energy efficiency; and

• encouraging fuel switching—for example, substitution of electricity with an alternative energy source such as firewood, liquid petroleum gas (LPG) or household solar power.

From the supplier's perspective, the situation is in many ways more straightforward: its key objective is to reduce consumption specifically during periods of peak demand (both seasonal and daily). Apart from load shedding, which is both socially and economically damaging, KEK's main demand response tool is the electricity tariff structure (see box 2.2).

At the policy level, an Energy Efficiency Law has been mooted in the Parliament but progress has been slow toward passing it. There are few other measures being considered under the existing energy strategy to promote energy efficiency and fuel switching. From the current energy strategy and other Ministry of Energy and Mining documents, it appears that much is being left to market forces and consumer choice in this respect<sup>65</sup>. Policy mechanisms and measures to support the increased use of energy efficient technologies and appliances are not yet in place, though a reduction of import duties on some goods is to be considered.

Meanwhile, a wide-scale increase in the use of more costly alternatives is unlikely given the fact that electricity prices are kept relatively low to ensure that electricity is affordable for poorer consumers<sup>66</sup>. At present the government's Energy Regulatory Office (ERO) is responsible for protection of consumer interests in tariff reviews, and that agency has blocked KEK's attempts to increase charges. As noted in Box 2.2, electricity tariffs are even subsidized by the government for those unable to meet even the lowest prices.

### Box 2.2 Electricity tariffs

KEK's tariff structure is complex. In total, there are 48 different tariffs for consumption by kWh and 11 different standing charge rates across 8 consumer tariff groups. There are three different tariff groups for domestic consumers, according to whether they have a single-rate meter, a 2-rate meter, or are unmetered.

For those customers whose consumption is metered, there are different tariff bands for different levels of monthly consumption and for different times of year. High tariff season is from October to March, with April to September being the low tariff season. In addition, customers with a 2-rate meter have different charges for consumption at peak and off-peak times during the day. The daily peak period runs from 07:00 to 22:00 in the high season, and from 08:00 to 23:00 in the low season.

For customers without meters, there are three different monthly flat rate charges, according to different levels of estimated consumption.

Some customers classed as "social cases" are charged at a zero rate, up to a consumption level allowed by the government. The government directly subsidizes these customers' consumption by paying KEK on their behalf.

Metered Customers	Consumption	Time of day		Time of year
			High tariff	Low tariff
				(eurocents/kWh)
2-rate meter	<200kWh/month	High tariff	4.42	3.17
		Low tariff	2.21	1.58
	200-600kWh/month	High tariff	5.97	4.28
		Low tariff	2.99	2.14
	>600kWh/month	High tariff	8.67	6.21
		Low tariff	4.33	3.11
single-rate meter	<200kWh/month	Single tariff	3.94	2.82
	200-600kWh/month	Single tariff	5.32	3.81
	>600kWh/month	Single tariff	7.72	5.53
plus:	standir	ig charge of € 24 per	customer per year	
Unmetered customers	Estimated consumption			
	<400kWh/month 400-800kWh/month		20	
			36	
Source: KOCTT 2007		2000KW11/11011(11		01

### Public perceptions of the problems

Energy choices made by consumers are based on three main criteria: reliability, accessibility and affordability. The survey of households undertaken for this report collected data on householders' perceptions of the electricity supply system to meet the reliability criterion, both at present and in the near future. There was a general consensus among households that KEK is not, at present, providing a reliable supply of electricity (see Figure 2.6). However, the survey responses indicated a high level of uncertainty about whether KEK has the capacity to meet current demand: though the largest proportion of respondents believe, correctly, that existing capacity cannot meet demand, nearly half thought that it could, or were not sure.

KEK's relationship with its customers is poor. Public opinion tends towards the view that there is a high level of corruption within the corporation<sup>67</sup>. However, when respondents in the household energy survey were asked about their perceptions concerning the underlying causes of the power cuts, corruption of KEK workers was not the most often cited reason (see Figure 2.7). More than half the households attribute the existing supply problems to bad management at KEK. The next most common reason identified was non-payment of bills by consumers. Lack of production and the parlous state of the distribution system were the two least-cited causes of the present situation.



Further evidence on the level of consumer uncertainty relates to the perceived risk of ongoing power cuts. While over 55 percent held the pessimistic view that power cuts would continue, a significant minority (over 20 percent) thought that the reliability of supply would improve, and a further sizeable minority were unsure (see Table 2.4).

Table 2.4	Perceptions of the risk of ongoing power cuts			
		Responses (%)		
Yes		55.2		
No		21.2		
Don't know/	No answer	23.6		
Source: UNDP Koso	vo Human Development I	Report survey 2007		



As it turns out, KEK's present management and its international management consultants acknowledge that there have been serious management problems since 1999. There have been frequent changes in senior management and international consultancy teams, and experienced and skilled personnel are still a scarce resource at the firm<sup>68</sup>. Consumers themselves appear to be similarly aware of the relation between nonpayment of electricity bills and the poor supply of electricity.

A significant disconnect exists between perception and reality regarding capacity, however. It is clear from the data and earlier discussion that the present infrastructure cannot meet demand, yet this is perceived to be problem by relatively few consumers. The data from Figures 2.6 and 2.7 suggest that only around a third of consumers are aware of this situation. One possible interpretation of this apparent misconception concerning the most important factors in current electricity supply problem is that, from a consumer perspective, the ABC load shedding mechanism closely associates cuts in supply with payment of bills. Anecdotal evidence indicates that the ABC system is seen as a "punishment" for non-paying consumers, rather than as a mechanism for scheduling load shedding because demand cannot be met.

The poor condition of Kosovo A and Kosovo B, and the lack of capacity in the existing transmission and distribution systems are overriding problems in respect of the mismatch between supply and demand. Investment is badly needed, and increased payment of bills will support efforts in this area. But current delivery times for energy production equipment are estimated to be, at best, around 24 months<sup>69</sup>. Therefore, significantly increased output within the next two to three years (at least) is unlikely. Both KEK officials interviewed for this report and the European Regulatory Office (ERO) confirm the near-certain veracity of MEM's demand forecast that Kosovo will have to rely on increased imports for some years. Such reliance is likely to necessitate regular tariff increases over the medium term.

Consumer hardship is likely to increase should power cuts continue and electricity prices rise. Energy conservation, energy efficiency and fuel switching are therefore likely to be important in the electricity sector itself and at the levels of individual firms, public-sector organizations and households. Such demandreduction steps are also important for energy planning. Planning installed capacity for a centralized supply is based, first and foremost, on forecast peak demand. Installed capacity for domestic consumption is usually based on peak demand (plus a margin for exceptional circumstances, for example, temporary cessation or large reduction of output from a power plant). Obtaining a viable and appropriate balance between demand and supply can be difficult. One the one hand, a key objective for energy planners is to try to reduce peak demand and level out spikes in demand as much as possible to avoid the need for power cuts. On the other hand, planners recognize that excessive underutilised capacity represents an inefficiency of its own<sup>70</sup>. The Ministry of Energy and Mining (MEM) acknowledges that, in compiling its forecasts, future consumer behaviour in respect of energy conservation and fuel switching cannot be estimated with any confidence (and have therefore been excluded from forecast models)<sup>71</sup>.

### 2.3 Other energy supply systems

The supply systems for fuels and energy services other than electricity are less complex in terms of associated supply and demand problems. There have not yet been insufficient supplies of imported liquid or gaseous fuels, or firewood, to meet transport and household demands. The two key problems relate to price uncertainty (for imported fuels), and the potential impact of consumption on human and environmental welfare.

### Energy for heating and cooking

Electricity, firewood, gas (in canisters), and oil are the main sources of energy for space heating and cooking. There is no natural gas supply network in Kosovo. At the government policy level, and especially in the current energy strategy, relatively little attention is given to heating and cooking fuel sources. The main concern appears to be the impact that the use of electricity for heating has on winter electricity demand. Yet there is substantial potential for fuel switching to reduce peak electricity demand, due to the relatively wide range of potential alternatives—including for example, solar water heating and LPG for both heating and cooking.

There is extensive use of firewood throughout Kosovo, though the annual rate of wood cutting is said to be difficult to quantify with any accuracy: MEM estimates that between 216 and 250 ktoe of firewood is cut from woods and forests every year<sup>72</sup>. According to a survey carried out by the Statistical Office of Kosovo, firewood accounts for 98 percent of overall wood utilization73. According to the Ministry of Environment and Spatial Planning, the high demand for wood for fuel and for construction in the post-conflict period has put pressure on the long-term sustainability of Kosovo's forests. Around 47 percent of Kosovo's land comprises forest, forest land and fallow land. The total volume of wood covers 54 million m3, with approximately 222,000 m3 of wood being felled each year<sup>74</sup>. The amount felled represents less than 1 percent of the total, with annual growth being over 3 percent per year<sup>75</sup>; therefore, there have been few problems to date with supply of firewood. Substantial increases in the price of firewood to end-users are likely in the near term only if crackdowns are initiated on illegal woodcutting and the Ministry of Agriculture, Forestry and Rural Development develops a stringent forest policy. Neither step has been taken yet, however.

District heating supplies around 5 percent of heat demand. District heating systems in three municipalities—Prishtinë/Priština, Gjakova/Djakovica and Mitrovicë/Mitrovica serve a total of 12,860 households, together with some public buildings. All the district heating systems run on heavy fuel oil, and provide space heating only. The installed capacities of the three systems are shown in Table 2.5. Because the district heating systems in Kosovo provide only space heating, and not hot water, they are not operational on a year-round basis. Even during the winter period, the district heating utilities do not supply heat constantly throughout the night<sup>76</sup>.

	systems	, <b>.</b>
		"Installed capacity (MW)"
Prishtinë/Prišti	na	159.0
Gjakovë/Djako	ociva	38.6
Mitrovicë/Mitr	ovica	16.9
Source: ERO 2007		

Table 2.5 Installed capacity of district heating

It is recognized that the district heating systems are outdated and inefficient. There are problems of repair and maintenance resulting from the fact that responsibility is diffused among different entities in the existing systems. There are two stages in each distribution network. The primary network is from the district heating plant to sub-stations in building installations. The heat is then distributed to end-users through a secondary network. These secondary networks, in particular, have suffered from a lack of maintenance and are in poor condition. The problem is that the utilities are not responsible for the secondary part of the systems, and there are no end-user groups set up to manage and maintain them. In these circumstances it is the end-users who take care of secondary distribution in their dwellings.

District heating is provided by municipal utilities that fall under the auspices of the Kosovo Trust Agency (KTA). Two of these utilities, in Prishtinë/Priština and Gjakova/Djakovica, have been incorporated into joint stock companies (as the first step toward privatisation). Like KEK, the district heating companies collect only a relatively small proportion of what is billed to the customers. Recent reports in Kosovo's press indicate that the district heating company in Prishtinë/Priština is owed around €13 million (\$19 million) by its customers, and that a suspension of district heating services may occur as a result. There are no incentives for energy efficiency because district heating is not metered; instead, consumers are billed according to the square footage of their dwellings. The current energy strategy aims to create incentives by moving the district heating systems to payment based on usage. It also hopes to improve the cost-effectiveness of the service to create new demand and expand the district heating networks. District heating tariffs are, like those for electricity, subject to the oversight of the Energy Regulatory Office, under the Law on District Heating.

The Law on District Heating sets out the performance standards for the generation, distribution and supply of heat through district heating systems. Observers have noted, though, that the existing district heating systems are neither technically nor financially sustainable in their existing forms<sup>77</sup>. They use old and outdated boilers fired with heavy oil, and these are heavily polluting. According to the current energy strategy, it is intended that existing district heating systems be repaired and upgraded to improve the quality of the existing service and to provide hot water. An emissions reduction certification scheme is to be enforced. In Prishtinë/Priština, potential exists to utilise the existing infrastructure to develop a combined heat and power (CHP) project that converts the municipality's district heating system to take advantage of heat supplied by the nearby Kosovo B thermal power plant. A feasibility study has been carried out, and the proposal is

included in the current energy strategy. However, no progress has been made on initiating implementation of the project. Future expansion of district heating is likely to be viable only where it is based on CHP operations.

### **Transport fuels**

All transport fuels, which consist primarily of petrol and diesel, are imported. To date there have been no problems in meeting demand for these commodities. In terms of accessibility, therefore, petroleum products are not considered to be a serious problem. The retail price of petrol in Kosovo was around €1.10 (\$1.65) per litre at the end of 2007, but prices are likely to rise in the future because of ongoing increases in the price of oil on international markets. Moreover, in Kosovo itself, proposals from the Ministry of Trade and Industry to tighten regulations and monitor the quality of petroleum products may, if implemented, have some impact on prices at the petrol pumps. In terms of the reliability of supply, existing problems relate more to quality than to quantity. Unlicensed petrol stations and poor quality fuel imported are considered to be problems on a significant scale.

Consumer perceptions about their local petrol stations were sought as part of UNDP's recent household energy survey. Almost half the respondents were unsure about both the legality of the petrol stations in their localities, and the quality of the fuel sold there (as shown by the level of "don't know" responses in Figure 2.8). For the remainder, there were more doubts about the quality of fuel than whether the petrol stations were licensed to operate.



On the other hand, only 15 percent of respondents reported having any problems with fuel supply for transport (see Figure 2.9).



The survey results suggest that consumers are not particularly concerned about transport energy problems at present. Greater controls over fuel quality can potentially reduce what current concerns do exist. However, there could be serious implications for both business and household consumers if prices rise significantly, in the wake of greater controls over quality or other factors, because of the lack of adequate alternatives to road transport in Kosovo. The public transport network is generally in poor condition, particularly the railway system. That system is not well used by individuals, and businesses still prefer transporting goods by road. Public investment in transport in Kosovo has given priority to repair and expansion of the road network since the end of the conflict, and this continues to be the transport priority in the Kosovo Medium Term Expenditure Framework 2006-200878. Private bus services are operating in some areas, and these are perceived to be functioning well.

### 2.4 Impacts on human development from electricity generation

The burning of lignite for electricity generation is closely connected to air pollution from emissions of harmful gases and dust, and from ash residues. Lignite has a relatively high ash content, and it has been customary practice to date to dispose of ash waste from the power plants in large, open ash heaps. Kosovo's 2005 Energy Strategy document acknowledged that, at that time, over 40 million tons of ash covered a total of about 150 hectares of agricultural land. Further, ash from Kosovo A is stored in open dumps from which ash is spread by winds and leaches into local water sources<sup>79</sup>. And finally, the Ministry of Environment and Spatial Planning lists surface mining (which focuses almost exclusively on lignite) as one of the major contributing factors to soil quality damage in Kosovo<sup>80</sup>.

Emissions of  $CO_2$  from Kosovo A, the older of the two existing thermal power plants, were around 1.5 tonnes/MWh in 2006 (see Figure 2.10). Kosovo B, the most modern power plant in Kosovo, which has received high levels of investment in the past eight years, still has not achieved EU standards for air pollution, although emissions per MWh have decreased steadily in the past four years as a result of new investments made.



A lack of functioning filters at both Kosovo A and Kosovo B plants allows high emissions of other contaminants. It has been reported that concentrations of dust, sulphur dioxide and nitrogen oxide from the power stations all vastly exceeds current EU limits<sup>81</sup>. The current energy strategy acknowledges that the government and KEK permit the present levels of emissions, despite the environmental impacts, because of the high level of demand for electricity<sup>82</sup>.

The European Commission recently reported that there had been "no progress on air and water quality", in terms of designing and implementing environmental legislation and monitoring systems in Kosovo<sup>83</sup>. Wastewater from both mining and electricity production is a major pollutant. The *amount* of water used in electricity production is also a problem. There is a lack of natural or man-made reservoirs in the territory, and temporary cuts in the supply of water to residential consumers are becoming more frequent. Such restrictions compound the problems associated with power cuts for households because a reliable supply of both electricity and water at the same time is essential for many activities.

It is widely recognized that there are serious localized health impacts from Kosovo's lignite mining and electricity generation operations. These operations are concentrated in the municipality of Obiliq/Obilić, but they also affect other cities, including Prishtinë/Priština. Unfortunately, there is no detailed, published data yet available on these impacts, and the recent household energy survey data did not highlight any statistically significant differences between survey respondents in the two closest municipalities and those in other municipalities<sup>84</sup>. However, a forthcoming report on the proposed new thermal power plant (Kosovo C) is expected to report findings that show a significantly higher than average incidence of not only respiratory disease but tumours as well in the populations around the existing operations<sup>85</sup>.

### 2.5 Public perceptions

Respondents to UNDP's 2007 survey were asked a series of questions about their perceptions of energy-related pollution (see Table 2.6). Using the level of uncertain responses (that is, "neither agree nor disagree", or "do not know") as an indicator of selfproclaimed lack of awareness, it appears that, overall, between a third and a half of those interviewed feel that they do not understand energy-related pollution issues. Another point that emerges from this data is that the greatest levels of certainty in responses relate to those impacts that are most likely to be felt directly and personally, rather than to indirect impacts or issues that require objective evaluation.

Table 2.6

#### Public perceptions of energy-related pollution (% of total responses)

	Agree	Disagree	"Neither / Do not know"
"We are faced with the constant problem of air pollution which is caused by current electricity production"	50	25	25
"KEK current pollution levels are impacting on the physical health of our population"	53	18	29
"People who live in our municipality are faced with soil pollution caused by current electricity production"	21	46	33
"There are more important issues facing KEK than pollution reduction"	27	35	38
"Generators contribute more to pollution than KEK"	51	12	37
Source: UNDP Kosovo Human Development Report survey 2007	-	-	-

Projects for the clean up of environmental damage from past and present mining operations, including a major World Bank-funded initiative, the Kosovo Energy Sector Clean-Up and Land Reclamation Project, are ongoing or planned. This project includes back filling mining-out areas with ash from existing ash dumps and cleaning up pollutants from an old gasification plant that has been out of operation since the 1980s<sup>86</sup>. Further, the plans for the construction of Kosovo C include provisions for social and environmental assessments to be undertaken, and for EUcompliant standards to be applied with respect to specifications for construction and operation of the plant. It is expected that the modern combustion technologies proposed for Kosovo C will not only produce much lower levels of emissions that could be achieved by the old power plants, but will also use less lignite to produce the same output.

The survey found that coal was the most popular choice when respondents were asked a series of questions about which energy resources should be used for electricity production in Kosovo (see Figure 2.11). Nuclear power was rejected by more than half the respondents, and gas was the next least popular source. The responses are presented in the order in which the questions were asked—that is, the question of whether coal should be used was asked first, then nuclear, and so on. That method offers the most logical reason why, having rejected nuclear power for electricity generation, around 40 percent of respondents then agreed that any source should be used to generate more power.



Over 50 percent of respondents favoured the use of renewable energy sources, yet nearly a third of respondents were unsure about that question. When asked which energy sources could be used to diversify energy supply in Kosovo, the responses indicated a relatively high level of uncertainty about all renewable resources other than hydropower, which is already used to supply electricity in Kosovo (see Figure 2.12). Natural gas was the least favoured option, which is consistent with the responses presented in (Figure 2.11). A local analyst has suggested that there may be significant opposition to the introduction of natural gas because of perceptions about the potential risk of explosions.



Finally, in relation to energy supply in Kosovo, respondents were asked for their view on the construction of the Kosovo C thermal power plant. Responses were analysed by ethnic group, age group and educational level. Given that, in energy stakeholder circles, there is a perceived high level of controversy surrounding the plans to build Kosovo C, the public opinion survey responses show a surprising lack of awareness about the proposed construction (see Table 2.7). Among ethnic groups, the minorities—and, particularly, K-Serbs—were far less likely to have heard about the plan than K-Albanians. To some extent this discrepancy may be indicative of the wider disengagement of the minority groups from political and socio-economic issues that are debated at the centre in Kosovo. Further analysis showed that awareness of the issue increased by educational level, and, to an extent, with age. The exception here was the greater lack of awareness among the highest age group than all other groups. It is notable that less than half of the respondents under the age of 25 were aware of the plan.

Overall, 58 percent of respondents who had heard about the plans for Kosovo C supported its construction. K-Albanians were the most supportive, followed closely by ethnic minority respondents other than K-Serbs. No clear pattern of support level was found by educational level or age groups.

Overall, the survey data on public perceptions of electricity supply and impacts indicated that the respondents were rather more likely to be aware of, and hold definite opinions on, sources for the generation of electricity than its impacts. If the sample is indicative of the general population, a question must be raised about whether current perceptions and beliefs are based on adequate information about the potentially adverse impacts of energy production and consumption—or whether the current energy crisis leads people to disregard the adverse affects of energy production even if they are aware of them.

 Table 2.7
 Awareness of and support for plans to build Kosovo C (% of respondents)

	Aware	Support
By ethnic group		
K.Albanian	65	41
K.Serb	28	4
Other	40	24
By age group		
18-25 years	49	35
26-40 years	53	28
41-59 years	60	33
60+ years	45	32
By educational level		
No education	17	6
Elementary	42	25
Secondary (3 grades)	58	42
Secondary (4 grades)	57	30
University	73	50
Source: UNDP Kosovo Human Development Report survey 2007		

### 2.6 Key policy implications

The main energy supply problem in Kosovo relates to the electricity sector, as is well known already. The key finding from this study in relation to energy supply is that the majority of household consumers lack awareness about the overriding problems in the electricity production and supply systems. Essentially, the key problem is that supply cannot meet consumer demand at peak periods because the physical infrastructure is inadequate. Of course, the capacity constraints per se can be seen to be the proximate cause, with the underlying cause being inadequate investment funding to maintain, upgrade and expand the infrastructure, which in turn is in large part due to non-payment for electricity by consumers.

However, this perspective can lead to unrealistic expectations from consumers as the rate of bills payment increases. In reality, the supply situation is unlikely to improve significantly in the immediate future, even if investment funding were available, because the time lag between receipt of investment funding and delivery of improvements to the infrastructure is estimated to be a minimum of 24 months. This means that, in addition to paying their bills, consumers need to be made more aware of the need to reduce demand and subsequently assisted in efforts to contribute to demand reduction.

For KEK and KOSTT, the main immediate problems are financial, and relate to the need to increase revenues to provide investment funding for improvements in infrastructure and financing of electricity imports. Identification of unbilled consumers, prevention of theft, and collection of bill payments are therefore major priorities. All options to encourage consumers to pay for energy consumed merit serious consideration, including incentives and rewards for paying customers and less punitive measures (than disconnection or unscheduled power cuts) for habitual non-paying customers. Metering systems, including prepayment meters, may play an important role in establishing a sound and sustainable footing for the future of the electricity system. In addition, KEK and KOSTT need to be able to operate on a more sound business footing, including the removal of constraints related to public procurement procedures. While these procedures remain in force, the potential upgrade and repair of essential infrastructure will be subject to unacceptable delays.

In the context of the critical supply situation in the electricity sector, environmental impacts of the existing production systems are not given the highest priority: this is admitted by the Ministry of Energy and Mining. Public awareness about the impacts of coal and electricity production is quite low, particularly concerning impacts that cannot be seen or felt clearly at the individual level. Effective environmental monitoring systems and health information systems need to be put into place. Such systems would serve as a basis for both policy analysis and design as well as the improvement of public information and understanding of the environmental and health impacts of energy-related activities, including consumers' own direct consumption of polluting energy sources.

Finally, the inadequate and often polluting provision of space heating represents a serious concern for the health and well-being of householders. Despite there being more alternative primary and secondary energy sources for this particular energy service than for any other, many households are only able to heat one room of their homes in the winter months. District heating is of poor quality, and the use of firewood, oil and gas for space heating is limited by both the cost of the fuel and the number of heating devices, such as wood burning stoves, that the household can afford and accommodate. The problem is compounded by the inadequate thermal insulation of existing buildings in Kosovo, which leads to high levels of wasted heat. Heating is one area that merits immediate attention from policy makers, on the grounds of both energy demand reduction and human welfare.



## **Energy Consumption: Trends, Perceptions, Attitudes and Behaviours**

- Overall trends
- Electricity consumption, billing and payment
- Energy efficiency and fuel switching
- Transport
- Energy and environmental awareness
- Key policy implications

## **3** Energy Consumption: Trends, Perceptions, Attitudes and Behaviours

As noted throughout this report, the household sector is the major consumer of electricity, firewood and district heating in Kosovo. Therefore, it is at the household level where the most intensive efforts should be made to address the consequences of limited domestic electricity production, the high cost of imported electricity, and high levels of environmental pollution from energy production and use.

The pressing need for energy conservation, energy efficiency, and informed choices at the household level does not, however, easily translate into clearly effective solutions. Consumer behaviour is influenced more by individual perceptions and attitudes than by policy makers' evidence-based exhortations. Where low consumer awareness about the impacts of their behaviour-and about the options, costs and benefits of behaviour change-prevails, the influence of individuals' perceptions and entrenched attitudes is very strong. In order for policy makers and other concerned organisations to initiate activities to encourage payment of bills, energy demand reduction and/or fuel switching, an understanding of consumer perceptions and attitudes is needed.

### 3.1 Overall trends

The Ministry of Energy and Mining acknowledges that, given present political and economic uncertainties, together with a lack of accurate statistical data, it is difficult to produce reliable forecasts at this time. However, from the ministry's overall forecasts for 2007, it can be estimated that electricity accounts for around 60 percent of total household energy usage, with most of the remainder being firewood (see Figure 3.1).

The overall energy demand trends show that households now consume around 70 percent of electricity supplied and account for



approximately 50 percent of overall consumption of firewood. The proportion of energy consumed by the household sector is expected to decrease in the future as a result of assumed private-sector business growth in Kosovo. Even so, based on predicted growth in the number of households, household energy consumption for all fuel sources is expected to grow in absolute terms over the same period.

It is important to note that the growth forecasts do not, in any systematic way, take into account potential future changes in consumption behaviour, including energy conservation and efficiency, and switching between alternative fuel sources. Such changes may occur in response to market prices, changing social values and attitudes, and, in the case of electricity supply, increased measures to prevent non-payment of bills and theft. This chapter is particularly concerned with those potential underlying factors as well as others that influence consumer behaviour in respect of energy choices and consumption. Results from UNDP's recent household energy survey are presented here with a view to gaining a better understanding of consumer behaviour and the potential for change. Additional data from the Statistical Office of Kosovo (SOK) is also used.

Household survey data in Statistics on Living Standards 2003-2005, produced by SOK<sup>87</sup> in 2007, indicate a surge in household purchases of major consumer items in 1999 and 2000, following the deployment of the UN interim administration. The highest number of purchases was of televisions, with refrigerators, washing machines, cars and freezers all among the other most favoured items (see Figure 3.2). The pattern of purchases of other household electrical goods such as microwave ovens and personal computers was similar for that period, although less significant in terms of numbers. This surge of consumer purchasing tailed off after 2000 for all items except mobile phones, for which sales have continued to grow. It is also believed that an increase in summer demand for electricity is the result of increases in the number of household air conditioners installed in the past two years<sup>88</sup>.



Despite the decreasing trend in purchases of large consumer goods since 2000, the wide-scale acquisition of these durable, energy-consuming goods has had significant implications for energy consumption in the household sector.

Chapter 2 indicated that a priority concern for future planning is to reduce household consumption of electricity, especially at peak periods. Electricity demand reaches a seasonal peak in the winter months, and this is largely attributed to increased heating needs. In the household survey, no clear distinction was made between space heating and water heating, although the viability of switching to alternative energy sources differs between them. Most households in the survey rely on individual devices at the household level, with only a small minority receiving their heating supply from district heating or centralized multi-unit housing systems (see Table 3.1).

Table 3.1	able 3.1 Heating systems used by households			
		%		
Household he	eating device(s)	87		
District heatir	ng from utility	7		
Multi-unit housing central heating		4		
Other/No ans	wer	2		

Source: UNDP Kosovo Human Development Report survey 2007

Most households use electric boilers for water heating, but there is a range of energy sources used for space-heating devices used at the household level. Of these, firewood was identified as the main source of heating by 80 percent of households surveyed for this report, with electric heating being the main source for 12 percent (see Figure 3.3). There is only a small difference in the relative use of electricity and firewood between urban and rural households. Electricity is used by a greater number of urban households (16 percent) than by rural households (7 percent), with a similar inverse difference in the use of firewood for heating (81 percent in urban, 88 percent in rural). Coal is also used for heating, mostly in schools and houses in rural areas.

Most surveyed households use alternatives to electricity for both heating and cooking. Of those that do, firewood is the most common alternative, with gas (in canisters) as the next most popular source. There are some differences between ethnic groups (see Table 3.2). K-



Table 3.2

Energy sources used for cooking and heating (other than electricity)

	-			_		
			Heating			Cooking
	K.Albanian	K.Serb	Other	K.Albanian	K.Serb	Other
Firewood	75	92	71	59	84	37
Gas	10	4	15	21	14	36
Other fuels	12	0	13	6	1	9
No answer	3	4	1	14	1	18
Source: UNDP Kosovo Human Development Report survey 2007						

Serbs are the most likely to use firewood rather than gas, whereas higher percentages of other minority groups reported using gas as an alternative source of heat.

The survey data did not present any clear reasons for these differences, which could include relative cost and availability in particular geographical areas, or even cultural preference.

# 3.2 Electricity consumption, billing and payment

According to data from UNDP's survey of households, commissioned for this report and carried out in October and November 2007, only a little over half (53 percent) of households surveyed claimed that they paid electricity bills on a regular basis. "Regular payment" was defined in the survey as being at least every two to three months. Forty percent acknowledged not paying regularly, while the remaining 7 percent did not answer the question. The household survey found that responses differed significantly among ethnic groups (see Figure

Frequency of electricity bills Figure 3.4 payment, by ethnic group % of respondents 40% 20% 60% 80% 100% ∩% K.Albanian K.Serb Other Every month Every 2-3 months Every 4-5 months Every 6 months Doesn't pay Doesn't want or rarely to answe Source: UNDP Kosovo Human Development Report survey 2007

3.4). In particular, only 11 percent of K-Serb households reported paying regularly, compared with 69 percent of K-Albanians and 38 percent of other ethnic groups.

According to the survey data, the great majority of K-Serb households do not pay electricity bills at all, but those that pay tend to pay regularly each month. On the other hand, a significant minority of both the K-Albanian and other minority group households pay on a sporadic basis. This may indicate that, for these groups, financial problems and income insecurity might be the overriding cause of non-payment. Further analysis of the household data by income level found that, for K-Albanians and non-Serb minorities, household income and regular payment of bills were positively correlated. However, this was not found to be the case for K-Serb households. In fact, a higher proportion of the poorer households pay regularly than do the richer households (see Figure 3.5). The definition of a "richer household" here is one where household income is greater than the overall median household income of



€250 (\$375) per month, as found in the surveyed households. It should be noted that the median household income among the "other minorities" group was actually much less than the overall median, at €160 per month. The median K-Serb household income was significantly higher, at €500 per month, while the K-Albanian median was €250 per month.

Survey respondents whose household did not pay electricity bills on a regular basis (at least once every 2-3 months) were asked to give the main reason for this. The results, shown in Figure 3.6, indicate that economic reasons are the main cause of irregular payment or nonpayment among K-Albanian and other minority households. The perception that other people do not pay the bills was the second most cited factor among these groups, but the most commonly cited one by K-Serb respondents. However, over half of the K-Serb respondents declined to give any reason at all for not paying. It should be noted that few respondents in any of the groups believe that there will be an amnesty on unpaid bills.



KEK's low collection rates are not uncommon in the region, according to a 2007 report from the Energy Community Treaty Secretariat. Metering, billing, collection rates and nonpayment were all identified in the report as "characteristic problems" for community members, as were insufficient domestic generation, lack of investment in distribution and low tariff levels<sup>89</sup>. However, there is one aspect of KEK's billing and collection problems that is specific to Kosovo. This relates to (i) inadequate metering and billing throughout the territory and (ii) a lack of enforceable penalties for non-payment of bills issued in ethnic minority areas, particularly in K-Serb enclaves.

The political, economic and social situation of Kosovo's minority ethnic groups, including K-Serbs, Roma, and Ashkali is extremely sensitive. In 2006, the European Commission reported that despite the institution of an Anti-Discrimination Law and an extensive outreach campaign launched by the president and prime minister, "minority communities, mostly Serbs and Roma, face discrimination, serious restrictions in freedom of movement, access to education, health care, public utilities and social assistance, due to the poor quality of services and security concerns<sup>90</sup>."

The report also noted that a large proportion of some minority groups, including Roma, live in informal settlements and subsequently lack access to public services. Security concerns, as well as the perceived need to extend special assistance to the minority groups that face particular hardships, resulted in an UN-MIK instruction to KEK to ensure that minority areas are not disconnected from utility supply systems.

Social attitudes may be important factors in determining consumer behaviour towards payment of energy bills. Householders were asked whether they agreed that every household should pay for all services, including electricity, in full (see Table 3.3).

## Table 3.3 Attitudes towards payment of electricity bills (% of respondents)

Each household should pay for all services, including electricity, in full					
	Yes	No	"Don't know / No answer"		
K.Albanian	97	2	1		
K.Serb	68	23	9		
Other	80	8	12		
Source: UNDP Kosovo Human Development Report survey 2007					

Table 3.4	Attitudes towards theft of electricity (% of respondent	s)		
		Yes	No	No answer
Those who at	tempt to thieve electricity should be penalized	71.2	19.4	9.5
"Decent peop of those who	ole do not have a good quality service because attempt to thieve electricity"	41.5	34.4	24.1
Source: UNDP Kosov	vo Human Development Report survey 2007			

The responses highlight that, for all ethnic groups, the great majority believe that electricity should be paid for, in full. It must be noted that there is an element of ambiguity in the question asked, because it is not clear whether paying "in full" would take into account the direct payments made to KEK by the Ministry of Labour and Social Welfare against the bills of households that receive social welfare benefits. In a separate question on that issue, the vast majority of survey respondents (91 percent) agreed that low-income households should receive discounts or compensatory payments on paid bills.

Further evidence of social empathy in respect of electricity consumption is shown by attitudes towards the theft of electricity through illegal connections and tampering with meters. While the majority of survey respondents agreed that theft of electricity should be penalized, a significant minority thought otherwise (see Table 3.4). Moreover, the majority of respondents were not inclined to blame electricity theft for the perceived poor quality of service they receive.

The results from the household survey, while by no means conclusive or definitive, indicate that inability to pay due to economic reasons is only partially responsible for the high levels of non-payment in recent years. A majority of households feel that electricity is too costly in principle, and those households that pay more than €30 per month are particularly inclined to feel that way. Moreover, while a majority of households believe that they should pay, there is clear evidence of empathy with those that do not. Finally, more than half the respondents were reluctant to blame other householders for the poor quality of electricity service received.

It is clear from previous surveys that KEK has a poor relationship with its customers, including private-sector enterprises<sup>91</sup>. There are a potentially wide variety of mechanisms that KEK can use to encourage full and prompt payment of bills, foremost among these being disconnection of supply for non-payment. However, UNMIK has instructed KEK not to disconnect households or commercial users within ethnic minority enclaves, even where their consumption is metered. That directive places KEK in somewhat of a quandary, given its recent report that demand for electricity in minority areas is rising, and now accounts for between 8 and 10 percent of total demand. KEK has subsequently requested that UNMIK review its directive so that the power company is able to—as a partial solution-disconnect non-paying commercial customers in minority areas<sup>92</sup>.

Table 3.5	Disconnections for non-payment of bills, by ethnic group Response to this question: Have you been disconnected for non-payment of electricity?			
	% of responses			
	Yes	No	No answer	
K.Albanian	11.3	81.1	7.6	
K.Serb	10.1	78.4	11.5	
Other	21.6	72.4	6.0	

Source: UNDP Kosovo Human Development Report survey 2007

Alternative mechanisms to disconnection to encourage regular payment of bills include the ABC system of load shedding, as described in Chapter 2. The household energy survey found that, according to responses received, the ABC system only partially successful, at best. Analysis of the relationship between regularity of bills payment and frequency of power cuts shows that there is little difference between paying and non-paying consumers in respect of daily power cuts (see Figure 3.7).

Another mechanism that has been tried is the refusal of car registration for those who are in debt to KEK. However, at the end of 2007 it was reported that this mechanism is to be discontinued. Among the reasons are the



negative consequences, some unforeseen. For example, the mechanism led to an increase in the number of unregistered (and, therefore, illegal) vehicles on the roads, a development that placed constraints on the ability of the PISG to improve energy and environmental performance in transport.

Finally, KEK has approval from the energy regulator to charge interest on late payment of bills. Again, monitoring data on the impact of this measure is not available. However, it is notable that all of the mechanisms deployed by KEK so far are punitive, and the corporation might be well advised to also consider the potential of incentive and reward mechanisms, such as discounts for prompt payments. On the other hand, to meet the objective of lowering household demand for electricity, KEK has to ensure that its tariff structures and lack of enforcement of penalties for non-payment do not encourage wasteful consumption and/or using electricity in preference to other, perhaps more appropriate, fuel sources. The tariff system is the major tool for demand management within KEK, but the potential for its most effective use is constrained by both the inadequacies of the metering systems in place and the requirement to keep electricity prices affordable for poorer households.

### **Electricity tariffs**

There is no relationship at present between KEK tariffs and regional wholesale market prices. Electricity in Kosovo is, in practice, heavily subsidized. The present tariff structure in Kosovo has developed over time in response to domestic economic and political factors. It is therefore quite complex, partly as a result of different metering systems in use. The key elements for residential customers are as follows:

- there are two different seasonal tariffs for winter and summer months respectively, with the winter (peak) tariff set at over twice that of the summer tariff;
- for some consumers, two different daily rates (on and off peak) are applied; and
- electricity consumption over 600 kWh per month per customer (referred to as "overlimit") is charged at a higher rate.

While the third measure is designed to encourage an overall decrease in consumption of electricity, the others are all mechanisms designed to avoid "spikes" in the load profile and to lower peak demand levels.

The impacts of the seasonal tariff system are unclear. Winter bills are in any case likely to be higher than summer ones, and applying a high tariff during this season may serve to increase the rate of non-payment. Moreover, demand for electricity increases in winter due to, particularly, the increase in heating and lighting needs. Consumers cannot transfer their consumption for these services between seasons in the way that some daily activities can be shifted to different times of day.

KEK has recently applied to revise the tariff structure that came into force in April 2007. One of the proposed revisions is to replace the two daily tariffs with a single rate. From a demand management perspective, this appears to be a retrogressive step in that it removes the incentive for consumers to wait until the off-peak rate applies before using certain appliances (where this is practical). However, KEK officials and other observers recognize that the twin tariff system is useless in any case, perceived or real energy-conservation incentives or not. That is because the inadequacy of the existing metering system, combined with load shedding programme, makes it impossible to accurately implement the appropriate rate at the right times of day<sup>93</sup>.

Asked whether the price of electricity is affordable, only 20 percent of households surveyed agreed that it is; 62 percent said "no", and

the remaining 18 percent were not sure, or did not answer. In relation to their own household, respondents were asked how much, on average, their electricity bills are and whether they think that this is a reasonable amount to pay. The results, shown in Figure 3.8, indicate that the majority of households find the monthly electricity bill reasonable when it does not exceed  $\in$ 30 (\$45). Satisfaction with the price dips quite sharply where the monthly bill is over  $\in$ 30. This amount is significant, as it is also the overall average monthly electricity bill among the households in the survey.



However, it is clear from a combination of factors that consumer prices will inevitably continue to rise in the near future. These factors include the rising prices on the wholesale electricity market, the continuing need for imports of electricity, and the need for KEK to become a viable business. The average price for electricity imports in 2006/7 was €55 (\$82) per MW, which is more than the average consumer price billed by KEK. Further, where electricity not already contracted is needed on an emergency basis—such as when there are unexpected shut downs at one of the power plant units-the price of imports is much higher than average. In 2007, KEK reported that the price of emergency electricity was €150 per MW.

### 3.3 Energy efficiency and fuel switching

When asked directly, 83 percent of respondents in the household survey said that energy efficiency is important to them; 7 percent said that it is not important to them, and the remaining 10 percent were not sure or did not answer. Energy efficiency was less important than the average to those that do not pay electricity bills, although it is still important for the majority (69 percent). It is notable that energy efficiency is more or less equally important to those that do pay their bills, irrespective of the regularity of payment (between 89.1 and 89.5 percent of respondents); this indicates a strong economic incentive for efficiency measures. Respondents were then asked about energy efficiency measures taken in their households (see Table 3.6).

What can be seen from the questions, especially in light of the predominance of electric water heaters in Kosovo, is that there is a strong emphasis on electricity usage. According to the responses given in the survey, the majority of households carry out all of the measures asked about, with the exception of the two that relate to the purchase of energy efficient appliances<sup>94</sup>.

The measures related to space heating are particularly notable given their potential negative impact on household members. For example, 77 percent of households reported that they heat only one room. This is what has been referred to, ironically, as "energy efficiency through freezing"<sup>95</sup>. In response to another survey question, 1 in 4 households reported that their home is heated irregularly, or hardly at all, during the winter months. A reduction in the use of this energy service has potentially serious implications for human health. Older people are particularly vulnerable in this respect. Other

## Table 3.6 Energy efficiency measures taken at the household level (% of households)

	Yes	No	No answer
Switching lights off when I leave a room	93	3	4
We switch to firewood	87	11	2
Switching the water heater off when I go away	85	7	7
Boiling the exact amount of water needed	83	12	5
Showering instead of bathing	78	15	7
We heat only one room	77	21	3
We do not heat the entire apartment/house	77	21	3
Switching the stove off a little before a meal is cooked	70	22	8
My boiler is set to 55 C or less	55	29	16
A deciding factor when buying an appliance is energy efficiency rating	50	36	13
Replaced light bulbs with energy-saving ones	41	48	10
Source: UNDP Kosovo Human Development Report survey 2007		-	

vulnerable groups are the unemployed, women and small children, all of whom are more likely to spend most of their time in the home. Among the household surveyed, over half (52 percent) have at least one member of the household in the 60+ age group, and almost all households (99.5 percent) have at least one member of the household who spends most of the day at home during weekdays.

The household survey did not reveal a statistically significant relationship between energy efficiency measures and income levels. The average "energy efficiency" level may be expressed as the average percentage across all energy efficiency measures noted in Figure 3.6. Yet few clear trends are evident when this level is analysed by household income group—although, broadly speaking, households with monthly incomes of €500 (\$750) or less make greater efforts to save energy than better off households (see Figure 3.9).



However, the data does indicate a clear negative relationship between frequency of payment of electricity bills and efforts to save on electricity consumption. Using the same method of calculating average energy efficiency efforts between groups, but only in respect of those efforts clearly related to electricity consumption<sup>96</sup>, the data showed that those households that do not pay electricity bills also make the least effort to reduce their consumption of electricity. These households are also the least likely group to switch to firewood for the provision of heat (see Figure 3.10).



The numbers of affirmative responses to the list of questions about energy efficiency efforts may indicate a perception, on the part of households, that they are already doing all they can to save energy. If this is the case, there is likely to be resistance to suggestions that further reductions in energy consumption should be made at the household level, as these are often associated with a reduction in living standards<sup>97</sup>. Evidence from the household energy survey supports this hypothesis. When asked whether respondents agreed or disagreed with statements relating to external influence on household consumption, 75 percent agreed that the onus should be on KEK to produce more electricity rather than on households to reduce consumption (see Table 3.7). The responses on whether overlimit (consumption over a set amount) should be charged at a higher rate were less certain, but the largest single group of respondents were not in favour of this.

Table 3.7 Attitudes towards external influences on electricity conservation (% of respondents)

	Yes	No	"Don't know/ No answer"	
"Electricity above a certain consumption amount should cost more to encourage energy efficiency"	32	46	22	
"KEK should provide more electricity to meet demand rather than private households reducing consumption"	75	8	18	
Source: UNDP Kosovo Human Development Report survey 2007				

Analysis of attitudes by ethnic group and by frequency of electricity bills payment showed some differences between groups, but in these cases the data does not suggest a clear interpretation of the reasoning behind the differing opinions<sup>98</sup>. However, these analyses highlighted a key common difference in the responses to both questions: the highest rates of non-response (or "do not know" responses) came from households that do not pay electricity bills at all (28 percent and 26 percent, respectively). This may indicate either greater ambivalence to, or perhaps, disengagement from, the questions raised.

### Investments in energy efficiency

Energy for heating is perhaps the key area where most improvements in energy efficiency could be made, and also where the greatest potential for effective fuel-switching lies. The data from the UNDP survey in Kosovo was not sufficiently detailed to quantify proportions of household energy consumption by end use, but data from across EU countries indicates that more than half (57 percent) of the average household's energy consumption is for space heating, with a further 25 percent being used to heat water. Only 11 percent is used for lighting and other electrical appliances, although this is the area on which so much discussion on the promotion of energy efficiency is focused. The remaining 7 percent of energy consumption is accounted for by cooking<sup>99</sup>.

In terms of developing policies and strategies to improve energy efficiency, it is also worth noting that, as shown in Table 3.6, the two energy efficiency measures taken by the least number of surveyed households in Kosovo involve financial outlays. Energy efficient light bulbs and most electrical appliances with high energyefficiency ratings cost more than less energy efficient equivalents. The price difference can be recouped through savings on energy bills in the longer term, and, in the case of energy efficient light bulbs, their improved durability. However, all the results from the household energy survey indicate that the majority of people are either unable or unwilling to make decisions based on a longer-term calculus-or perhaps are unaware of the potential benefits doing so. As a result, investments in energy efficiency at the household level are uncommon. Such investments might include maintenance and repair of secondary networks

of the heating systems and improvement of thermal insulation in dwellings.

The disinclination or inability to undertake such investments is particularly noteworthy given that over 70 percent of surveyed households reported that their heating system was in need of repair, with more than one in five dwellings requiring urgent and intensive repairs (see Figure 3.11). Similar responses were given in respect of electricity supply systems at the household level.



Appropriate thermal insulation of dwellings has not, until recently, been a legal requirement in the construction of residential buildings. Households could invest in retrofitting (for example, putting in roof insulation or installing high quality or double-glazed windows) to improve the thermal performance of their home. However, the survey data indicates that most households have not done so and thus have adequate insulation (see Figure 3.12). Only around half of households surveyed had roof insulation, with less than half having wall insulation and well-fitting or double-glazed windows<sup>100</sup>.



The reasons for the low levels of investment in basic, and economically sound, improvements in the home were not directly addressed in the survey. It does not seem likely to be lack of direct personal interest: the survey found, after all, that nearly 90 percent of dwellings were owned by the respondent, their spouse or their parents.

It was clear that members of lowest income group (households with a total monthly income of  $\in 100$  [\$150] or less) are the least likely to have all types of basic insulation. Households with total monthly incomes between  $\in 501$  and  $\in 700$  are the most likely to have roof and wall insulation, with those in the second highest income group ( $\in 1,001-\in 1499$  per month) the most likely to have double-glazed or other wellfitting windows.

Low-income households may find it difficult to make the initial investment in most insulation improvements. As such, investment in home improvement for energy efficiency is an area that might usefully be flagged for priority policy interventions, for example, through the introduction of grant and low-interest loan schemes<sup>101</sup>. In municipalities where energy efficiency programmes are being carried out in municipal buildings, it has been found that, even for relatively high cost investments (such as replacement of inefficient boilers), the payback period can be as little as one year<sup>102</sup>. At the aggregate level, direct benefits are likely to accrue in respect of reduction in demand for electricity, especially during peak winter periods. Meanwhile, indirect benefits-though more difficult to predict and measure-could include a reduction in the requirement for healthcare provision for those people whose health suffers because of energy poverty.

### Potential for fuel switching

At the household level, decisions related to fuel switching are likely to be determined by three main factors: availability, cost and impact on household members (for example, comfort and convenience). The wider environmental impact of alternative fuels may be an additional factor for some households, depending on the level of value they place on environmental issues both generally and specifically. Availability is an overriding factor, of course: it can force households to switch from their usual fuel when it becomes unavailable, and it can preclude the option to switch to a preferred alternative. Cost, including initial investment in new equipment, may also be an overriding factor for poorer households—especially when credit is not available or is itself too expensive.

Where high start-up costs do not preclude a specific fuel, decisions to switch will largely be based on the relative costs of fuel use and the relative anticipated impacts on the household members. However, uncertainties about any of the main factors—availability, cost and impact—will almost certainly influence decisions about fuel switching. These uncertainties currently represent a barrier to market penetration for potentially beneficial new energy technologies in Kosovo, including solar energy and the use of liquefied petroleum gas (LPG)<sup>103</sup>. Put simply, the ideal energy source is one that has been found to be cheap and reliable over a period of time.

(Figure 3.13) shows the respondents' assessment of the reliability of different energy service provision from firewood, gas, liquid fuels and electricity. Firewood is the most favoured source, with over 80 percent of those surveyed being satisfied or very satisfied with its reliability. Electricity is the least reliable.



However, substitution of electricity use with increased use of firewood, where possible, has several drawbacks. At the household level, the extent of its use for space heating is limited by the number of fireplaces or wood-burning stoves that are present or can be afforded and accommodated.

Moreover, without adequate ventilation, the increase in wood smoke can have potentially serious health impacts by, in particular, increasing the possible of contracting respiratory diseases. Babies and young children are especially vulnerable, but so are adults who have prolonged and close exposure to it. While there has not been any study to measure levels of indoor air pollution in households in Kosovo, and there is no specific data on the health impacts of inhalation of indoor wood smoke, the data that is available on incidence of respiratory diseases treated within the healthcare system do indicate that children under the age of 5 suffer disproportionately. Over 30 percent of combined primary, secondary and tertiary healthcare for respiratory diseases was accounted for by children between the age of 1 and 5 years, whereas total healthcare provision (for all diseases and age groups) for this age group was less than 15 percent. Healthcare for respiratory diseases accounted for over 57 percent of total healthcare provided for the 1-5 age group<sup>104</sup>. A causal relationship between indoor wood smoke and incidence of respiratory disease in Kosovo cannot be inferred with any confidence, at least not from the available data. However, the data does suggest that under-5s are particularly vulnerable to respiratory diseases, and therefore, by implication, are likely to be most affected by poor indoor air quality caused by wood smoke.

In addition, at the aggregate level, increasing the already extensive use of firewood as a household fuel in Kosovo has implications for the sustainability of existing forestry resources. Further, burning firewood at the household level is extremely inefficient in terms of the conversion of wood energy to heat. A rough estimate of the conversion efficiency is 10 percent, although that may differ according to the moisture content of the wood (and, to a lesser extent, other factors such as species burned). In comparison, the conversion efficiency of lignite is nearly 33 percent, according to the most recent figures from Kosovo.<sup>105</sup>

Two sources of household energy appear to hold great potential in Kosovo, but they are as yet used hardly at all. The first is solar energy, particularly for water heating. The other is LPG, which can be used for cooking or heating. Switching to one or both of these energy sources could reduce household electricity consumption quite substantially. In addition, using LPG as a substitute for firewood or coal reduces potentially harmful indoor air pollution and it is more convenient to use. The Ministry of Energy and Mining's Energy Strategy particularly highlights the potential market penetration of LPG as desirable. However, the ministry has not, for the time being, articulated proposals for how this might be achieved. Rather, it is being left as an issue to be considered by citizens and the private sector on their own<sup>106</sup>. In addition, there may be potential for the production and use of lignite briquettes, although this is not explicitly mentioned in the present strategy document<sup>107</sup>.

### 3.4 Transport

As reported elsewhere in this report, private vehicle ownership has increased significantly since 1999. According to responses in the household energy survey, vehicle ownership has increased by over 25 percent in the past three years. Ninety percent of vehicle owners in the survey have cars, 8 percent own vans, and 2 percent have other types of motorized vehicle. The changes in transport use in the period 2004-2007 are quite significant in terms of higher demand for transport fuel (see Figure 3.14). Overall, a large increase in car use, for both long and short distances, is associated with a similar reduction in the use of public transport. That development is particularly notable in terms of short distances, which was defined in the household survey as relating to travel within the respondent's own municipal area.



Not surprisingly, public transport use is more common among urban dwellers than those in rural areas. Even so, only around a third (32 percent) of urban respondents use public transport for short journeys. Car use differs little between urban and rural groups, but more rural than urban residents use vans.

Bicycles are used infrequently in general, according to the household survey. Only around 17 percent of respondents use a bicycle for any purpose, and of those, two thirds (67.4 percent) use it for recreation only. Less than one third (32.6 percent) use bicycles as a form of transport. The lack of cycle lanes and heavy motorised traffic on urban roads may act as disincentives to use bicycles for daily transport use.

Those who claim not to use any form of transport for short distances—that is, they walk—account for only around 5 percent of the total. The survey indicates that nearly half the respondents walk less than 1 km per day, with less than 20 percent walking 3 km or more each day (see Figure 3.15).



The results of the survey suggest that energy efficiency in respect of transport use is far less a priority than is household energy efficiency. Partly for that reason, the age (often old) and condition (often poor) of private vehicles in Kosovo are not conducive to efficiency in fuel consumption. Data on the age of householders' vehicles was not collected as part of the survey: rather, respondents were asked to give an estimated market value for their vehicle. The results show that most privately owned vehicles are valued at less than €2,000 (US\$3,000), which suggests that the majority of cars are relatively old (see Figure 3.16). Therefore, they are more likely to be fuel-inefficient. In Europe generally, there is evidence that fuel consumption in cars registered after 1999 was around 5 percent lower than those registered between 1997 and 1999. Cars registered after 2005 consume 7 percent less than those from the same period. The increasing fuel efficiency of new cars is attributed, in part at least, to a voluntary agreement between motor manufacturers and the EC<sup>108</sup>.



The fuel consumption of vehicles in Kosovo is likely to be even higher than average fuel consumption for similar vehicle types and ages elsewhere in Europe, because of the lack of regulation on car emissions—or, indeed, of testing to determine whether vehicles are roadworthy. However, the key impacts in respect of transport energy relate to the environment, and to environmental health (see Box 3.1). Security of energy supply is not, as yet, a policy issue.

### Box 3.1 Energy and transport use

Every year the government allocates a portion of the budget for improvement of transportation issues in Kosovo. During the 2006, the Ministry of Economy and Finance financed  $\in$ 29 million (\$44 million) for transportation, an amount that was increased to  $\in$ 36 million in 2007. These funds were to be used mainly for the rehabilitation of old roads and the construction of new ones.

In 2006 mini-buses replaced the old vans that served as public transportation in Prishtinë/ Priština. This change has greatly improved public transportation conditions. Public transportation in Kosovo has become more convenient as the buses and mini-buses stick to a planned schedule, set by the municipalities in cooperation with other institutions. The buses are fulfilled with passengers, a sign that the public transportation system could increase its capacities

After industry, automobiles are the main polluters of the air in Kosovo. According to the director of the Environmental Protection Department, Kosovo has a high proportion of cars that release

3.5 Energy and environmental awareness

In general, consumer awareness about energy issues appears to be quite low, despite the impact that energy problems have on everyday life in Kosovo. Energy conservation measures taken at the household level tend to be those that require no investment costs, regardless of whether they would be the most appropriate or efficient. Fuel switching involves taking a step down the "energy ladder"-that is, from modern sources to traditional, inefficient ones (primarily, in Kosovo, from electricity usage to firewood consumption for space heating). Some initiatives have been taken to raise consumer awareness, but there has not yet been a systematic approach to awareness-raising on the part of the government.

The authorities' limited response was reflected in the household energy survey. Less than 12 percent of respondents believed that the government had, to date, done a good job in educating people about energy efficiency. A third of respondents thought that it had not done a good job and the majority (over 55 percent) either didn't know or had no opinion on the issue. Analysis of different groups of respondents tends to support the hypothesis that harmful gases. There are no required car inspections in place (in accordance with EU standards) with regard to emission of gases. Through a personal observation on 80 moving vehicles in urban areas, mainly in Prishtinë/Priština, data on persons per automobile was collected. In 53 percent of the cases, there was only the driver in the automobile, which represents an inefficient use of energy for travelling. Additional information about the informal survey is contained in the graph below.

Number of people per vehicle in Prishtinë/Priština



the majority response in essence indicates a lack of awareness. The clearest example was found when responses were grouped by the educational level of respondents (see Figure 3.17). While there was no pattern of positive or negative responses according to educational level, the relative rate of non-response and uncertainty was inversely related to educational level. It was also found that, within age groups, the 60+ respondents showed the lowest level of definite answers, while the 25–40 years group were the most likely to have a definite view.



When asked whether they had read about any aspect of energy in the past three months, either in the newspapers or on the Internet, only a minority responded positively: around 31 percent had read about energy in the newspapers, but only 7 percent had read energy-related articles on the Internet. KEK has put energy efficiency information on its website, but this is evidently not a particularly effective medium for awareness-raising on the issue.

With regard to reading a newspaper article about energy, there was another clear pattern based on respondents' different educational levels (see Figure 3.18). Even so, less than half of those with the highest levels of education had read about energy in the newspapers in the past three months. Further, members of the 60+ age group were the least likely to have read a newspaper article about energy: only 23 percent responded in the affirmative, compared to around a third of each of the other age groups. Finally, there was a noticeable difference in responses between genders on this question, with women significantly more likely to have read about energy (35 percent) than men (26 percent).



Respondents who had read articles about energy on the Internet were, characteristically, young and/or very well educated (see Table 3.8). Yet even so, Internet-based energy education reached only 13 percent of the 25-and-under age group, and only 21 percent of universityeducated respondents. No difference between men and women was found in the responses to this question.



Survey responses: Do you read about energy on the Internet? (% respondents saying 'yes')

By age group		
18-25 years	13	
26-40 years	7	
41-59 years	4	
60+ year	2	
By educational level		
No education	0	
Elementary	2	
Secondary (3 grades)	1	
Secondary (4 grades)	8	
University education	21	
Source: UNDP Kosovo Human Development Report surve	v 2007	

There have been several public awareness initiatives on energy launched in Kosovo, including one carried out by students at the American University in Kosovo. They do not appear to have had significant impact, at least based on survey results indicating low levels of both energy and environmental awareness. Lack of awareness is particularly extensive among older people and those who have received relatively little formal education. Perhaps the most significant responses on awareness in the UNDP survey related to whether the respondent believed that they personally could make a difference toward reducing pollution levels. More than a quarter (27 percent) of respondents believed that they *cannot* make a difference, but the largest single group (over 40 percent) said they simply did not know.

### 3.6 Key policy implications

UNMIK and the PISG have been trying to develop clear policies and strategies regarding the payment of electricity bills, including the non-payment of bills by ethnic minority households that cannot be disconnected by KEK. They tried to address the issue in 2007 through a UNMIK-PISG-KEK Joint Task Force, but with limited success.

It is important to stress that non-payment of electricity bills is not specific to Kosovo; it is in fact a common problem throughout South-East Europe. That fact indicates as well that non-payment is not inherently related to ethnic

background. However, it appears that an unintended consequence of UNMIK's protection of minority areas from disconnection of electricity supplies has been an increase in the levels of non-payment of bills and demand for "free" electricity in those areas. That development can only serve as an irritant to existing ethnic tension, and its resolution should consequently be an imperative.

Data from the household survey indicates that a large majority of all ethnic groups believe that theft of electricity should be penalized, and that households should pay in full for electricity. The reasons for non-payment do not, therefore, appear to lie with people's fundamental beliefs and attitudes. Based on that assumption, the Joint Task Force should focus on two reasons for non-payment when seeking to identify appropriate solutions: (i) high levels of income poverty, and (ii) a lack of penalty for non-payment. One potential solution would be the introduction of prepayment meters, which have worked well in similar contexts elsewhere (including South Africa). This would give greater potential for self-monitoring and control of consumption on the part of consumers, which in turn could help poorer households to manage their consumption more effectively and so reduce their household energy costs.

In general, efforts to improve energy efficiency and reduce consumption should take into account the issues that influence consumers the most. The data from the household survey suggests that households respond strongly to developments around energy prices and energy reliability, but less to other factors such as impact on comfort and health, and environmental impacts. This is illustrated, for example, by the relative unimportance to surveyed households of energy efficiency in transport use. Such results raise the valid question of whether awareness-raising in itself will be sufficient to influence consumer behaviour in relation to energy consumption.

Government policy might be best targeted at a small number of priority objectives, such as improvement in thermal performance of buildings and the promotion of solar energy for water heating (and/or LPG for heating and cooking). Grant and loan schemes for home improvements that contribute to energy conservation are potentially important mechanisms to achieve demand reduction objectives and contribute to the welfare of households at the same time. Programme for Energy Efficiency and Renewable Energy Resources, would be useful to identify the most favourable portfolio of priorities. However, this programme lacks a funding mechanism at present. The establishment of such a mechanism, together with measures to provide a supporting revenue stream for it (for example, through levies on consumer petrol prices or carbon taxes), may be a prerequisite for future development.



## **Toward a Sustainable Energy Future**

- Long-term viability in the electricity sector
- Cleaner energy
- Energy efficiency
- Capacity-building for a sustainable energy future
- Recommendations

# 4

## **Toward a Sustainable Energy Future**

Energy policy in Kosovo has, to date, concentrated primarily on addressing supply-related problems. The main aim in that regard has been on increasing the provision of electrical power as a precondition for sustained economic growth. However, that single-minded focus may no longer be appropriate to ensure the improved health and well-being of people in Kosovo. As observed in UNDP's global Human Development Report for 2007/8:

There could be no clearer demonstration than climate [change] that economic wealth creation is not the same thing as human progress. Under the current energy policies, rising economic prosperity will go hand-in-hand with mounting threats to human development...<sup>109</sup>.

The challenge for energy stakeholders in Kosovo is therefore more complex: to design and implement policies and plans that support an economic development trajectory that is both ecologically and socially sustainable.

The concept of sustainable development has, broadly, three interrelated aspects: (i) economic (or, perhaps, techno-economic) sustainability, (ii) environmental sustainability, and (iii) social sustainability. Sustainable energy systems for development thus depend on the practical application of energy technologies that provide the best "fit" among technoeconomic viability, social acceptability, and environmentally sustainable resource use. Further, any evaluation of this "fit" has to be projected into the short- medium- and long-term futures.

The first aspect, economic sustainability, is relatively clear-cut. It refers to impacts on national and individual wealth and income-generating opportunity. In relation to environmental sustainability, sustainable energy development will have three main strands:

- reduction of the adverse environmental impacts of heavily polluting energy production systems through the introduction of, for example, "cleaner coal" technologies;
- increased supply of energy services from "cleaner" sources to meet development needs; and
- reduced consumption through more efficient use of both primary and secondary energy sources.

Recognition and understanding of the third aspect, social sustainability, have been more recent than of the other two. It concerns, among other things, the socio-cultural acceptability of specific development trajectories or individual projects; the impacts of development on human health and well-being, and on individual lifestyles; and demographic and employment impacts. Beyond these issues, social sustainability in energy development relates not only to improvements in energy services and more healthy environments, but also to local impacts on, for example, job creation and education.

The concept of sustainable development is easily incorporated into strategy documents, but in reality it is difficult to translate into viable policy measures and mechanisms, and even harder still to implement. In Kosovo, sustainable development is conceptually integrated into the current energy and environmental strategies, but has yet to be integrated into mainstream economic and social development policies. One problem is that energy and environmental strategies and policies are being developed according to EU legislation and policies, which themselves have evolved within economic and social development contexts that are different from those that prevail in Kosovo at the present time. Finding an appropriate "fit" among policies that are influenced by regional-and, indeed, global-concerns as well as meeting urgent territorial and local needs is likely to be a major challenge for energy policy in Kosovo. Success will require the development of effective interrelationships among a wide range of other sector policies (see Figure 4.1).



A guiding principle for Kosovo's energy policy in the long term should be the development of a sustainable lower carbon economy. Fossil fuel consumption, both in transport and electricity production, warrants close policy attention to improve efficiency and reduce negative environmental impacts. The International Energy Agency estimates that 85 percent of the world's energy needs over the period up to 2030 will be met by fossil fuels and that, without mitigating action, global carbon emissions will grow by 60 percent<sup>110</sup>. Access to electricity is a key human development need in Kosovo, but major investments and institutional changes are needed to address the challenges of ensuring cleaner power generation and the more efficient use of energy resources. Establishing a viable electricity sector is a key precondition for the achievement of a sustainable lower carbon economy. At the same time, current strategy needs to be developed to move Kosovo towards "cleaner" energy production and a reduction in demand through improved energy efficiency. Finally, the wide-ranging changes that these objectives imply will need new human skills and expertise in energy and environmental policy analysis, economics, law and local planning, as well as a range of engineering and environmental science skills and disciplines.

### 4.1 Long-term viability in the electricity sector

In conventional energy policy, self-sufficiency in energy supply-or more specifically, electricity supply-was regarded as a prerequisite for each country's domestic energy security. Regional approaches to energy security are comparatively recent, and the Energy Community Treaty that Kosovo has acceded to aims to develop both efficiency and security of energy supplies in the Balkan region. The first and major objective is to develop a cohesive regional electricity network, with a regional gas network also part of the regional energy future. However, this treaty is not expected to bring about an efficient regional system in the short term: regulatory regimes may be in place to support a regional liberalized electricity market, but in reality there are major barriers to its implementation not only in Kosovo, but also in some other Balkan states<sup>111</sup>.

One key barrier in Kosovo is that the liberalization of the domestic electricity market is progressing slowly. While current policies and plans intend to encourage private investment in production and supply, there are relatively few viable opportunities for potential new entrants in the electricity supply market in Kosovo. That situation by itself serves as an obstacle to further liberalization and viable customer choice: it has been argued that effective competition in electricity generation requires at least five "players" in the market<sup>112</sup>. Therefore, much depends on the development of effective competition in generation and retail in the regional market. Yet in Kosovo, the construction of Kosovo C, which will be operated by the company (KEK) that has long enjoyed a monopoly on energy supply, could effectively crowd out serious competition in the domestic market even if restrictions are lifted on other companies' involvement. Moreover, KEK's present inability to operate on a commercial basis is likely to act as another deterrent to private investors seeking to help it upgrade and improve services.

### Security of supply

As noted throughout this report, Kosovo's current energy strategy prioritises the construction of a new thermal power plant (Kosovo C). The construction of that plant, together with the associated new lignite mine at Sibovc/Sibovac, is expected to realise the objectives of developing electricity as a key export and prompt the creation of hundreds of new jobs. Kosovo C's main detractors have focused attention on the undesirable environmental and social impacts that are anticipated at the local level, as well as the increase in greenhouse gas emissions from the new plant. In addition to these concerns, there are three major disadvantages to the current concentration of policy and stakeholder initiatives on planning for Kosovo C:

- 1. There is an urgent need to ensure a reliable supply of electricity in Kosovo in the short to medium term—and the first unit of Kosovo C will not likely go online for at least seven years.
- 2. The planned capacity of Kosovo C is based on projected regional demand for exported electricity, and it is uncertain whether the planned capacity will be sufficient to meet both domestic and export demand. If in fact the capacity turns out <u>not</u> to be sufficient, it is unclear whether private investors in the plant will be permitted to favour exports over domestic supply should Kosovo's local tariff structures make that option less profitable. Conversely, Kosovo C's potential output may turn out to be excessive, in the face of regional competition. Overall, Kosovo's electricity sector may be vulnerable if the regional electricity market does not mature effectively within the next 8-10 years.
- 3. The planned dependence on a single large thermal power plant presents the same structural weakness in the sector that was highlighted by the lightning strike on Kosovo B in 2002, which prompted a prolonged period of extensive power outages followed while the plant was under repair. For Kosovo's base-load electricity system to be secure and sustainable, redundancy (that is, spare capacity) *and* diversity of supply need to be built in to it.

Present expectations are that the solution lies with the complementarity between the generating systems of Kosovo and Albania. However, Albania faces critical problems in its electricity sector similar to those of Kosovo, including a financially unviable electricity company and a reliance on electricity imports. It has been reported that domestic demand for electricity in Albania is growing at three times the European average, with one result being that the country has gone from being a net exporter of electricity to being unable to meet winter peak period demand. The recent supply shortfalls were caused by a reduction of available exports from Bulgaria (following the shutdown of two of that country's nuclear power units) combined with drought conditions that reduced the hydropower potential in Albania. During the winter of 2006/7, power cuts in Albanian cities lasted for up to 12 hours per day, with rural areas losing their supplies for up to 20 hours a day<sup>113</sup>. Exploiting the potential complementarity of the two systems will therefore depend on joint developments to modernize and upgrade existing infrastructure.

Kosovo has limited options for domestic diversification of supply, although the current strategy includes exploration of the potential for small-scale lignite-fired plants and the development of electricity from renewable resources. However, it will be extremely difficult for small-scale generation to achieve price competitiveness in a liberalised electricity market when pitted against large-scale generation based on cheap lignite. Well-designed policy instruments will be needed in future to promote investment in small-scale generation. Options include:

- regulation to ensure that the environmental costs of lignite extraction and its associated electricity production are internalised and reflected in wholesale electricity prices;
- quotas for a minimum share of electricity from renewable sources, which may, in any case, be required to support compliance with EU Directives on Renewable Energy Sources;
- feed-in tariffs for electricity from renewables, for which the production costs and/or conversion efficiencies are expected to become more economically efficient and, therefore, self-sustaining in the long term; and

 funding mechanisms to support the development of renewable energy technologies. Such mechanisms might include clean energy taxes and levies, tax relief on initial capital investment in renewables, and reductions on customs duty for imported technologies for renewables development.

An appropriate and timely set of policy mechanisms could create attractive opportunities for small-scale private investors in the energy sector. That development would in turn contribute to diversification of energy supply and local economic development.

## Electricity supply and demand management

Kosovo's energy strategy aims to create the conditions necessary for a liberalised electricity market. Key among these conditions is the potential economic viability of the wider electricity sector. Current policy states that privatisation and further unbundling of KEK will not take place until KEK itself can be seen to be a viable operation. The immediate challenge is for KEK to operate on a sound business footing. To that end, the following key areas warrant close attention in the immediate future:

- removing constraints on effective business management that have resulted from public ownership. One constraint particularly worth addressing is KEK's subjection to onerous and restrictive public procurement regulations (a constraint that also limits KOSTT's effectiveness). Easing that restraint should be accompanied, however, by accompanying measures that ensure close monitoring of the company in the future and specifically retain retroactive accountability for its performance to date. Another constraint that should be addressed are legal prohibitions on individual disconnections for non-payment;
- implementing a scheduled programme of tariff reviews that specifies clear target deadlines for achieving (at least) marginal cost pricing of electricity;
- initiating a demand side management strategy to reduce peak demand and to support load levelling; and
- improving KEK's customer relations.

In addition, government would be well advised to review the system of payments made to KEK on behalf of customers who are entitled to social assistance benefits. Two key drawbacks of this system must be highlighted. The first is that the system will not, in any case, be easy to operate after 2015, when other suppliers are expected to have entered the market and households will be free to choose between them. The other drawback is that as currently structured it represents, in effect, a subsidy on consumption of electricity. As part of a broader effort to improve awareness and decrease demand, the subsidy might be better placed to assist poorer households in energy conservation, energy efficiency and fuel switching. The IMF has recommended a full review of social welfare payments, with a view to streamlining existing mechanisms and ensuring that assistance targets the neediest<sup>114</sup>. Social payments in respect of energy would, logically, be included in this review.

While there is a need to protect the welfare of poorer households, measures to assist consumers to manage their own electricity consumption and payments more effectively would be more sustainable in the longer term. Replacement of the two seasonal rates with a single year-round rate could help customers spread bills a little more evenly across a 12-month period. On the other hand, in the present supply situation, reducing the winter tariff from its current level might encourage winter peak-season demand to rise beyond a viable level. One potentially useful stopgap solution would be to introduce voluntary schemes for customers to "bank" credit against their future winter bills as part of their payments during the summer months. Another measure that should be given serious consideration, but only through extensive consultation with customers, is the introduction of prepayment meters. Prepayment meters have been adopted elsewhere (including in South Africa) where delinquent bill payment has been a wide-scale problem. They also have the advantage of allowing customers to monitor their consumption more effectively, and prepayment removes the administrative and legal burden involved in remote disconnections for non-payment.

The relationship between KEK and its customers appears to be one of mutual distrust at
the present time. As noted in Chapter 3 of this report, no definite conclusions emerged from UNDP's recent household energy survey as to the reasons for wide-scale non-payment of bills. "Economic reasons" were the most frequently cited in the survey, although those responses did not entirely correlate with household income levels. Even so, it is reasonable to assume, given the prevailing high rate of poverty in Kosovo, that many households genuinely cannot afford to pay. Also worth noting is that nonpayment of bills was found to be closely associated with lower efforts to reduce electricity consumption and improve energy efficiency in the households surveyed. That finding points to a lack of incentives to change behaviour in general.

A range of measures have subsequently been deployed to encourage regular and prompt payment of bills. For example, interest is charged on late payments, disconnections for non-payment are increasing, and registration of vehicles has been denied to customers who are not fully paid up in respect of their electricity bills (although this particular policy has been abandoned). These measures are likely to engender even more ill will toward KEK because they are all punitive. In terms of improving customer relations, incentives and rewards for good customers might be a useful counterbalance to the current measures. These might include discounts for prompt payment and/or a scheme to spread the annual costs of household electricity more evenly across the year.

Another problem that was evident from the household energy survey was the broad lack of awareness concerning the ongoing electricity supply problems in Kosovo. This persistent gap could further undermine consumer trust; as such, greater-or at least, more visible-transparency on KEK's part is needed to maintain and build consumer confidence. Apart from present tools adopted for communication, KEK should consider more direct approaches to consumers via community meetings for mutual exchange of views and information on present problems in electricity supply and demand. These meetings would be beneficial especially for neighbourhoods where payments are low and there are problems with supply.

A balance is required between KEK's need to manage demand levels and paying customers' capacity to control their own electricity consumption. Tariff structures are, in general, fairly crude tools for demand side management. At the same time, it will be difficult to replace such tools quickly and smoothly. Mechanisms that rely on more sophisticated metering and/ or involve negotiated agreements for specific demand-side management options (such as selective and limited load shedding at peak demand times, or load-scheduling) are difficult to implement and administer in the household sector because existing metering systems are not compatible with new technologies for remote load shedding during the peaking hours.

KEK is now implementing a project for remote reading and eventual demand side management for some industrial customers. In Kosovo, the industrial sector is not the largest customer base, but it may still be the most viable starting point for a modern and sustainable demand side management strategy.

## 4.2 Cleaner energy

In Kosovo, adverse implications for both the environment and human health stem from the extensive use of lignite as an energy resource and the concentration of mining and electricity production in a small geographic area. While current strategy is committed to utilizing Kosovo's abundant lignite resources as the major source of domestic energy supply, opportunities remain to develop new, and cleaner, energy sources and technologies to reduce environmental and environmental health impacts. There is also potential for fuel switching, which in some cases might improve energy efficiency and support human development by enabling household consumers to access more modern fuel sources.

## Natural Gas

Kosovo has no natural gas resources and no viable gas network. That has not precluded the Ministry of Energy and Mining from undertaking an assessment of the future feasibility of the introduction of natural gas into the energy sector<sup>115</sup>. Development of natural gas for use in industry was planned for Kosovo in the 1980s, but those plans were shelved in the wake of regional political upheavals. The potential investment costs of developing a new gas infrastructure are perhaps prohibitive now, however, given the present low level of demand from industry and the extensive investment needs in the existing lignite-based electricity production system.

Nevertheless, the potential future use of natural gas in Kosovo is perceived to have a key advantage over lignite-based energy: it is less environmentally damaging. With the anticipated development of the regional gas market under the Energy Community Treaty, the wholesale price of gas may become more competitive with lignite-fired power generation, especially as environmental costs become increasingly internalised under EU regulations. Those benefits of natural gas are countered by the high initial investment costs to develop a gas-based energy system, the present low energy demand levels, and the potential insecurity of supply given that all natural gas would need to be imported. Russia is the main supplier of gas to South-East Europe, and a pipeline connection to Kosovo would have to pass through several countries. Pipelines to connect Prishtinë/Priština, the main market, with FYR Macedonia and/or Serbia would need to be built. The Ministry of Energy and Mining is charged with assessing all potential markets for gas in Kosovo, including electricity generation, and for developing a draft action plan for the development of a natural gas sector should the feasibility study indicate that there is sufficient potential<sup>116</sup>.

#### **Renewable energy sources**

Under the schedule for meeting the terms of the Energy Community Treaty, the Ministry of Energy and Mining (MEM) has been charged with submitting targets for the future consumption of electricity in Kosovo from renewable energy sources over the next 10 years<sup>117</sup>. These targets are to be expressed in the form of renewable energy sources' share of total electricity consumption.

According to the Kosovo Program for Energy Efficiency and Renewable Energy Resources (2007–2009): "The main potential renewable energy resources in Kosovo are hydropower, solar energy and biomass (mainly wood). There may also be some potential for geothermal and wind energy. Those natural resources must be considered as local resources, like lignite." In reality, the potential of renewable energy sources (RES) may be of limited viability in terms of contribution to overall electricity need, but their development has some key advantages. In particular, many are appropriate for relatively small-scale investments; RES projects contribute to local development; and some RES are particularly suited to address peak demand (whereas large-scale coal-fired plants are better for base load). The development of RES is also relevant with regard to future requirements for Kosovo to include a proportion of energy from RES in the overall energy mix. MEM has identified solar water heating and small-scale hydropower as special priorities.

The exploitable hydropower potential in Kosovo has already been identified. It appears to be economically promising, but there is a need to take into account any potential environmental externalities. Moreover, development of hydropower is likely to be limited to the potential small-scale sites already assessed; as such it is not an RES with long-term potential for further development.

The associated employment opportunities for small-scale hydro are also relatively insignificant. A similar situation in respect of employment applies to certain other mature renewable energy technologies, including wind and geothermal energy, two areas of renewables flagged in the current energy strategy for feasibility assessment (see Box 4.1). Solar power is, given its present technological constraints, mainly suitable for small-scale installations at the household level. In the ultimate analysis, the two related RES that may hold the most potential for future development in Kosovo are sorted municipal waste and other forms of bioenergy.

The production of energy from sorted municipal waste is a potentially attractive option in Kosovo because there is increasing pressure on existing landfill sites. Given the small area of the territory, long-term sustainability may depend on finding more efficient ways to dispose of waste. Municipal waste is not sorted at the present time, but the Ministry of Environ-

#### Box 4.1 Environmentally friendly energy

#### Solar potential as an energy resource

The production of energy from the sun is an extensively debated issue. Prishtinë/Priština gets 250 days of sunlight yearly. Yet solar power could be feasible even if sunny days were far less common. The most effective solar power cells currently available are plastic cells that use nanotechnology. They are the first solar cells able to harness the sun's invisible, infrared rays, which means that the panels can create energy even on cloudy days.

#### Wind as an energy resource

Wind is another source of energy that might be suitable for Kosovo. One option could be Istog/Istok, which has the most rapid winds in Kosovo. According to Ibush Jonuzaj, the president of the Assembly Commission for Trade and Industry, Vushtrri/Vučitrn is another potentially good site to produce wind-derived energy because it sits at a relatively high altitude of some 1,200 metres. Wind atlases and other technical assessments ultimately would be needed to evaluate if there is a real potential for producing energy from this source.

ment and Spatial Planning has indicated that work to evaluate the potential of generating energy from municipal waste is a priority area. A Waste Law has already been put into place, and current and future policies in this area will inevitably be guided by EU directives on waste and landfills; in the long run, though, the development of energy from waste in Kosovo may ultimately depend on its attractiveness at the municipal level. Municipalities are far more likely than the national government to view the creation of energy from waste as a win-win situation in that it boosts local power supply and helps dispose of waste. Furthermore, it offers the potential for new job creation at the local level and could increase the attractiveness of the municipality to potential new enterprises.

Similar optimism accompanies the idea of developing biomass energy, including biofuels. However, biomass energy covers a wide range of potential sources and conversion technologies. Each of these needs careful evaluation: picking winners in new areas of technology carries high risks of failure, and it must be noted that success in the development of bioenergy in other countries has been mixed. With regard to woody biomass used in the generation of electricity or heat, the only biomass resources that are economically competitive with traditional fuels are wastes, particularly forest and agricultural wastes, and waste from the timber industry. Cultivation of bioenergy crops is not likely to be economically viable in Kosovo in the near future, and some observers have contended that Kosovo's woods are not suited to industrial type of production<sup>118</sup>. On the other hand, the current use of biomass at the level of individual

households is inefficient, and, in the long term, possibly unsustainable.

Exploitation of biomass energy needs to be associated with sustainable natural resource management strategies. One key advantage of biomass energy production is that the developments of new technologies seem likely to bring about more efficient conversion processes in future. That achievement should make energy crops more economically viable. In the longer term, there may be potential for district CHP (combined heat and power) using biomass and/or municipal waste. There may also be some potential for co-firing biomass with lignite, at least at any smaller lignite power plants that are built.

Energy planning at the local level does not exist in Kosovo. However, some municipal authorities are already engaging in energy efficiency activities, many with technical assistance from the German Technical Cooperation Agency (GTZ), and these activities may facilitate the development of energy planning capacity within municipalities. The Association of Kosovo Municipalities has a key role to play in coordinating activities, sharing new knowledge among its constituent members, and in advocacy and cooperation with the PISG and its international partners. Links with relevant stakeholders in other countries in the region that have developed energy from waste and/or biomass, such as Croatia, Slovenia and Bosnia and Herzegovina<sup>119</sup>, could be developed. There may also be future potential to include energy as an issue for discussion in the ongoing decentralization agenda.

Other options in addition to RES and the asyet-unassessed potential of the development of a natural gas network stem from emerging technologies for clean(er) energy production of the most polluting sources. The most relevant of those technologies for Kosovo's purposes include cutting-edge coal conversion technologies and carbon capture and storage. Exploiting them could enable Kosovo to further develop its lignite resources while adhering to European regulation on energy production and renewables.

In the longer term, capacity building is needed to keep up with technological progress in these areas. Moreover, the negative externalities associated with electricity production are not at present internalised in electricity prices, and the costs are borne disproportionately by those living and working in close proximity to the mines and power plants. Experience in other countries indicates that the development of cleaner energy is, in general, constrained by competitive disadvantages in liberalized energy markets in which support for expensive and untried technologies has been withdrawn<sup>120</sup>. Policies to address the market failures associated with environmental and other externalities are usually needed to support the development of cleaner energy resources and technologies. It is unclear if Kosovo could meet the financial costs of implementing and sustaining such policies, which in other countries amount to publicsector subsidies.

It was clear from the household survey that where fuel switching occurs in Kosovo, it is most often related to a switch from electricity to firewood. Yet this change has negative repercussions as well: extensive use of firewood may not be environmentally sustainable and in any case has potentially adverse health implications related to indoor air pollution. Fuelwood and forest and agricultural residues are energy sources at the bottom of what has been called the "energy ladder"—their use is closely linked with poverty and a lack of means to utilise more efficient energy resources. Combustion of wood fuel in domestic stoves is inefficient in comparison with other energy-production methods, and emissions of particulate matter from domestic wood stoves can be between 10 and 30 times greater than those from com-

mercially produced bioenergy, per unit of heat produced<sup>121</sup>. Further, while firewood is a renewable resource, its current level of use in households may not be sustainable in the long term. Illegal woodcutting is a problem, and poor forestry management in the past has led to limited degradation of Kosovo's forests; if not addressed more forcefully, these practices will undoubtedly cause more serious problems. Moreover, unless a sustainable forestry policy is implemented that takes into account the demand for firewood at the household level, wood fuel resources may become scarcer and its retail price in Kosovo is likely to rise. This could trap many households in a cycle of fuel poverty.

There is little apparent market penetration of LPG in Kosovo even though that energy source offers positive health-related advantages (greatly reduced indoor air pollution) in comparison with traditional household fuelwood. The current energy strategy indicates that although increased LPG use is a stated government objective, its uptake is being left to market forces. Experience from other countries suggests that this will be insufficient to increase household use of LPG significantly. In Kosovo, LPG is relatively untried and untested. It also must be imported, a requirement that has associated implications for future accessibility and price. Further, there are initial costs involved in the purchase of LPG canisters and, possibly, compatible stoves. Policy initiatives are likely to be needed to promote and facilitate the increased use of LPG.

Similarly, solar thermal energy may be particularly attractive for water heating in respect of running costs, but the payback period on initial investment at household level is long. Demonstration projects may be useful to show the potential of the technology, but initial market penetration may be difficult without financing mechanisms for purchasers.

## 4.3 Energy efficiency

The International Energy Agency has estimated that, on average, each \$1 of investment in more efficient appliances and buildings avoids more than \$2 of investment in electricity supply<sup>122</sup>. Theoretically, therefore, energy conservation and efficiency in households is in the householders' economic interests. But in Kosovo to date, energy conservation and energy efficiency measures tend to be restricted to simple, no-cost efforts. Households are not at present inclined to invest in energy efficiency, either by buying more energy efficient appliances or through improving insulation in their homes. The latter investment offers perhaps the most significant potential benefits for households in Kosovo. A combination of greater awareness and a welldesigned grants or loans scheme for home improvement to support energy efficiency may be the best way to promote better thermal insulation in existing dwellings. For such projects and schemes to be effective, comprehensive analysis will need to be undertaken to determine (i) which consumers should be targeted for awareness raising and for future grant/loan schemes, and (ii) what organisation(s) should be responsible for overseeing the related activities.

At first glance there are two possible, and not mutually exclusive, levels at which initiatives might be initiated. First, at the central government level, existing subsidies on energy consumption might be reoriented towards a more general social welfare scheme for household energy support. Such a scheme could make social welfare credit for energy redeemable against either energy bills, or it could provide co-financing for grants and loans for investment in energy efficiency. However, municipal authorities may well be better placed than their national counterparts to administer schemes at a local level, and particularly, to conduct awareness-raising activities. Technical assistance is now being provided by GTZ to some municipal authorities in Kosovo to improve energy efficiency in municipal buildings. One of the objectives of that project is to develop a knowledge base about energy efficiency at the local level to support the rapid diffusion of knowledge into the wider community<sup>123</sup>.

Market penetration of energy efficient appliances in both households and businesses may need fiscal and/or financial incentives. This is already recognised in current strategy. The economic rationales for public support for market penetration of energy efficient appliances and improved thermal insulation of buildings in Kosovo include the following: (i) the need for electricity demand reduction in the short term, (ii) a reduction in the indirect costs related to subsidizing consumption of electricity, and (iii) the longer-term imperative of reducing CO2 emissions. The IEA estimates that the more efficient use of electricity in household and industrial applications could account for up to 30 percent of potentially avoidable emissions<sup>124</sup>.

Public support schemes offer great potential, but smaller-scale initiatives could also be effective on their own. For example, efforts to raise awareness and facilitate householder access to information and, perhaps, commercial finance, may be sufficient to encourage household investment in energy efficiency. Awareness raising might include supplying easily accessible information on (i) procedures for carrying out simple, self-administered energy audits within residential or commercial buildings, and (ii) the potential cost-savings and pay-back periods of investments in lowcost energy efficiency options such as draftproofing and boiler maintenance. New building regulations are soon to be introduced that include provisions for ensuring improved thermal characteristics of new buildings; they will not, however, apply to existing buildings. Additional schemes may therefore be warranted to encourage and facilitate retrofitting of the shells of existing buildings such as commercial and multi-residence blocks.

The anticipated establishment of an Energy Efficiency Agency in Kosovo may resolve the issue of institutional responsibility for the design and implementation of policy measures and mechanisms to support energy efficiency. Should the creation of such an agency be further delayed, the Ministry of Energy and Mining, perhaps in cooperation with the independent regulator, would be well-advised to delegate specific responsibilities in the area of energy efficiency promotion to other appropriate organizations.

#### **Transport**

The IEA estimates that more efficient use of transport fuels, mainly through the utilization of more fuel-efficient motor vehicles, could save up to 36 percent of CO2 emissions<sup>125</sup>. Kosovo is already progressing, albeit slowly, towards a more reliable transport fuel system with the establishment of a fuel quality testing laboratory. Authorities also plan to improve systems to test and regulate vehicle roadworthiness. A combination of vehicle roadworthiness testing, higher fuel prices and phasing out the use of lead in petrol (which is planned but poorly implemented or enforced as yet) could be met with strict resistance among many citizens. They are likely to reduce opportunities for car ownership and use because most cars are old and inefficient.

It is nevertheless difficult to predict the potential impacts of such policy changes on public transport use. Results from the household survey indicated that consumers pay relatively little attention to the environmental impacts of pollution from vehicles; given such attitudes, they are not necessarily inclined to consider the environmental benefits of public transport. It is possible that the lack of a viable alternative public transport system is a factor in this, although the data on public transport use collected as part of the household survey did not distinguish between different types of public transport—and therefore the relative merits of the existing private bus and public rail systems could not be evaluated. The government has done little to encourage usage in any case: the public transport system is at present receiving less priority in the consolidated budget than road construction and rehabilitation.

# 4.4 Capacity-building for a sustainable energy future

There are two interrelated aspects of energy development that act as overriding constraints on Kosovo's progression towards a sustainable energy future. These are the design and institution of appropriate policies and legislation, and education (including public awareness). UNMIK, the European Agency for Reconstruction and other international organisations have, in the past eight years, provided extensive technical assistance to support institutional capacity-building in Kosovo. Much has been accomplished in Kosovo in terms of building legal, regulatory and policy frameworks for energy development. However, some areas of policy are not yet well developed. These include policies to promote renewable energy sources, energy conservation and efficiency, and fuel switching. Furthermore, implementation and enforcement of legislation and policies that have been put into place are to be weak. To a large extent, the slow progress in the development of appropriate policies, and failures in implementation of those that are in place, are both attributable to a scarcity of skilled and experienced personnel.

## Policies to promote sustainable energy systems

Energy policy attention to date has concentrated on the provision of large-scale electricity supply and the transition to a liberalised electricity market. Policies to promote renewable energy sources and energy efficiency are lagging behind. The current plan of action for the development of renewable energy sources and energy efficiency is to evaluate and/or pilot a wide range of development options that relate to specific sources and technologies. However, funding sources have yet to be identified for most of the proposed projects. That step would likely move forward more quickly if policy makers prioritised the projects and provided rationale for doing so. Once the most promising areas for development have been identified and evaluated, specific policy mechanisms and programmes will need to be designed to promote and facilitate implementation. In general, it is unlikely that development of renewable energy sources can be left entirely to the market. The development of renewable energy elsewhere has usually depended on a mix of regulatory and market mechanisms, which in some cases are supported by new funding mechanisms.

A range of policy instruments can be considered for the promotion of renewable energy sources (see Table 4.1). Instruments to directly promote the uptake of renewables are not all mutually exclusive, and there are other supporting policy measures that may be required to

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facilitate uptake and market penetration. The two most commonly implemented mechanisms in the EU are feed-in tariffs and quota systems. Feed-in tariffs guarantee producers a fixed price for each unit of electricity produced from renewable sources for a fixed number of years. This of course has budgetary implications.

Carbon taxes are among the measures that could raise funding to cover feed-in tariffs. Carbon taxes are (environmental) use taxes that relate to emissions to air. The range of options for the design of one or more carbon taxes includes:

- a tax per ton of direct CO<sub>2</sub> (or CO<sub>2</sub> equivalent) emissions from power stations and other industrial operations;
- a levy on electricity bills for one or more consumer categories;
- a tax on the retail price of petroleum products; and
- an annual, or one-off, fee for owners of registered vehicles that varies according to the capacity of the vehicle's engine (where a higher fee is applied to larger engine size).

Quota systems are based on selecting and enforcing a minimum proportion of electricity produced to come from renewable sources as a legal requirement. Financial penalties for failure of producers to meet the quota are sometimes applied. Alternatively, tradeable "green" production certificates schemes have been used to support the efficient use of quota systems. In the EU, feed-in tariffs are considered to have been more successful than quota systems<sup>126</sup>.

Table 4.1	Policy measures to promote and support renewable energy sources	
Promotion		Support
Competitive tenders		Planning process
Feed-in tariffs		Technical standards
Production certificates		Education & Training
Renewables quota		Research, development & demonstration
Carbon taxes		
Emissions trading		
Capital grants & tax incentives		
Source: Komor & Bazilian 2005		

The combination of instruments and measures in a renewables policy needs to be designed within the context of prioritised goals. These might include energy goals, environmental goals and economic goals. Energy goals include security of energy supply, low energy prices, and/or energy price stability. Environmental goals might relate to sustainability in general, and/or to reduction in emissions of one or more greenhouse gases or other pollutants. Economic goals include employment creation and local and regional economic development. Many potential policies are likely to have a significant positive impact on one set of goals but a relatively minor one (if any at all) on others. Some analysts believe, for example, that although carbon taxes and emissions trading are instruments that are particularly useful to achieve emissions reductions, they have little impact on economic or energy security goals<sup>127</sup>. Therefore, a clear prioritization of goals is a prerequisite in the design of an appropriate set of instruments.

In policy terms, energy efficiency is a much broader field of activity. It relates not only to efficiency in energy supply systems as well as consumption, but also (in respect of consumption) to consumption of a wide range of energy sources in a wide range of contexts and by a wide range of applications. These include:

- combustion technologies for electricity generation and district heating;
- household electrical appliances;
- industrial production equipment;
- boilers in public buildings and multi-unit residential buildings;
- thermal characteristics of buildings; and
- motor vehicles.

Different actors, stakeholders and technologies are directly engaged in each of these consumption-related applications. (For example, household members select and use electrical appliances and vehicles, while companies and municipal authorities install and maintain boilers.) Therefore, different policy instruments may be needed to address each area. Again, priorities need to be established for immediate policy action.

# Human resources and public awareness

Another major limitation on energy development has been the slow development of a critical mass of skilled and experienced personnel in policy, management, economics, and-importantly for energy development-skilled and semi-skilled engineering workers and graduate engineers. Hence, one of the key goals identified in the Kosovo Development Strategy is the establishment of a flexible education system that is responsive to the needs of the economy and society. A more developed and modern education system is also likely to improve the capacities of civil society to have an effective voice in energy decision-making. Qualified engineers and other graduate experts are few in number, so the education system, together with policy makers and the energy industries, would be well advised to target priority needs for the education and training of potential energy sector employees.

However, it must be pointed out that the energy sector may offer quite limited potential for the creation of new jobs. In other countries, experience indicates that the deployment of new technologies in energy production has led to job losses. A World Bank report on energy in South-East Europe calculated that the coal industries of selected countries in the region needed to shed between 68 percent and 83 percent of jobs to become viable<sup>128</sup>. In Kosovo, the bulk of the new jobs foreseen in energy relate to the opening of the new mine at Sibovc/ Sibovac and the construction and subsequent operation of Kosovo C. However, it is unclear to what extent if any those new jobs will offset jobs lost when the two existing operational mines cease production. Another limitation is that job creation related to Kosovo C will be local to the mines and power plants, and therefore the geographic concentration of energy-related jobs will remain as it stands. Furthermore, KEK, Kosovo's largest single employer, is actually overstaffed, and it plans to downsize from current staffing levels<sup>129</sup>. Finally, the energy sector does not in general offer much opportunity for women. According to a survey undertaken by the Statistical Office of Kosovo, the mining and electricity sectors together employed only

1 percent of the female labour force, compared to 6 percent of the male labour force<sup>130</sup>.

In respect of education and training for skilled and graduate engineers, it is difficult to predict what areas of new technology might be developed in Kosovo in the future. Therefore, while energy sector employers need to coordinate with universities, government scholarship bodies and vocational training schools to ensure an effective supply of skilled personnel for the future, potential energy engineers may be well advised to train in general energy engineering skills rather than specialise in any particular area of energy development. Instead of trying to pick or predict "winners" within the range of existing and cutting-edge technologies, the Ministry of Education, Science & Technology might be better off working with the universities to develop a monitoring programme of a range of potentially interesting technologies for Kosovo, to be carried out by research engineers. Cooperation and integration could also be encouraged toward the design of postsecondary education and training that combine engineering with environmental science and/ or management. Potential participants in that joint effort include vocational and higher education providers; the Ministries of Education, Science & Technology, Environmental and Spatial Planning, and Energy and Mining; and other relevant organizations.

More broadly, education and public information is needed to create an energy-aware and carbon-aware society. Awareness in general is low throughout Kosovar society. It is evident from responses to the UNDP survey that misconceptions about the supply and impacts of energy in Kosovo are widespread. These misconceptions appear to contribute to the high levels of distrust between energy suppliers and consumers, and act as barriers to the willingness of energy consumers to introduce new energyefficient measures and appliances.

Improving awareness is a viable objective, however. Experience elsewhere suggests that demonstration projects and awareness campaigns have proven to be quite effective in promoting household energy efficiency<sup>131</sup>. The efforts to date in Kosovo have perhaps been far too limited and poorly targeted. For example, the survey data suggests that energy informa-

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tion on the Internet and in the print media is reaching only a minority of the population. Television-based campaigns, through documentaries, feature news items, and/or perhaps public information broadcasts, might offer the greatest potential to reach the widest possible audience—although possibly at significant expense.

One hopeful sign is that sustainable development has now been introduced onto school curricula, and many teachers have already been trained on environmental protection issues. This is one way to reach and raise awareness at the household level, especially if the curricula include home- or community-based projects, such as simple energy audits, for children to carry out and/or information bulletins for them to take home from school.

## 4.5 Recommendations

The relative scarcity of skilled and experienced policy decision makers and managers, together with budgetary constraints, severely limits policy development and implementation within the PISG and other relevant stakeholder organisations. The recommendations of this report, presented in the following concluding section, are offered with these limitations in mind.

## KEK, KOSTT and the supply of electricity

It is assumed that the process of reforming KEK and other actions necessary for the liberalisation of the domestic electricity market will progress once details for the construction of Kosovo C are finalised and agreed. In the meanwhile, KEK and KOSTT are in a difficult stage of institutional evolution. They are required to conform to regulations governing public-sector entities while at the same time function as viable business entities. Ultimately the companies should be transparent, separated from government influence, and made subject only to the oversight of the independent regulator. The following additional recommendations apply to the short term:

• Requirements for public procurement procedures and regulations should be waived, or applied more selectively, for KEK and KOSTT. This would enable them to obtain urgently required equipment, parts and services, free from the costly and time-consuming strictures that are currently applied. It is important, however, that these steps be accompanied by mechanisms designed to increase the companies' transparency and (especially) accountability.

- The current system of administering social welfare subsidies for energy supply through KEK should be reviewed with the goal of designing alternative mechanisms to protect the interests of poorer householders. This step should be included in the more general review of subsidies proposed by the IMF<sup>132</sup>. Also this should be designed to encourage cost savings through energy efficiency, rather than simply subsidizing consumption. Such mechanisms, all of which should also protect household consumers from fuel poverty, include grant schemes for energy efficiency measures in the home or broader "social assistance vouchers" that can be used for a range of goods or services.
- KEK, in cooperation with the PISG, international partners, and commercial lenders, should review the potential for the institution of a pre-payment metering scheme that could be made mandatory for persistent non-paying customers and voluntary for others. This would resolve the contentious debate over disconnection for non-payment. Should such a scheme be viable, KEK's access to minority areas should be facilitated as part of a meter installation programme.
- A training programme, including health and safety training, for KEK employees and police forces should be designed and implemented by KEK and/or relevant government bodies. The goal would be to support the enforcement of the law in respect of illegal connections to the distribution network.
- Every effort should be made to assist customers in debt to KEK to meet their obligations. One option would be to stretch out, as determined by customers' financial ability, the rescheduling of payments. Some flexibility in monthly rates should also be considered.
- KEK should be encouraged to develop a better relationship with its "good", and potentially well-paying customers through:

- designing appropriate incentives for regular bill payments, such as discounts for prompt payment (applied to the next month's bill), and schemes to enable bill payments to be spread more evenly across the high and low seasons;
- information, awareness and dialoguebuilding activities that keep customers informed of the realities of the electricity supply problems in Kosovo. These new activities should recognize that the present system of posting information on KEK's website is insufficient to reach the vast majority of the customer base. They should be developed and introduced in cooperation with local authorities and through community meetings and other methods that are not only likely to reach more people, but are also far more affordable than expensive media campaigns.
- Simplification of tariffs and potential increase to ensure viability of imports, by establishing a tariff that finances imports.

# Renewable energy sources, energy efficiency and the promotion of alternative household fuels

Concerted action is needed to progress from the drafting of strategies, policy frameworks and plans to the design of specific implementation mechanisms and concrete action. Noting that there is already a proposal to replace the TV licence fee charged through electricity bills with an environmental fee, it is recommended that the Ministry of Energy and Mining (MEM), in consultation with other ministries, other relevant stakeholders, and international partners:

- sets and prioritises clear goals for the development of renewables and energy efficiency, and prioritises and sets realistic schedules for the implementation of proposed projects. This would be the first step towards building "implementability" into the existing framework documents and legislation;
- prioritises, in respect of household energy use:
  - the promotion and facilitation of improvements to the thermal characteristics of existing dwellings (new builds

will be covered by the new building regulations);

- evaluation of the potential for the development of solar water heating systems and, if favourable, devise appropriate mechanisms to support market penetration of these new technologies—for example through customs duty exemptions or reductions on imported equipment; and
- evaluation of the costs, benefits and needs of a long-term programme of support to assist market penetration of LPG<sup>133</sup>;
- solicits the active participation of the municipal authorities and other interested agencies at the municipal level in all activities relating to the development of renewables;
- finances projects designed to improve KEK's ability to collect payment from customers. One such project could be prepaid metering;
- works closely with other relevant ministries to enforce payments rigorously, including for public institutions and other large consumers; and
- evaluates a range of different instruments to raise funding for the implementation of proposed projects under the current and future action plans. To this end it should work with other relevant ministries in the design of an appropriate set of policy instruments to achieve the goals for renewables and energy efficiency.

## At the local level, it is recommended that municipal authorities:

- designate a municipal energy officer if energy is not already covered by other managerial mandates:
- promote energy efficiency in the business, household and public sectors at the local level through information, awareness and demonstration activities;
- work with the MEM, the Ministry of Environment and Spatial Planning (MESP) and other relevant organisations to evaluate the potential for the development of renewable energy sources and energy efficiency campaigns at the municipal level;

- engage and develop knowledge networks with other municipalities, both within Kosovo and elsewhere in the region, to share knowledge and experiences on the development and deployment of renewable energy systems in similar geographic, ecological and social contexts; and
- ensure enforcement of payment.

## **District heating**

The three existing district heating systems are in poor condition, remedial and upgrading work is urgently needed, and rates of bill payment are low. The closure of these facilities is therefore a potentially appropriate option. However, current energy strategy anticipates the likely expansion of district heating in Kosovo. If that occurs, work on the existing systems could help develop knowledge, skills and expertise and identify appropriate standards, benchmarks and best practices for future district heating systems. It is therefore recommended that municipal authorities, in cooperation with the Association of Kosovo Municipalities, MEM and the Energy Regulatory Office, work with the district heating companies and their customers to:

- design and implement organisational innovations for the effective management of the secondary networks, and raise funding to bring these into a good state of repair before new management systems are put into place.
- negotiate with commercial and other lenders to raise funding for the installation of meters at the household level; and
- facilitate the exchange of information between district heating operations within Kosovo and in other parts of the region, with the goal of identifying best practice technologies and services for the efficient production and distribution of district heating.

Where district heating systems do not exist, it is recommended that municipal authorities take the lead to evaluate the possibilities for the development of district heating in their municipalities. Important steps would include identifying potential investors, in consultation with local citizens and businesses, and seeking the cooperation of other members of the Association of Kosovo Municipalities.

#### **Environment and health**

Legislation on environmental protection that has been put into place relating to the limitation, reduction or mitigation of energy-related pollution should be implemented. Where this is not possible in the short term, initiatives to fill gaps in implementation capacity should be addressed. Measuring and monitoring systems are urgently needed to assess the environmental and environmental health impacts of energy production, supply and consumption. It is therefore recommended that MESP seek technical assistance from international partners and work with the Ministry of Health other relevant ministries, higher education institutions and other relevant stakeholders to:

- introduce, as a matter of urgency, systems for the measurement and monitoring of air and water quality;
- introduce systems for monitoring of health problems based at local health centres;
- introduce and enforce regulations and standards regarding building materials, insulation and heating; and
- conduct a comprehensive study on the direct use and direct and indirect impacts of firewood as a household fuel.

#### Policy development: A final note

Policy decision-making needs to take into account the energy services required or desired by targeted classes of end-users, particularly poorer households and strategic industrial investments, and design an appropriate set of policy options to ensure that energy sources and carriers are promoted to best meet these needs. Effective policies are likely to require a greater degree of intervention in free markets than is planned under the current energy strategy. Closer policy attention needs to be paid to fuel and conversion choices at the level of households and enterprises, because this is where the greatest potential lies for energy demand management and the promotion of human welfare in a healthy environment.

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The public opinion survey conducted in October 2007 by Prism Research was the main source of original data for this report. The method utilised for the survey was the administration of a questionnaire during face-to-face interviews. A total of 1,315 questionnaires were administered by that method. Of those, eight questionnaires were discarded as invalid during the post-interview control process.

#### Survey sampling method

A random stratified sampling method was used to select individual respondents within households.

Accurate population statistics are not available in Kosovo, and the enormous demographic shifts of the Albanian and Serb populations during the war and post-conflict period mean that pre-conflict population data is of limited usefulness. Therefore, for the purposes of sampling, population estimates used by UNMIK, the Organization for Security and Cooperation in Europe and other international organizations were used.

An initial sample size of 1,315 was used. That was divided into 263 sampling blocks, a sampling block representing 5 interviews to be carried out at each of 263 sampling points. Of these, 202 sampling blocks were allocated to Albanianmajority areas of Kosovo, with the remaining 61 blocks allocated to Serb-majority areas. These proportions are inconsistent with population data, as it is estimated that less than 10 percent of the population are of Serb ethnic heritage. However, it was important to obtain an adequate sample size of the Serb minority to allow meaningful analysis of data. Geographic distribution of the sampling blocks was then distributed among five geographic regions, corresponding to KFOR areas of responsibility (French, British, American, German and Italian).

The process of allocating the sampling blocks to streets (in urban areas) and villages (in rural areas), and selecting households and individuals for interview, is summarised in Table A.1.

A total of 1,307 valid responses were returned.

#### Summary of responses

The key variables used for the analysis of responses (for individuals, unless otherwise stated) were:

- Settlement type (for household)
- Gender
- Age group
- Educational level
- Ethnic heritage (analysis assumes that the household is of the same ethnic heritage as the individual interviewed)
- Income group (of household)

	Method used
Municipality	Sampling blocks allocated to each municipality within Kosovo, according to population estimates.
Settlement and settlement type (urban/rural)	Settlements were divided into two groups (urban and rural) on a 55:45 basis, which reflects current overall population estimates. Regional centres were included in the sample by default.
Street (urban) Village (rural)	From the lists of settlements according to type, a random computer selection of streets (for urban areas) and villages (for rural areas) was carried out.
Households	Households were selected using a selected starting point and a "random walk" method. The starting point was a specific household address, or, in some villages, a landmark building. For multi-dwelling residential units, interviewers selected one apartment. In the first such unit the interview visited, an apartment on the first floor was selected (by the interviewer). For subsequent units visited a higher floor was chosen each time, until it was necessary to start again on the first floor.
Individual respondents	Within each household, an individual respondent was selected, from those aged 18 years and over only, using the "closest birthday" (to the date of the interview) method.

#### Table A.1 Sampling process

Overall summaries of responses according to the key variables are shown in the tables following.

Settlement type	Number	Percentage	
Urban	731	55.9	
Rural	576	44.1	
Total	1307	100	
· · ·			
Ethnic Heritage	Number	Percentage	

K. Albanian	832	64
K. Serb	227	17
Other	232	18
No answer	16	1
Total	1307	100

"Other" ethnic minority groups include Ashkali, Bosnjak, Goran, Roma and Turk.

Gender	Number	Percentage
Male	658	50.3
Female	649	49.7
Total	1307	100

Age groups	Number	Percentage
15-25	290	22.2
26-60	884	67.6
60+	130	9.9
not stated	3	0.2
Total	1307	99.9

Total household income	Number	Percentage
€ 0-100 per month	225	17.2
€ 101-250 per month	425	32.5
€ 251-500 per month	454	34.7
€ 501-750per month	53	4.1
€ 751-1,000 per month	51	3.9
€ 1,001-1,499 per month	5	0.4
€ 1,500+ per month	23	1.8
No response	71	5.4
Total	1307	100

The median monthly household income in the survey is €250 (\$375) per month.

Educational level	Number	Percentage
No education	67	5.1
Elementary	300	23.0
Secondary (3 grades)	122	9.3
Secondary (4 grades)	625	47.8
University	155	11.9
No response	38	2.9
Total	1307	100

# Note on unrepresentative samples

Ethnic heritage is one of two variables where households and individual respondents were deliberately selected against known demographic or other valid trends. (The other was age group, where respondents under the age of 18 years were excluded from the survey). Responses to all questions were analysed by ethnic heritage to identify any significant statistical differences. Some questions are particularly associated with ethnic heritage in Kosovo—specifically, those relating to the supply, billing and payment of electrical power.

Where the analysis of responses is categorised and presented by ethnic group, a weighting is applied to the overall totals for that question. This weighting is calculated using the Statistical Office of Kosovo's most recent estimate of the population breakdown between ethnic groups: 88 percent Albanian, 6 percent Serb and 6 percent other minorities. Where a question was not *directly* associated with differences in behaviour or treatment of different ethnic groups, *and* there was no significant statistical difference between the groups, no weighting was applied to the totals. All totals presented are unweighted, unless otherwise specified.

- 1 Interview with the director of the National Institute of Public Health of Kosovo, November 2007.
- 2 The components of GHG include carbon dioxide, nitrous dioxide, sulphur hexafluoride, methane, perfluorocarbons and hydrofluorocarbons. These are grouped into a basket of gases which is measured in CO<sub>2</sub> equivalent.
- 3 European Commission 2006a.
- 4 Statistical Office of Kosovo 2007. Information obtained from website: www. ks-gov.net/esk.
- 5 UNMIK 2007.
- 6 SOK 2007a. Note that, as stated in the UNDP 2006 Europe and the CIS region MDG Report, the national poverty line for Kosovo in 2004 was given as PPP \$1.60 (€1.20) per day, with the extreme poverty line shown as PPP \$0.85 per day.
- 7 SOK 2007.
- 8 UNMIK 2007.
- 9 For example, Pasternak 2000, DTI 2005.
- 10 Pasternak 2000.
- 11 UNDP 2006, Human Development Report 2006, for 2004 HDI scores; and UNDP 2007, Human Development Report 2007/8, for per capita consumption of electricity.
- 12 Lignite is a very soft form of coal with a relatively low calorific value. Globally, there are extensive reserves of lignite, but in general it is only used as a source of mass energy in places with limited alternative resources. All coal mined and used for power-generation in Kosovo is lignite, which is why that specific term is used regularly throughout this report.
- 13 ERO 2007. Annual Report 2006.
- 14 Interview with the permanent secretary, Ministry of Energy and Mining, November 2007.
- 15 Interview with officials at the ERO, November 2007. This point was also raised in a Strategic Environmental Assessment of Montenegro's draft energy strategy, recently undertaken for the UNDP (Land Use Consultants 2007).
- 16 ERO 2007. Annual Report 2006.

- 17 Note that the discrepancy between the percentage of hydropower shown in Figures 1.3 and 1.4 is due to rounding, and to the small difference between MEM forecasts for 2007 and actual contribution of hydropower in 2006.
- 18 World Bank 2006.
- 19 IEA 2007. Energy Statistics.
- 20 Ibid
- 21 ERO 2007. Annual Report 2006.
- 22 ERO 2007. Annual Report 2006.
- 23 Several studies have assessed Kosovo's lignite to be "the most economic (least costly) fuel for the development of new base-load generation" in the whole SEE region (ERO 2007). However, it is not clear whether these studies based their findings on full economic costings, including externalities such as environmental costs.
- 24 MEM 2006b.
- 25 MEM 2006c.
- 26 SOK 2007a. Less than 80 percent of urban households use wood-burning stoves, whereas nearly all rural households possess them.
- 27 Recent accurate data on vehicle ownership could not be obtained for this report.
- 28 MESP 2006a. Kosovo Environmental Action Plan 2006–2010.
- 29 Interview with officials at the Ministry of Trade and Industry, November 2007.
- 30 Many different factors can contribute to lower fuel quality, including relatively high sulphur content and low octane rating. Fuel quality can also be reduced when water is added to gas that is then sold to customers. In Kosovo as elsewhere, the term "fuel quality" usually refers to a petroleum product's octane rating, which itself is a measure of how "smoothly" the fuel burns in an engine. A fuel with a very low octane rating not only reduces the performance level of the engine, but can damage it.
- 31 In 2002, it was estimated that 30 percent of petroleum products were imported illegally.

- **32** For example, UNMIK 2007, Bell *et al* 2004.
- 33 KAF 2007.
- 34 KAF 2007.
- 35 SOK 2007a.
- 36 In additional to those listed, there is some hydropower managed by the publicly owned water company that feeds into KEK's supply system, a small-scale hydropower plant that is distributed directly at the municipal level, and a low level of consumption of coal for direct heat.
- 37 MEM 2006a.
- 38 MEM 2006a.
- **39** Based on figures shown in ERO 2005.
- 40 EAR 2007.
- 41 Interview with ERO officials, November 2007.
- 42 MEM 2006a.
- **43** All hydropower in Kosovo is of the "run of the river" type; there are no pumped storage facilities, which are an even more efficient method of addressing peak demand where thermal (and/or nuclear) plants have excess capacity during period of low demand. (Pumped storage is based on an enclosed system of two reservoirs at different heights: water is released from the higher reservoir to the lower one in order to generate electricity to meet peaks in demand, and pumped back up using "spare" electricity when demand is low.)
- 44 Interview with international consultants at KEK, November 2007.
- **45** MEM 2007.
- 46 MEM 2007.
- 47 IMF 2007. Aide Memoire October 2007.
- 48 Interview with World Bank official, November 2007.
- **49** ERO 2007.
- 50 MEM 2005.
- 51 Interview with a World Bank official, November 2007.

- 52 UNMIK Fact Sheet on Energy Issues in Kosovo.
- 53 UNMIK Fact Sheet on Energy Issues in Kosovo.
- 54 Interview with international consultants at KEK, November 2007.
- 55 Interview with officials at the Energy Regulatory Office, November 2007.
- 56 Interview with international consultants at KEK, November 2007.
- 57 Interview with officials at KOSTT, November 2007.
- 58 Interview with officials at KOSTT, November 2007.
- 59 Interview with officials at KOSTT, November 2007 and interviews with the international management consultancy team at KEK, November 2007. As an example, KOSTT officials estimated that the company lost €2 million (\$3 million) during the tendering process for a €10 million project on a sub-station at the Kosovo A power plant.
- 60 Interview with KEK officials, November 2007.
- 61 Interview with officials from the Energy Regulatory Office, November 2007.
- 62 Interviews with the international management consultants at KEK, and with the Energy Regulatory Office, November 2007.
- 63 Of course, it does not necessarily remove a *required or desired* energy service—for example, switching off a light when leaving a room empty.
- 64 Boardman, B. 2004.

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For example, the strategy aims to increase the market penetration of LPG for use in household cooking and heating, but there are no associated policy measures to support such market penetration. The ministry's energy forecast for 2005–2015 also notes the same objective, but states that the expansion of use of LPG at the household level will be left to "private citizens". MEM 2006b.

- 66 Under the Law on Electricity, the Energy Regulatory Office (ERO) is responsible for ensuring that consumer interests are protected in tariff reviews. The ERO considers affordability as a key criteria when reviewing tariffs. (Interview with ERO officials, November 2007).
- 67 As evidenced in, for example, the UNDP/ USAID Early Warning Reports.
- 68 Interview with international consultants at KEK, November 2007.
- 69 Interview with international consultants at KEK, November 2007.
- 70 This issue remains important while the total capacity of the proposed Kosovo C power plant remains under discussion.
- 71 MEM 2007.
- 72 MEM 2006a.
- 73 SOK 2005.
- 74 MESP 2006a.
- **75** MESP 2006a states that the average volume of wood per hectare is 90m<sup>3</sup>, and that annual growth amounts to an average of 3m<sup>3</sup>.
- 76 ERO 2005. Annual Report 2004.
- 77 IBE 2005.
- 78 MEF 2006. Kosovo 2006–2008 Medium Term Expenditure Framework.
- 79 MEM 2005.
- 80 MESP 2006b.
- 81 Forum 2015, A Modern Tale—Kosovo C 2100. Lignite Power in Kosovo: limits of sustainability, April 2007.
- 82 MEM 2005.
- 83 European Commission 2006a.
- 84 This may be because sample sizes for individual municipalities were too small.
- 85 Interview with World Bank official, November 2007.
- 86 Interview with World Bank official in Kosovo, November 2007.
- 87 SOK 2007a.

- 88 The household survey data from SOK 2007a reported sales of air conditioners increasing—in hundreds, rather than thousands—annually up to 2003, but data for subsequent years is not available.
- 89 Energy Community Secretariat 2007b.
- 90 European Commission 2006a.
- 91 For example, KAF 2007.
- 92 Keyan 2007.
- 93 Interviews with officials from the ERO, November 2007 and KEK, November 2007.
- 94 It is worth noting here that in a smaller sample of consumers interviewed for another study undertaken for this report, only 13 percent of respondents said that they check an appliance's energy efficiency rating when making a purchase. This may indicate that the figures produced by the main household energy survey may actually be abnormally high.
- **95** As noted in an interview with officials from GTZ, November 2007. Actually, this is a case of energy conservation rather than energy efficiency.
- 96 These were: switching off lights, turning off water heaters, keeping the boiler set low, considering energy efficiency ratings when buying new appliances, and using energy-saving bulbs.
- **97** This was a phenomenon analysed in a study on household energy efficiency in the UK, Boardman 2004.
- **98** For example, a greater percentage of K-Albanians (over 80 percent) than the other minority groups (both less than 70 percent) thought that KEK should provide more electricity rather than reducing consumption at the household level.
- 99 European Commission 2005.
- 100 When the survey was carried out, interviewers asked only whether the windows had good isolation properties. Communication with Prism Research, November 2007.

- 101 It is believed that some commercial lenders offer "soft" loans for energy efficiency activities, but no details were available at the time of writing this report.
- **102** Interview with officials from GTZ, November 2007.
- **103** The successful widespread penetration of LPG in Brazilian households, for example, involved committed government support over several decades.
- **104** National Institute for Public Health of Kosovo, 01/01/07–01/06/07.
- 105 MEM 2007a
- 106 MEM 2006a.
- 107 The strategy document includes, in its list of activities beyond 2008, the aim to "monitor developments in alternative and unconventional means of lignite utilization" but this is not explained in detail.
- 108 Zachariadis 2005.
- 109 UNDP 2007b.
- 110 DTI 2005.
- 111 Interview with officials at the ERO, November 2007.
- **112** Pollitt 2007.
- 113 The Economist 2007.
- 114 IMF 2007 Aide Mémoire October 2007.
- 115 MEM 2005.
- 116 MEM 2005.
- **117** Energy Community Secretariat 2007b.
- **118** SOK 2005 Agricultural Household Survey 2005.
- **119** Domac, Richards & Risovic 2005.
- 120 Pollitt 2007.

- **121** IEA 2007.
- **122** IEA 2006.
- **123** Interview with officials from GTZ, November 2007.
- 124 IEA 2006.
- 125 IEA 2006.
- **126** For example, Meyer 2003, Reiche & Bechberger 2004.
- 127 Komor & Bazilian 2005.
- 128 Kennedy & Besant-Jones 2004.
- **129** Interview with international consultants at KEK, November 2007.
- 130 SOK 2007b. In contrast, the agricultural sector employs 21 percent of the female labour force, but only 18 percent of the male labour force. If there is a greater willingness among women than men to work in agriculture, this might be a factor to be considered in decision-making on the development of energy crops.
- 131 European Commission 2005 and European Commission 2006b
- 132 In an Aide Memoire of an IMF Staff Visit to Kosovo in October 2007, a concern was raised about the "mosaic" of different subsidies that exist at the present time in Kosovo. It was suggested that the government give priority to "the development of a concept paper on social protection [that] would form the basis for the development of appropriate social assistance mechanisms best tailored to Kosovo's social and economic conditions" (IMF 2007).
- 133 The UNDP has experience in developing such programmes, and might be an appropriate technical assistance partner in this activity.



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