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**Ministria e zhvillimit ekonomik  
Ministarstvo ekonomskog razvoja  
Ministry of economic development**

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**ENERGY STRATEGY  
OF THE REPUBLIC OF KOSOVO  
2017-2026**



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**March 2017**



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## ABBREVIATIONS

AI	Administrative Instructions
CG	Cogeneration
DH	District Heating
DSO	Distribution System Operator
EC	European Commission
EE	Energy Efficiency
ECS	Energy Community Secretariat
ECT	Energy Community Treaty
ENTSO-E	European Network of Transmission System Operators for Electricity
ERO	Energy Regulatory Office
EU	European Union
GoK	Government of Kosovo
GWh	Giga Watt hour
HPP	Hydropower Plant
ICMM	Independent Commission for Mines and Minerals
KEEA	Kosovo Energy Efficiency Agency
KEEAP	Kosovo Energy Efficiency Action Plan
KRESAP	Kosovo Renewable Energy Sources Action Plan
KEK	Energy Corporation of Kosovo - Public Supplier of Electricity
KEDS	Kosovo Electricity Distribution Company
KESCO	Kosovo Electricity Supply Company
KfW	Kreditanstalt für Wiederaufbau (Development Bank)
kg	Kilogram
kJ	Kilojoules
KEDS	Kosovo Electricity Distribution Company
KKI	Keshilli Kombetar per Investime (National Investment Council)
km	kilometer
KOSTT	Kosovo Transmission System and Market Operator
kV <sub>h</sub>	kilovolt hour
kW	kilowatt
kW <sub>h</sub>	kilowatt hour
Ktoe	kiloton oil equivalent
MED	Ministry of Economic Development
MF	Ministry of Finance
MIE	Ministry of European Integration
MESP	Ministry of Environment and Spatial Planning
MLSW	Ministry of Labour and Social Welfare
MO	Market Operator
MTI	Ministry of Trade and Industry
MW	Megawatt
MW <sub>h</sub>	Megawatt hour
NCI	The National Council for Investment
PMO	Prime Minister Office



PPP	Public Private Partnership
REPOWER	Project supporting Kosovo in the energy sector, financed by USAID
RES	Renewable energy sources
SAA	Stabilization and Association Agreement
SEE	Southeast Europe
TAP	Trans Adriatic Pipeline
TPP	Thermal Power Plant
TSO	Transmission System Operator
LFC	Load Frequency Control
WBIF	Western Balkans Investment Framework



## CHAPTER I – EXECUTIVE SUMMARY

One of the main factors for the economic development of the country and the increase in social welfare is the security of the energy supply. Since the development of a sustainable energy system requires time, the right decisions for the future of the energy sector should be defined as early as possible.

*The Energy Strategy of Kosovo 2017-2026 sets out the basic objectives of the Government of Kosovo in energy sector development, taking into account sustainable economic development, environmental protection, sustainable and reliable energy supply to final customers, efficient use of energy, development of new conventional and renewable generation capacities, creation of a competitive market, development of the gas system, and creation of new jobs in the energy sector.*

Some of the basic challenges facing the energy sector in Kosovo include:

- delays in the construction of new coal-based electricity generation capacities and rehabilitation of existing plants;
- insufficient generation capacities to cover the peak demand in the winter season;
- lack of secondary and tertiary power reserves in the system due to lack of flexible generators, since 97% of domestic generation is based on lignite;
- limited capacities of thermal energy power systems;
- lack of natural gas infrastructure;
- significant technical and commercial losses in the electricity distribution network;
- inability to correctly manage cross-border flows by the transmission system operator (TSO) as a result of obstruction by the Serbian TSO;
- underuse of energy saving potentials;
- underuse of potential renewable energy resources;
- lack of an effective competitive market in the electricity sector.

The Program of the Government of the Republic of Kosovo 2015-2018 puts a high priority on the energy sector, particularly electricity, and provides for concrete measures related to the construction of new electricity generation capacities from fossil and non-fossil fuels, measures for efficient energy use, measures for the use of renewable energy sources (RES) and cogeneration, and measures for developing conditions to bring natural gas in to Kosovo. Special attention in the program is paid to environmental protection.



The National Development Strategy 2016-2021 adopted by the Government in January 2016 (Pillar 4: Infrastructure) provides four priority measures for the development of the energy sector: 1. Build new and sustainable power generation capacities; 2. Establish an open and competitive energy market; 3. Decrease energy consumption through energy efficiency measures; and 4. Rational use of renewable energy sources. Each of these energy objectives has concrete actions behind them. The National Development Strategy 2016-2021 was used as a basic reference for the drafting of this Energy Strategy.

The energy sector holds an important place in the Stabilization and Association Agreement (SAA) which entered into force on April 1, 2016. Under this Agreement (Article 114), Kosovo is obliged to fulfill obligations related to the integration of the regional common market, which includes the Energy Community Contracting Parties. Implementation of the energy acquis related to competition in the energy market, protection of the environment, Energy Efficiency (EE), and renewable energy sources is an important set of obligations that Kosovo must fulfill in the energy sector in the near future. The Energy Strategy 2017-2026 is addressing these challenges.

This Energy Strategy, based on the detailed energy sector analysis, has defined five strategic objectives:

1. Security of a sustainable, high-quality, safe, and reliable electricity supply with adequate capacities for stable power system operation;
2. Integration in the Regional Energy Market;
3. Enhancement of existing thermal system capacities and construction of new capacities;
4. Development of natural gas infrastructure;
5. Fulfillment of targets and obligations in energy efficiency, renewable energy sources, and environmental protection.

For the realization of the Strategy's objectives, the team of experts has conducted different analyses of the energy sector, such as: energy demand forecast based on the economic development forecasts according to the National Development Strategy 2016-2021<sup>1</sup> and the Economic Reform Program, measures to reduce technical and commercial losses in the distribution system, impact of thermal network expansion, use of renewable energy resources for sanitary water heating, energy efficiency measures, and market integration. All details of these analyses are given in the Annex of this Strategy.

Policies and measures to achieve these objectives are defined here. The challenge is to ensure reliable and secure energy supply through the development of adequate generation, transmission, and distribution capacities along with the full opening of the energy market, in order to reliably meet increased energy demand, taking into account the diversification of natural domestic resources, affordability for consumers, the efficient use of energy, the

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<sup>1</sup> National Development Strategy 2016-2021, is the main policy document of the government for economic development.



maximal utilization of renewable energy resources, and the maximum protection of the environment during all energy sector activities.

Key measures to achieve the Strategy objectives are:

- Construction of new electricity generation capacities as replacements for the old ones in order to cover growing electricity demand and system reserve requirements, along with integration of the electricity market with Albania as a first step towards regional integration;
- Improvement of the operation of the distribution network by increasing efficiency and reducing costs;
- Fulfillment of the conditions for Kosovo's full integration in the common regional energy market and market opening obligations from the Energy Community Treaty and SAA;
- Expansion of the existing thermal power systems' capacities and preparation of the necessary conditions for the construction of new thermal systems;
- Preparation of the necessary conditions for natural gas infrastructure development;
- Improvement of overall energy efficiency and fulfillment of energy efficiency obligations from the Energy Community Treaty and SAA;
- Larger use of other available energy sources, mainly renewable energy sources, as well as fulfillment of RES obligations from the Energy Community Treaty and SAA;
- Improvement of environmental conditions through the rehabilitation of Thermal Power Plant (TPP) Kosovo B and replacement of TPP Kosovo A with TPP Kosovo e RE in line with Directive 2010/75/EC;
- Upon adoption of this Strategy, development of a set of supporting long-term energy sector development studies up to 2050 (as defined in new EU energy policy documents) according to the decarbonisation platform.

The Energy Strategy of Kosovo 2017-2026 consists of 6 Chapters and 8 Annexes. After a short introduction given in Chapter II, the mission, vision, and strategic objectives are given in Chapter III. In Chapter IV the current status of the energy sector in Kosovo is described, while Chapter V gives a list of selected activities and measures to achieve the strategic objectives. Finally, in Chapter VI, an overview of key activities, estimated costs, and the next steps for implementation of the Strategy are presented. As usual, in the Strategy body text, energy policy objectives and measures are listed, while analytical background is given in the Annexes.

*Implementation of this Energy Strategy is of the utmost importance not only for sustainable, high quality, safe, and reliable energy supply in Kosovo, but for the overall economic development of the country, as well as for national security. Knowing of all the challenges in Kosovo's energy sector, for this ultimate target it is crucial to have the strong contribution of all participants, including relevant international institutions.*





## CHAPTER II – INTRODUCTION

The Energy Strategy of the Republic of Kosovo 2017-2026 (hereinafter the “Energy Strategy”) is a basic ten-year document for the energy sector’s development. The role, importance, content, and procedures of developing this document are based on the Law on Energy and the Administrative Instruction No. 02/2012 on the Procedures, Criteria and Methodology for the Preparation and Approval of Strategic Documents and Plans for their Implementation. The Energy Strategy is based on existing policy documents and strategies of the Government of Kosovo and the result of analyses done by the Working Group as well as other studies conducted in the energy sector.

The Program of the Government of the Republic of Kosovo 2015-2018 gives priority to uninterrupted and sustainable power supply, using local fossil and non-fossil resources and encourages the diversification of sources to supplement domestic energy needs. The development of a liberalized energy market and environmental protection are also integral parts of this program.

The National Development Strategy 2016-2021 approved by the Government in January 2016 gives a special place to energy, under the four pillars of Government priority.

A high priority of the Government is the implementation of obligations as per the Stabilization Association Agreement. Energy is addressed separately in article 114, stating:

“In accordance with the relevant EU *acquis*, the Parties shall develop and strengthen their cooperation in the field of energy consistent with the principles of the market economy and the Treaty establishing the Energy Community, signed in Athens on 25 October 2005. Co-operation shall be developed with a view to the gradual integration of Kosovo into Europe’s energy markets.

Cooperation may include assistance to Kosovo as regards in particular:

- a. improvement and diversification of supply and improvement of access to the energy market, in accordance with the EU *acquis* on security of supply and the regional energy strategy of the Energy Community, and applying EU and European rules on transit, transmission and distribution and restoration of electricity inter-connections of regional importance with its neighbours;
- b. helping Kosovo implement the EU *acquis* on energy efficiency, renewable energy sources, and the environmental impact of the energy sector, therefore promoting energy saving, energy efficiency, renewable energy and studying and mitigating the environmental impact of energy production and consumption;
- c. formulating of framework conditions for restructuring of energy companies and cooperation between undertakings in this sector, in line with the EU internal energy market rules on unbundling.”



The drafting process of the Energy Strategy took into account all policies and measures defined in the aforementioned documents.

The Secretary General of the Ministry of Economic Development established the Working Group to draft the Energy Strategy. The team includes experts representing state institutions and other stakeholders related to the energy sector as follows:

- Ministry of Economic Development (MED)
- Office of the Prime Minister (OPM)
- Ministry of Finance (MF)
- Ministry of Trade and Industry (MTI)
- Ministry of Environment and Spatial Planning (MESP)
- Energy Regulatory Office (ERO)
- Kosovo Transmission System and Market Operator (KOSTT)
- Independent Commission for Mines and Minerals (ICMM)
- Energy Corporation of Kosovo (KEK)
- Kosovo Electricity Distribution Company (KEDS)
- Kosovo Electricity Supply Company (KESCO)

Drafting of the document was done through teamwork, sharing tasks for each chapter. In the process of conducting the required analysis for the preparation of the document, additional technical groups were established for each technical field: electricity, thermal energy, natural gas, renewable energy sources, energy efficiency, and the regional energy market. After agreements were reached in close groups, the results were distributed to the working group and the document was finally adopted and submitted for further approval procedures.

Structuring of the document and its drafting was done in line with the requirements of the Administrative Instruction (No. 02/2012) approved by the Government.



## CHAPTER III – MISSION, VISION AND OBJECTIVES

The Energy Strategy is prepared based on the Law on Energy. The scope of the Law on Energy includes electricity, natural gas, and thermal energy. Among others, the Law defines the duties and responsibilities in determining policies and measures for renewable sources and energy efficiency which are outlined in national action plans as mandatory documents approved by the Ministry responsible for energy, and based on the strategic objectives of the Energy Strategy.

### MISSION

*The Energy Strategy Mission is to create the conditions for a reliable and secure energy supply for increasing energy demand, through the development of generation, transmission, and distribution capacities, taking into account the diversification of resources, the efficient use of energy, and maximal utilization of renewable energy resources, as well as environmental protection in all sector activities.*

### VISION

*The Energy Strategy aims to create a developed energy sector, which is friendly to the environment and health, supporting economic development and social wellbeing in Kosovo, under a free and competitive market.*

### OBJECTIVES

The Government of Kosovo is committed to reach the following five energy sector objectives as defined in this Strategy:

1. Security of a sustainable, high-quality, safe, and reliable electricity supply with adequate capacities for stable power system operation;
2. Integration in the Regional Energy Market;
3. Enhancement of existing thermal system capacities and construction of new capacities;
4. Development of natural gas infrastructure;
5. Fulfillment of targets and obligations in energy efficiency, renewable energy sources, and environmental protection.



## OBJECTIVE 1

### SECURITY OF A SUSTAINABLE, HIGH-QUALITY, SAFE, AND RELIABLE ELECTRICITY SUPPLY WITH ADEQUATE CAPACITIES FOR STABLE POWER SYSTEM OPERATION

*Provision of a sustainable, high-quality, safe, and reliable energy supply is one of the main conditions for economic and social development of each country. This problem has become acute in Kosovo and it requires an urgent solution, even though it is very costly due to the nature of the investments needed.*

Although looking at it from the standpoint of annual generation and consumption the balance of electricity in Kosovo is not worse than the other countries of the region, it faces huge problems in terms of securing the necessary capacities to cover peak demand, particularly in the winter, and in meeting the reserve capacity requirements of the power system. One large problem for the Kosovo energy sector is the fact that interventions in the rehabilitation of the existing capacities and construction of new capacities as a replacement of the outdated plants will require nearly simultaneous investments. Despite the opening of markets and regional integration that are expected to ensure mitigation effects in terms of the supply problem, it is necessary to take measures as soon as possible to develop the appropriate generation capacities, taking into account the international obligations on environmental protection, climate change, and the fulfillment of the minimum criteria for ENTSO-E power systems states (KOSTT is in the process of a signing connection agreement with ENTSO-E<sup>2</sup>).

To achieve the goal of a reliable supply of electricity and required capacities for a stable power system, significant challenges must be addressed related to:

- Outdated And insufficient generation capacities to address the demand for electricity consumption (especially in the winter) and for power system reserve and balancing;
- High environmental pollution due to power generation from obsolete thermal power plants;
- Insufficient utilization of renewable energy resources for electricity generation, in addition to limited identified potential capacities;
- High technical and non-technical losses in electricity distribution network.

<sup>2</sup> ENTSO-E-European Network of Transmission System Operators of Electricity



## OBJECTIVE 2

### INTEGRATION IN THE REGIONAL ENERGY MARKET

*The Government of Kosovo is committed to implement all obligations from the Energy Community Treaty (ECT) and the Stabilization and Association Agreement (SAA) related to the creation of a free and competitive energy market. Creation of a common energy trading zone between Kosovo and Albania, as a first step towards integration in a regional energy market, has been selected by the Government of Kosovo as one of the top priorities.*

To achieve the objective of integration in the regional energy market, Kosovo addressed the challenges related to:

- Creating an effective competitive domestic market of energy with active participation of more than one supplier;
- Creating an integrated market between Kosovo and Albania as a first step towards integration in the regional energy market;
- Establishment of an energy stock exchange together with Albania;
- Effective implementation of requirements related to the deregulation of electricity generation prices;
- Elimination of cross-subsidies between consumers' categories as well as limiting state subsidies in the energy sector;
- Non-existing natural gas infrastructure;
- Protection of vulnerable customers;
- Operation of Kosovo electricity transmission operator (KOSTT) as independent control area;
- Access of the licensed electricity distribution operator (KEDS) to all customers in Kosovo, covering the entire Kosovo territory.

## OBJECTIVE 3

### ENHANCEMENT OF EXISTING THERMAL SYSTEM CAPACITIES AND CONSTRUCTION OF NEW CAPACITIES

*The construction of collective housing buildings in all cities of Kosovo, particularly in the largest ones, has taken off in unprecedented high levels since the end of the war in 1999. Accordingly, the treatment of thermal energy used for space heating through district heating systems is one of the main objectives of the Kosovo energy sector.*

The use of electricity for heating spaces is a high burden for the power system, particularly in a situation where large amounts of electricity are used in an unauthorized manner, on the one hand, and the generation capacities of electricity are limited on the other. Use of other types of energy such as firewood, oil and its products, etc., is inconvenient for collective residential buildings and buildings of the service sector.

To achieve this objective the following challenges must be addressed:

- Significant losses in the distribution network of thermal energy systems;
- Small exploitation of thermal power generation capacities, particularly TERMOKOS, after connection with the co-generation system, due to inadequate distribution network;
- Large non-technical losses;
- Lack of concrete initiatives for the development of thermal energy infrastructure by municipalities where there is a large concentration of collective housing facilities;
- Lack of concrete initiatives on the use of thermal systems for cooling of spaces, heating sanitary water, steam for industrial needs, etc.;
- Lack of updated and new feasibility studies;
- Securing finances for the implementation of projects.



## OBJECTIVE 4

### DEVELOPMENT OF NATURAL GAS INFRASTRUCTURE

*The official policy of the Kosovo Government is to promote and support the inclusion of Kosovo in the regional natural gas projects. The Trans Adriatic Pipeline (TAP) project has offered great opportunities to Kosovo to connect to the international natural gas network. In this regard, depending on the regional developments of gas projects in Southeastern Europe, the Government of Kosovo remains committed to use all opportunities to be involved in joint natural gas projects in the Energy Community.*

To achieve this objective the following challenges are addressed:

- Establish Gas Transport System Operator and Gas Distribution System Operator(s);
- Prepare needed feasibility studies; and
- Construct adequate natural gas infrastructure.



## OBJECTIVE 5

### FULFILLMENT OF TARGETS AND OBLIGATIONS IN ENERGY EFFICIENCY, RENEWABLE ENERGY SOURCES, AND ENVIRONMENTAL PROTECTION

*Kosovo has committed to meet the savings target of 9% of overall energy consumption, in accordance to Directive 2006/32/EC. Kosovo has also taken the obligation to implement new EU policies deriving from Directive 2012/27/EC on energy efficiency.*

*In the RES sector, the goal is to develop and improve all necessary regulatory and operational mechanisms to reach the target of 25% of RES share in gross final energy consumption by 2020. After that, the Government will revise RES integration achievements and set new targets for the following period. It is expected that Kosovo will further promote RES, in line with potential, obligation, and needs, as well as European developments and experience.*

*As an Energy Community contracting party, Kosovo has an obligation to implement European Directives related to the environment and it will remain one of the strategic objectives of the Kosovo energy sector.*

To achieve this objective with all its tasks the following challenges are addressed:

- Financing of energy efficiency and RES integration mechanisms;
- Legislative barriers that prevent establishment of the relevant funds other than the Kosovo state budget;
- Lack of experience in the application of public private partnership projects in the field of energy efficiency and RES;
- Lack of institutional municipal structures, especially for energy efficiency, as well as a lack of necessary human capacities specialized in municipal institutions.



## CHAPTER IV – CURRENT STATUS OF KOSOVO ENERGY SECTOR

### ELECTRICITY

The origin of the problem of reliable electricity supply in Kosovo began with the deliberate destruction of the electricity system in all its elements by the former state regime, particularly in the 1990s. Since 1984, there has been no construction of new electricity generation capacities apart from some small hydro capacities that were insufficient to resolve the problem of security of the electricity supply for the growing demand. Currently, most power plants' units are at the end of their technical lifetime. Had there been a normal development with stable power supply, virtually all capacities of TPP Kosovo A should have been either decommissioned or rehabilitated by this date, as happened in similar cases in other Southeast Europe (SEE) countries.

Despite all the problems and difficulties that the Kosovo energy system has been facing, in the last 15 years there has been a steady increase in electricity production, except in 2014 (see Figure below). A more detailed description of the situation of the energy sector is given in Annex 1, while an analysis of the projection of electric energy demand is given in Annex 2 of the Strategy.

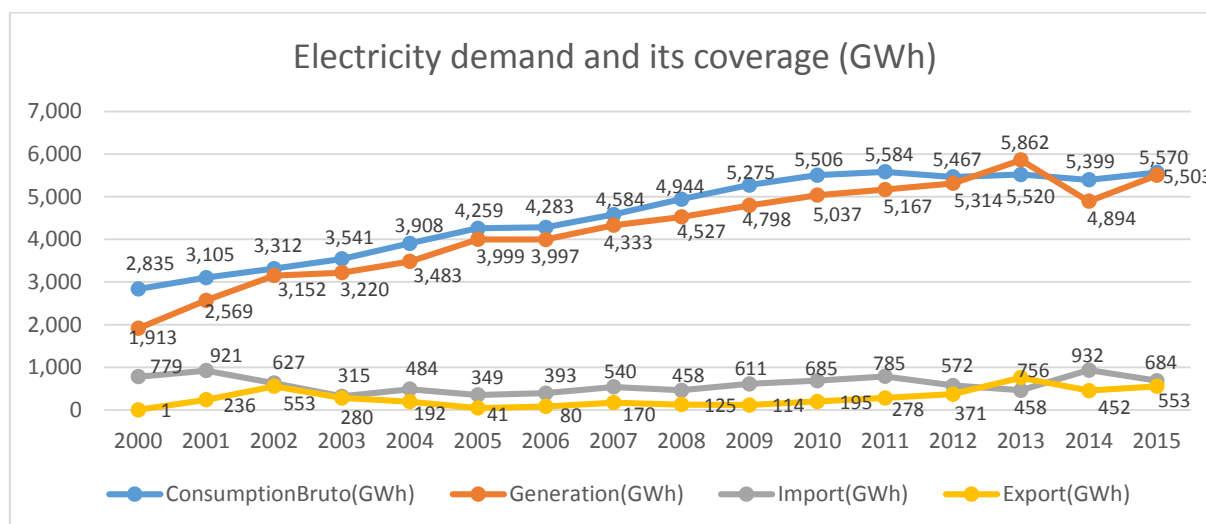


Figure 1 Evolution of the electricity demand and its coverage

Despite the increase of electricity generation over the years in existing TPPs and Hydro-power Plants (HPPs), due to growing electricity demand this situation is not sustainable. Operating with obsolete capacities and without required rehabilitation, the reliability of the generation system is far from adequate.



*In the last 30 years there has been no adequate new electricity generation capacities constructed to follow growing demand and to ensure the security of supply. Currently, most power plants' units are at the end of their lifetime. As a result, Kosovo has been facing occasional load shedding. Clearly, there is an urgent need for new generation capacities. This urgent need is compounded by serious environmental considerations, due to high level pollution from the existing old generation technology and high demanding environmental protection obligations.*

During recent years, the electricity demand has mostly been covered by domestic generation, while peak demand occasionally has been covered by electricity imports. In cases of the power system overloading and/or insufficient imports available at reasonable cost, there has been planned load shedding in Kosovo (according to the ABC plan). Load shedding has been in decline in recent years due to increased production from the existing plants. Although not cancelled entirely, this plan is not currently being applied.

From 2000 until 2015, 538.25 million EUR were spent on electricity imports. In some cases, there was Government intervention to subsidize imports, but since 2012 import subsidies have been discontinued. After the privatization of the electricity distribution and supply company, the cost of imported electricity has fallen significantly as a result of more efficient procedures of purchasing electricity.

Infrastructural capacities of the electricity distribution network have not kept step with electricity production output, primarily as a result of low investments in the distribution network. Consequently, the distribution system has been consistently overloaded at peak times, especially during the winter.

In May 2013, the electricity distribution and supply system was privatized. By the end of 2014 the process of the legal unbundling of the distribution system operator (DSO) and supply company was completed. In the years following the privatization, significant investments were made in the distribution network (20 million EUR per year) and the distribution system operator has planned further investments.

Despite improvements in recent years, technical and commercial losses in 2015 were 31.8%<sup>3</sup>. A more detailed description of the situation of the energy sector is shown in Annex 1 of this document. Due to the inability to control the distribution and supply system in some municipalities in northern Kosovo, around 5% of electricity remains unbilled. A positive indicator is the fact that the Public Supplier KESCO has managed to continuously improve its performance (see Annex 1, item 1.1) in billing and revenue collection.

The soundest link of the chain of the energy system in Kosovo is the transmission system. Due to significant investments in this system, today it is considered as one of the most efficient and stable systems in the region. Unfortunately, for political reasons, KOSTT is still not

<sup>3</sup> Source: KEDS

a member of the ENTSO-E and it is unable to control, allocate, and get paid for its cross-border flows. Thus, it has been an ongoing challenge to successfully carry out all of the mandatory operational duties as a transmission system operator in its own territory, while formally it is still treated as a third-party's responsibility.

## Lignite for generation of electricity<sup>4</sup>

Natural resources are abundant in Kosovo. Kosovo possesses around 12.5 billion tons of lignite in geological reserves, which places Kosovo as the country with the second largest lignite reserves in Europe and fifth largest in the world. Lignite is the most important energy resource of Kosovo, supplying 97% of total generation of electricity (TPP Kosovo A and TPP Kosovo B). As shown in Figure 2, the most important lignite reserves in Kosovo are located in:

- Kosovo Basin;
- Dukagjini Basin; and
- Drenica Basin.

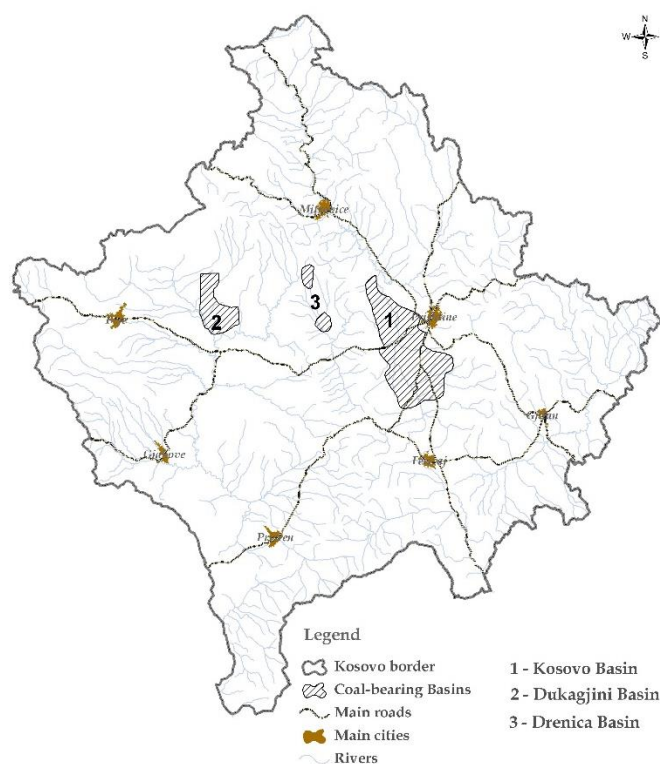


Figure 2. Lignite basins in Kosovo

<sup>4</sup> Energy Strategy 2013-2022, updated by KEK.

Estimated lignite resources<sup>5</sup> in all of Kosovo are given in Table 1.

Table 1. Lignite reserves in the Republic of Kosovo<sup>6</sup>

Lignite basins	RESERVES (t)		
	Geological	Balance <sup>7</sup>	Non-balance <sup>8</sup>
Kosovo	10, 091, 000,000	8,772,000,000	1,319,000,000
Dukagjini	2, 244, 830,000	2,047,700,000	197,130,000
Drenica (f. Skenderaj)	106, 631,000	73,188,000	33,443,000
Total	12,442,461,000	10,892,888,000	1,549,573,000

*Coal supply from the existing mines supplying the existing power plants will be exhausted by 2024, according to the mining plan and capacity. To safeguard future supply to both existing and new generation capacities, a new mine must be opened by 2024 with a capacity of over 430 million tons which would allow for the supply of existing power plants in the next 30 years.*

The opening of the new mine will ensure safe and sufficient supply for existing as well as new generation capacities. The Government made a priority decision for the opening of South Sibovc Field with a capacity of 430 million tons of coal. This project was approved by both the Keshilli Kombetar per Investime (National Investment Council) (KKI) and the Government of Kosovo<sup>9</sup>.

From the entire quantity of coal generated in the mines, 97.5% of the total amount is used to supply Kosovo's power plants, whereas the remaining 2.5% is dedicated to the market for consumption needs in the industry, households, agriculture, and services. Coal demand projections in the electricity generation scenarios are given in more details in Annex 4.

## THERMAL ENERGY

Space heating in Kosovo is largely realized from firewood. District heating accounts for only 3-5% in the heating of spaces. The household and the services sectors are major consumers of energy for heating, whereas the agricultural sector accounts for very little share of heating energy consumption. Annex 1, item 1.2 shows an overview of the energy consumption of the household and services sectors, as per the data of the Energy Balance 2015 published by the Kosovo Statistics Agency.

<sup>5</sup>Revising clause No. 152, University of Prishtina, 2008, on –"Study to assess researches and geological coal reserves in Kosovo", Kosovo Basin, Prishtina 2007, p. 81. Institute INKOS,

<sup>6</sup> Source: Mining Strategy of the Republic of Kosovo for the period 2012-2025,

<sup>7</sup> Balance reserves are the reserves where the caloric power of coal is over 5.450 kJ/kg,

<sup>8</sup> Non-balance reserves are reserves the caloric value of coal is below 5.450 kJ/kg,

<sup>9</sup> Single Project Pipeline of Infrastructural Investments - Energy, Project No. 1



*Currently, district heating sector in Kosovo consists of four systems:*

- *DJ Termokos, Prishtina;*
- *DH Gjakova;*
- *DH Termomit, Mitrovica; and*
- *DH Zveçan.*

*Altogether it has limited coverage, meeting roughly 3-5 % of the total heating demand in Kosovo. Accordingly, Objective 3 of this Strategy to enhance district heating systems is very challenging and important for energy sector development in Kosovo.*

After the war, several projects were developed in the heating sector which have improved the quality of supply (DH Termokos). The co-generation project of thermal energy supply from TPP Kosovo B and the rehabilitation of thermal network and substations has enabled a higher quality of supply for existing consumers and possibilities for connection of new ones. The following Table shows the data of the district heating systems of Prishtina and Gjakova, including total losses in both systems (for more details see Annex 1.2).

Table 2. Presentation of indicators of both obtained heating systems (district heating)<sup>10</sup>

	2010	2011	2012	2013	2014	2015
Generation of heating (GWh)	83.15	52.68	54.20	58.62	69.20	201.08
Own consumption (GWh)	8.25	6.63	5.35	5.35	8.96	2.33
Losses in transmission and distribution (GWh)	12.56	10.70	8.84	10.58	12.90	37.33
Available for final consumption (GWh)	<b>62.57</b>	<b>40.00</b>	<b>40.00</b>	<b>42.68</b>	<b>47.33</b>	<b>161.42</b>
Consumption in household (GWh)	40.70	23.03	26.05	27.68	30.70	104.90
Consumption in services (GWh)	21.86	13.33	14.07	14.88	16.51	56.52

Figure 3 shows losses in the thermal energy system in both district heating (Prishtina and Gjakova) for which there are available data. In 2012 MED financed a project for a study in district heating in Peja, Prizren, Gjilan, and Ferizaj<sup>11</sup>.

<sup>10</sup> Source: Annual electricity balance for respective years. This excludes district heating of Mitrovica and Zveçan.

<sup>11</sup> Study on district heating in Peja, Gjilan and Ferizaj financed in 2012 by MED.

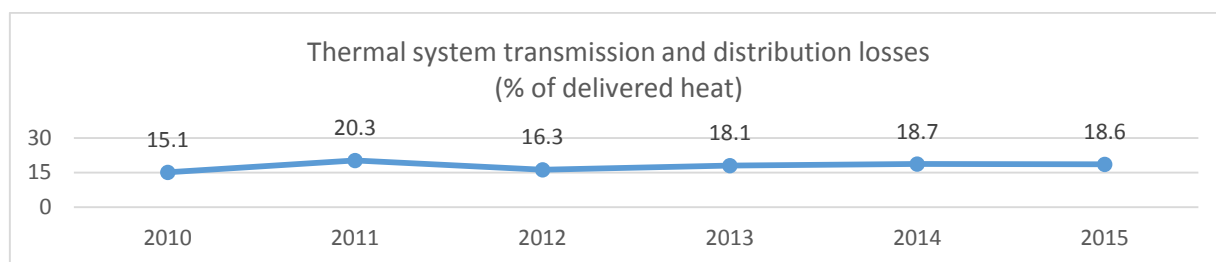


Figure 3. Presentation of technical losses in TERMOKOS and DH Gjakova<sup>12</sup>

## NATURAL GAS

Kosovo has no natural gas infrastructure. However, the legal framework for natural gas in Kosovo was adopted in line with the Third Package of EU legislation. It was approved by the Assembly of Kosovo in June 2016 and ERO is entrusted to regulate the natural gas sector.

Along with Albania, Kosovo has applied for a joint natural gas project. A grant of 300,000 EUR for the pre-feasibility study for this project has been secured under the Western Balkans Investment Framework (WBIF) platform. The project was approved in the Project of Energy Community Interest List (PECI)<sup>13</sup> in October 2016 at the Energy Community's Ministerial Council meeting. General data for this project are presented in Annex 6 of this Strategy.

*Kosovo currently has no natural gas infrastructure, but the legal framework for natural gas is in place. Along with Albania, Kosovo has applied for a joint natural gas project as a connection to the TAP pipeline. Kosovo's gasification project is ranked 7th on the list of Projects of Energy Community Interest (PECI) and it is already approved by the National Investment Council and by the Government.*

## RENEWABLE ENERGY SOURCES

Renewable Energy Sources (RES) represent an important source of energy in Kosovo, with a highly underutilized potential. The use of RES in energy generation represents a long-term target for the implementation of three energy policy milestones of the country: support of overall economic development; increased security of energy supply; and environmental protection. In view of these milestones, it is necessary to apply fiscal and financial incentives for all types of RES including the implementation of the support scheme based on the mechanism of the certificates of origin.

<sup>12</sup> District heating in Mitrovica and Zvecan are yet to submit data.

<sup>13</sup> Single Project Pipeline of Infrastructural Investments - Energy



To encourage the use of RES, Kosovo has defined a support scheme through feed-in tariffs for hydropower, wind energy, photovoltaic energy, and biomass. This incentive measure for RES aims to fulfill the planned energy targets for RES for 2020, as a requirement of Directive 2009/28/EC, the transposition and implementation of which shall be subject to monitoring by the Energy Community.

RES contribute to heating, namely the generation of thermal energy. As such, they have become part of the Heating Strategy. Since there is a need to minimize the use of wet lignite and the unsustainable use of wood for heating purposes, the use of solar energy, municipal waste, and wood waste are seen as the most promising sources for space heating and sanitary water.

Support for a greater use of RES was provided by development policies of the forestry sector, designed and implemented by the Ministry of Agriculture, Forestry and Rural Development, which continues to treat wood as an important source of thermal energy. For this reason, the Forestry Development Strategy (2010-2020) has given priority to supporting the appropriate use of systems and methods that lead to better utilization of forests for energy production. The results achieved in implementation of the first RES Action Plan 2014-2015 are presented in the Progress Report<sup>14</sup>.

The energy sector laws, in particular the Law on Energy, aim to promote RES in terms of the optimization of their use, including the setting of annual and long-term energy generation targets from RES and facilitating their access to the market. To support and promote the use of RES, Ministry of Economic Development (MED) has drafted a ten-year Action Plan for RES, as a policy document. In accordance with the legal obligations and those taken under the Energy Community Treaty (ECT), MED has set RES targets for 2011-2020, considering the possibilities and potentials of RES available in Kosovo. The fulfillment of these targets is monitored by MED, which is responsible for reporting progress on the Energy Community Secretariat in Vienna.

MED also has adopted secondary legislation concerning specific measures to promote greater use of RES.

An important role for the promotion of RES lies with the Transmission System Operator and the Distribution System Operator. They are mandated by the Law to give priority to RES generation, in line with the limits specified in the Grid Code. System operators establish and publish rules regarding the costs for technical adaptations required for the integration of RES into the system. These rules are approved of by the ERO. Also, ERO ensures that transmission and distribution tariffs for RES generation are non-discriminatory, especially to those from peripheral regions. By the Law on Electricity, ERO is also responsible for issuing certificates of origin for electricity generated from RES.

An incentive measure for RES is the legal obligation of the Market Operator to purchase RES generation with the regulated feed-in tariff, as defined by ERO. It takes into account the

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<sup>14</sup> [https://www.energy-community.org/portal/page/portal/ENC\\_HOME/DOCS/4480397/45A9DE97127B6AABE053C92FA8C0A790.pdf](https://www.energy-community.org/portal/page/portal/ENC_HOME/DOCS/4480397/45A9DE97127B6AABE053C92FA8C0A790.pdf)

compensation to the Market Operator needed to cover additional costs of purchasing RES generation.

ERO is legally responsible for regulatory activities in the field of RES, developing methodologies for regulated feed-in tariffs and issuing licenses for energy activities and authorizations for the construction of RES capacities as well as issuance of certificates of origin for energy produced by RES.

ERO is also obliged to issue certificates of origin for district heating from thermal energy generated from RES or energy generated in a co-generation of electricity and thermal energy. Thermal energy generation that is issued certificates of origin has priority to be purchased by the public supplier rather than other generation issued right-to-sell green certificates.

## RES support schemes

To meet the RES integration goals, a special rule has been established by ERO. It determines:

- the level of required RES capacity;
- the criteria and procedures for admission to the support scheme;
- rights and obligations of RES generators for which a certificate of origin was issued;
- rights and obligations of the distribution system operator in connection with electricity for which a certificate of origin has been issued;
- rights and obligations of transmission system and market operator;
- financing of the RES support scheme;
- integration of electricity generated from RES in the electricity system.

Primary sources of energy admitted in the RES support scheme are: water, wind, biomass, and photovoltaics. RES projects with capacities within the level of planned targets are based on the feed-in tariff scheme determined by the ERO. Currently, feed-in tariffs vary from different technologies as follows:

- small hydro power plants: 67.3 EUR/MWh
- wind power plants: 85 EUR/MWh
- biomass power plants: 71.3 EUR/ MWh
- photovoltaics: 136,4 EUR/MWh

Upon review of the incentive feed-in tariff scheme for hydropower and wind power in 2016 the ERO has increased the feed-in tariff for small hydro power plants from 63.3 to 67.3 EUR/MWh, whereas for wind power plants the support scheme period has been extended from





10 to 12 years. The 12-year support scheme period also applies for photovoltaic energy, while for small HPP energy it is set to 10 years.

*Renewable Energy Sources represent an important source of energy in Kosovo, with a highly underutilized potential. To encourage the use of RES, Kosovo has set up a legal framework as well as a support scheme through feed-in tariffs for hydropower, wind energy, photovoltaic energy, and biomass.*

*As a member of the Energy Community, Kosovo is obliged to meet mandatory RES targets for 2020 defined and approved by EnC Ministerial Council in 2012. For Kosovo it assumes 25% of RES share in the final gross energy consumption, as it is set by the National Action Plan. An even higher target of 29.47% was set by Kosovo Administrative Instruction in 2013. RES share in final gross consumption in Kosovo in 2015 was 19.7%.*

*Starting from 99.5 MW of RES installed in 2017 this Strategy aims to 401-470 MW in 2026, depending on the development scenario.*

Annex 1, point 1.3 gives a more detailed description of the policies and measures applied by Kosovo's institutions to promote the use of RES. Annex 7 provides projections for the development of small HPPs which are taken into account upon the analysis of covering the demand for electricity by 2025.

## ENERGY EFFICIENCY

Along with the need and efforts to ensure sufficient energy generation from existing power plants and other alternative sources, energy efficiency in Kosovo is considered by the GoK an essential component of strategic planning and the economic development of Kosovo.

Important political, legal, and institutional steps have been already taken in energy efficiency promotion. The Kosovo Agency for Energy Efficiency has been established as well as the Certification Commission of Energy Auditors and Managers. Also, there have been significant investments in improving energy efficiency.

In addition to the basic laws of the energy sector, since 2012 the Law on Energy Efficiency is in force, as well as a number of Administrative Instructions (AI) and various regulations, including:

- Administrative Instruction for the promotion of energy efficiency of end users and energy services;
- AI on Labeling of Energy Use;



- AI on Energy Audit;
- Technical Regulation on Energy Audit;
- Regulations on internal organization of the Kosovo Energy Efficiency Agency;
- Regulation on the establishment of the Commission for Certification of Energy Auditors and Managers.

The Kosovo Energy Efficiency Action Plan (KEEAP) 2010 - 2018 was approved and envisages energy savings of 9% or around 92 ktoe by 2018. The first medium-term action plan of the Kosovo Energy Efficiency (KEEAP) 2010 - 2012 is already implemented and foresees energy savings of 3% or around 31 kiloton oil equivalent (ktoe) by 2012, which has been achieved. The second mid-term National Energy Efficiency Action Plan (KEEAP) 2013-2015, envisaged savings of 3% or about 31 ktoe. The third intermediary plan for Energy Efficiency 2016-2018 is in the process of finalization with a savings target of 3% or 31 ktoe by 2018.

So far 27 municipalities have drafted Municipal Energy Efficiency Plans 2014-2020 and have also approved them in their respective municipal assemblies.

A draft-law on the Energy performance in buildings was adopted by the GoK, while a draft-law on Energy Efficiency is being developed for submission in the GoK.

Relevant projects financed from the budget of the Republic of Kosovo in the period 2011 – 2016 are divided in two groups:

- Energy audit of public service buildings: 144,000 EUR/year
- Public Campaign on Energy Efficiency and RES: 50,000 EUR/year

Besides projects financed from the state budget, there have been many valuable projects funded by donors and/or borrowings, such as:

- Supervision, monitoring, verification, and evaluation of energy efficiency measures in schools and hospitals in Kosovo (funded by the European Commission with 15.6 million EUR). The project started and these measures will be implemented in 63 schools and 2 hospitals.
- The study and implementation of energy efficiency measures in central public buildings (funded by WBIF / WB with 31 million USD). Negotiations between MED-MF-WB were completed in May 2014 and in June 2014 the WB Board approved the loan. After the signing of the agreement between the MF and the WB, the project was ratified by the Kosovo Assembly. For 19 buildings the project design was completed together with bidding documents for implementation of Energy Efficiency (EE) measures.
- Implementation of energy efficiency measures in municipal buildings (funded by WBIF, the German Government and Kreditanstalt für Wiederaufbau (Development Bank) (KfW) with 7.5 million EUR). The respective funding and the agreement credit were approved by the Assembly of the Republic of Kosovo.



- Support for the private and residential sectors with EE measures (funded by the European Bank for Reconstruction and Development (EBRD), with 12 million EUR). The emphasis will be given to the private sector (Small and Medium Enterprises (SMEs)), where the first contracts were already made with a commercial bank, TEB (5 million EUR) and Kosovo Rural Crediting KRK (1.5 million EUR). The project is in the implementation phase. Thus far 8.2 million EUR has been spent, with 4 million EUR for SMEs and 4.2 million EUR for the household sector.
- Through UNDP a series of projects have been developed to promote EE and two municipalities have been helped in drafting Municipal EE Plans 2014 - 2020 as well as with concrete measures in public lighting in the municipality.
- The German Government has supported MED through GIZ Open Regional Funds (ORF) in the development of a web-platform for the monitoring and verification of the implementation of National Energy Efficiency Plans (NEEP).
- Three municipalities have developed Sustainable Action Plans for EE supported by the German Government through GIZ ORF for Modernisation of Municipal Services (MMS), ORF EE, and Swiss Agency for Development and Cooperation. Two municipalities have already joined the initiative Covenant of Mayor (CoM).

Other details for activities in the field of energy efficiency are described in Annex 1, item 1.4.

Kosovo, as a signatory of the Energy Community Treaty, has an active role in meetings of the Energy Community in Vienna, actively participating in the Coordination Group for EE, harmonizing its legitimacy with the relevant EU Directives. Annex 1, item 1.4. gives a more detailed description of the activities in the field of energy efficiency.

*Energy efficiency in Kosovo is considered by the GoK as an essential component of strategic planning and the economic development of Kosovo. Important political, legal, and institutional steps have been already taken in energy efficiency promotion, followed by concrete activities, plans, and implementation measures. It resulted in a significant reduction in consumption and expensive energy imports. It certainly enables better strategic planning, energy policies, and more effective implementation. However, this is only the beginning as a lot more remains to be done. There are significant potentials for the implementation of energy efficiency in Kosovo, along with the need for savings and improving the quality of life of the citizens of Kosovo, primarily in the household sector.*

## ENVIRONMENT

Considering that electricity is generated from power plants with an obsolete technology, designed at a time when there weren't significant environmental protection requirements, Kosovo is in a dire situation in terms of environmental protection. This is clearly shown in the



following table with concrete indicators of pollution compared to allowed levels by EU requirements. Annex 1, point 1.5 gives a more detailed description of the environmental situation of the thermal power plants.

Table 3. Emissions from Kosovo power plants in the last two years<sup>15</sup>

TPP Kosova	Dust (mg/Nm <sup>3</sup> )		SO <sub>2</sub> (mg/Nm <sup>3</sup> )		NO <sub>2</sub> (mg/Nm <sup>3</sup> )		CO <sub>2</sub> (mg/Nm <sup>3</sup> )	
	2015	2014	2015	2014	2015	2014	2015	2014
TPP Kosovo A	44	57	289	418	725	714	259.67	262.91
TPP Kosovo B	645	860	327	511	821	814	220.7	216.04
EU* criteria	50		400		500			

\* Current emissions [(mg/Nm<sup>3</sup>) 6 (%) dry] and limits as per the European Commission

*Emission measurements from Kosovo power plants in the last two years prove that the level of dust from TPP Kosovo A has significantly decreased due to large investments by KEK in 2013. Also, there have been additional improvements in hydraulic transportation of ash, thanks to government investments and foreign donations (World Bank).*

*However, there is still hard work and investments needed to bring the other parameters to the desired level while also ensuring adequate security of the power and heat supply.*

## COMPARISON OF THE CURRENT SITUATION OF THE ENERGY SECTOR WITH THE COUNTRIES IN THE REGION

Relevant comparative data and indicators of the other South East European countries are given in Annex 1, point 1.6. In general, it can be concluded that almost all SEE countries face similar problems in covering energy demand, especially electricity demand. All SEE countries are dependent on imports, since electricity market prices are lower than local generation prices.

## MAIN ISSUES AND CHALLENGES IN KOSOVO ENERGY SECTOR

Based on the above mentioned current status and specifics, as well as other contributing factors, the main issues and challenges of the Kosovo energy sector are given below and need to be covered and resolved in this Strategy:

<sup>15</sup> Environmental Status Report, KEK



1. **Lack of investment in electricity-generating capacities:** Even though Kosovo has one of the largest lignite-based energy resources in the world, since 1984 there has been no investment in the construction of new generation capacities or substantial rehabilitation of existing ones that would enable a stable electricity supply. Moreover, existing generation technology doesn't meet the environmental criteria defined by EU legislation. TPP Kosovo A and TPP Kosovo B have a joint installed capacity of 1478 MW, but due to their age, their operational capacity currently is about 915 MW or 62% of total installed capacity. Existing generation capacities are outdated, need constant repairs, and are operating with inefficient technology<sup>16</sup>. Although the Energy Strategy of Kosovo 2009 - 2018 envisaged the construction of new generating capacities and replacement of TPP Kosovo A, for various reasons the process was delayed and finally in 2015 the selection of the bidder for the construction of TPP Kosova e Re took place and the process is now ongoing. A new updated feasibility study for the rehabilitation of TPP Kosovo B is under-way (funded by the EU), while the previous one was conducted in 2010 (funded by USAID<sup>17</sup>).
2. **Lack of investment in the distribution network system:** Insufficient investments in the electricity distribution system have led to a critical situation in which the system cannot withstand an increasing load, particularly in the winter. This has led to load shedding and a high level of technical losses which is further deteriorating the system.
3. **Large level of non-technical power losses:** Non-technical losses are a result of unauthorized use of energy, as well as unpaid electricity delivery to certain municipalities in northern Kosovo, where the DSO and the supply company have no control. It has led to severe problems in the distribution and supply system. At the same time, the transmission system operator continues to have no control of its cross-border electricity flow, which has also impacted the ability of suppliers to achieve favorable contracts for electricity import. In 2015, KOSTT signed a connection agreement with ENTSO-E, but this agreement has still not been put in force.
4. **No competitive electricity market:** Although the legal framework for the energy sector, adopted in 2010, has enabled the gradual opening of the electricity market, thus far there is no competitive electricity retail market in Kosovo. Three suppliers were recently licensed, but are still being passive most likely due to a low level of existing final consumer prices. By adopting new legislation for the energy sector, all barriers in terms of an effective market opening have been removed. ERO is currently working in harmonizing the secondary legislation with the new primary legislation. There is only one supplier who supplies all customers with regulated prices and has long-term power purchase agreements from all domestic producers. If there were more suppliers in the energy market in Kosovo, the power supply would be more stable.
5. **Large share of electricity used for heating:** Electricity has a significant share in the heating of living spaces, water, cooking, and sanitation. This is due to the lack of alternatives to supply other energy products. Consequently, the household sector is the largest electricity consumer. When the uncontrolled and unauthorized use of electricity are added, the problem becomes even worse. It is estimated that 450 GWh of electricity has been used for space heating in 2016.
6. **Non-rational use of energy:** Despite the considerable potential for energy savings, so far this potential is not being used sufficiently in Kosovo.
7. **Insufficient use of RES potentials:** Although the share of RES in the final gross energy consumption, including thermal energy from such sources, is around 19%, the electricity generated from RES continues to remain low in the consumption of electricity. The use of solar energy is also modest in meeting the needs of sanitary water heating particularly in the household and services sectors. In addition, there is no use of forms of biomass for this purpose, including urban

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<sup>16</sup> National Development Strategy (2016-2021)

<sup>17</sup> TPP Kosova B investment, requirements and rehabilitation feasibility study, 2010



and rural waste. If the energy-saving potential and RES were exploited in a better way, the power system would be in a better position and therefore the problems would be mitigated.

8. **Low share of district heating in final consumption:** Despite significant improvements in the heat supply from the cogeneration units, the district heating in final energy consumption is still very low compared to the available potential.
9. **Lack of natural gas infrastructure investments:** Despite the opening of real opportunities for the inclusion of Kosovo in regional natural gas projects, Kosovo still has no feasibility study for the construction of a natural gas infrastructure. Further steps are expected upon the finalization and adoption of the feasibility study.

## MAIN ONGOING ACTIVITIES UNDER EXISTING ENERGY SECTOR POLICIES

Before going into the detailed strategic objectives of energy sector development in the following period, it is important to note which activities have already been undertaken. The GoK, with the support of other state and international institutions, has already undertaken a range of activities to improve the situation in the energy sector in Kosovo. The main activities developed by the GoK and other institutions of Kosovo include:

- Harmonization of secondary and primary legislation. After approvals in June 2016 of laws on the energy sector, which have transposed the requirement of the Third Package of EU legislation on the energy sector, within nine months the secondary legislation is expected to be prepared for implementation;
- Significant effort has been taken in supporting the construction process of TPP Kosova e Re;
- Significant effort has been taken in supporting the process of rehabilitation of TPP Kosovo B;
- Activities have been undertaken in the implementation of soft measures<sup>18</sup> to open the energy market under the guidelines of the Energy Community Secretariat;
- Approval of the list of priority investment projects in the energy infrastructure sector<sup>19</sup> has issued and it includes 13 projects of strategic importance;
- Application to the list of projects of common interest for the Energy Community for the natural gas project (along with Albania) has been submitted;
- Developing the process for the establishment of a common energy market with Albania is underway, as a first step towards integration in a regional energy market;
- Approval of action plans for RES and EE and measures for their implementation have been issued;
- Activities have been undertaken in the process of transposing EU legislation for energy efficiency, with a focus on efforts to finding modalities for the establishment of the Energy Efficiency Fund;

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<sup>18</sup> Guideline for implementation of soft measures is based on Berlin process requirements

<sup>19</sup> Single Project Pipeline of Infrastructural Investments



- Intensive activities have been undertaken in the establishment of One Stop Shops to facilitate the development of projects in the field of RES;
- Implementation of Decision No. 04/156 for decommissioning and dismantling of gasification facilities, fertilizer, heating, and other facilities that do not impede the normal operation of active units of TPP Kosovo A is underway;
- Implementation of measures set out in the National Development Strategy 2016-2021 for the energy sector is underway.

## SWOT ANALYSIS

As a final step in the evaluation of the current status of the Kosovo energy sector, as well as the main issues and challenges, a SWOT analysis has been undertaken and presented as follows:

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Large lignite reserves with wide opportunities for electricity generation with competitive prices</li> <li>• Industry experience in production and exploitation of the lignite in Kosovo</li> <li>• Sufficient transmission interconnection capacities to provide for cross-border trade</li> <li>• Sufficient human resources for recruitment and development of skilled staff which may cover the needs of the sector</li> <li>• Legislative framework in accordance with EU directives</li> <li>• Kosovo is a contracting party of the Energy Community</li> <li>• Adequate institutional mechanisms for the functioning of the energy sector, in particular independent regulatory authority, independent transmission system and market operator</li> <li>• Relatively favorable RES potentials, which enables the diversity of energy sources</li> <li>• Development of a common Kosovo-Albania electricity market</li> <li>• High potential in energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>• Current generation capacities are old and do not provide reliable and sustainable energy generation</li> <li>• High level of technical and commercial losses in the distribution system</li> <li>• Lack of access to manage the energy sector in the northern part of Kosovo</li> <li>• Limited access for self-financing of investments</li> <li>• Delays in investments in modernizing and developing generation and distribution capacities</li> <li>• Irregular supply with electrical and thermal energy</li> <li>• Low RES share in electricity generation</li> <li>• Partial dependence on electricity imports</li> <li>• Low efficiency in power generation and energy use</li> <li>• Undeveloped market and low participation of the private sector in financing of EE measures</li> <li>• Environmental pollution from lignite mines and electricity generation</li> <li>• High use of electricity for heating</li> <li>• Lack of KOSTT control over cross-border electricity flows</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Increased demand for electricity in Kosovo and the region with opportunities for fast sector development</li> <li>• Restructuring and full reforms of the energy sector in line with EU Directives</li> <li>• Liberalization of the market regionally and the development of the sector with private capital</li> <li>• Potential for attracting strategic investors</li> <li>• Construction of new lignite-based generation capacities</li> <li>• Construction of district heating systems in larger cities</li> <li>• Reduction of technical losses and increased investments in distribution</li> <li>• Increased EE in energy generation and efficient use of energy by end-consumers</li> <li>• Development of renewable energy resources with private capital</li> <li>• Establishment of the energy efficiency fund</li> <li>• Development of RES projects with private capital</li> <li>• Kosovo's access to international financial mechanisms for increased EE</li> </ul>	<ul style="list-style-type: none"> <li>• Unexpected increases of prices of imports of liquid fuel and unforeseeable obstacles in oil products supply</li> <li>• Possible global financial crisis, with negative impacts in foreign investments</li> <li>• Continued obstructions by Serbia in the energy sector</li> <li>• Increased prices of electricity and increased demand for imports, until the development of new generation capacities</li> <li>• Lack of electricity available in the region</li> <li>• Non-functioning of open and competitive electricity market in the region</li> <li>• Non-fulfillment of strategic objectives on time, particularly in construction of sufficient capacities for electricity supply</li> <li>• Failure of establishment of the common market Kosovo-Albania as a first step towards integration in a regional energy market</li> </ul>





## CHAPTER V – SELECTED ACTIVITIES AND MEASURES FOR ACHIEVING STRATEGY OBJECTIVES

There are several ways to achieve strategy objectives. Based on the local specifics, available inputs, and analyses the following aspects were selected for achieving the Kosovo Energy Strategy objectives defined in Chapter III:

1. The objectives and measures already set out in the National Development Strategy 2016-2021;
2. Kosovo's obligations to international agreements in the field of energy;
3. The level of overall economic development in Kosovo;
4. The existing situation of the energy sector outlined in Chapter IV;
5. Kosovo's natural energy resources and their rational use;
6. Security of a continuous electricity supply, regarded as a matter of high overall national interest;
7. Demand for electricity is variable and requires a more flexible power system, while natural energy resources in Kosovo are dominated by coal;
8. The list of projects of interest to the Energy Community (PECI list 2013 and PECI list 2016);
9. List of priority infrastructural projects approved by the National Council for Investments and the Government of Kosovo;
10. High level of electricity import dependency of countries in this region<sup>20</sup>;
11. Very early stage of an effective opening of the energy retail market on one side and limitations in control systems and the transmission and distribution of electricity from the relevant operators on the other side;
12. Lack of natural gas infrastructure and the challenge of introducing a new and highly complex sector for countries like Kosovo that have no existing infrastructure, and a lack of necessary technical studies;
13. Very early stage of development of heating systems in cities that previously did not have such infrastructure and the lack of necessary studies;
14. The current pace of project developments in the sector of RES and energy efficiency;
15. The current level of meeting the targets for RES and energy efficiency;
16. The obligation to develop a new plan for RES for the period of ten years after 2020 and the need for a feasibility study;
17. The obligation to develop a new long-term plan for energy efficiency for the period of ten years after 2018 and the need for a feasibility study;
18. Developments in the Energy Community towards advancing the RES and energy efficiency policies for the contracting parties;
19. Analysis of electricity demand<sup>21</sup>;

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<sup>20</sup> See Annex 1, point 1.6.1

<sup>21</sup> See Annex 2



20. Long-term planning of the existing district heating companies<sup>22</sup>; and
21. Analysis of electricity generation adequacy, with some alternatives supported by other analyses<sup>23</sup>.

Based on this, detailed activities and steps for each of the five strategic objectives are given as follows.

## OBJECTIVE 1

### SECURITY OF A SUSTAINABLE, HIGH-QUALITY, SAFE, AND RELIABLE ELECTRICITY SUPPLY WITH ADEQUATE CAPACITIES FOR STABLE POWER SYSTEM OPERATION

The basis for the Energy Strategy development is the model of energy demand projection. After several rounds of analyses the Energy Strategy drafting team has adopted the model of projections of electricity demand based on the existing experience, economic growth forecast, gradual reduction of technical and commercial losses, expected industrial development, future energy efficiency measures, district heating system development, and solar energy for sanitary water heating. Electricity demand projections are prepared in four different scenarios. The methodology used in each scenario is described in Annex 3. Table 4 and Figure 4 show the electricity demand scenarios used in this Strategy<sup>24</sup>.

Table 4: Scenarios of electricity demand

Electricity Demand (GWh)	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Scenario 1 (LOW)	5634	5464	5662	5591	5694	5700	5706	5715	5741	5751	5776	5809	5849	5897
Scenario 2 (BASE)	5634	5464	5662	5620	5784	5826	5902	5955	6024	6084	6156	6238	6330	6455
Scenario 3 (HIGH)	5634	5464	5662	5735	5942	6041	6164	6253	6361	6461	6577	6706	6848	7010
Scenario 4 (HIGH 1)	5634	5464	5662	5892	5990	6120	6280	6410	6610	6870	7080	7319	7522	7731

The Low Scenario of electricity demand growth (Scenario 1) assumes an average annual growth rate of just 0.35% in the given period 2013 – 2026 (please note that in the period 2013 – 2016 there was a slight decrease in electricity demand (-0.08%)).

The Base Scenario is made up of the average annual growth rate of 1.05%, while the High Scenarios (Scenarios 3 and 4) are based on the average annual demand growth of 1.7% and 2.46%, respectively.

<sup>22</sup> See Annex 5

<sup>23</sup> See Annex 3

<sup>24</sup> Demand analyses details are included in Annex 2

The difference of total electricity demand predicted for 2026 between Base Scenario 2 and Low Scenario 1 is 558 GWh, or 8% of the Base Scenario's demand. The difference of total electricity demand predicted for 2026 between Base Scenario 2 and High scenario 4 is 1,28 TWh, or 19% of the Base Scenarios demand. More details on the analysis of electricity supply alternatives are given in Annex 3.

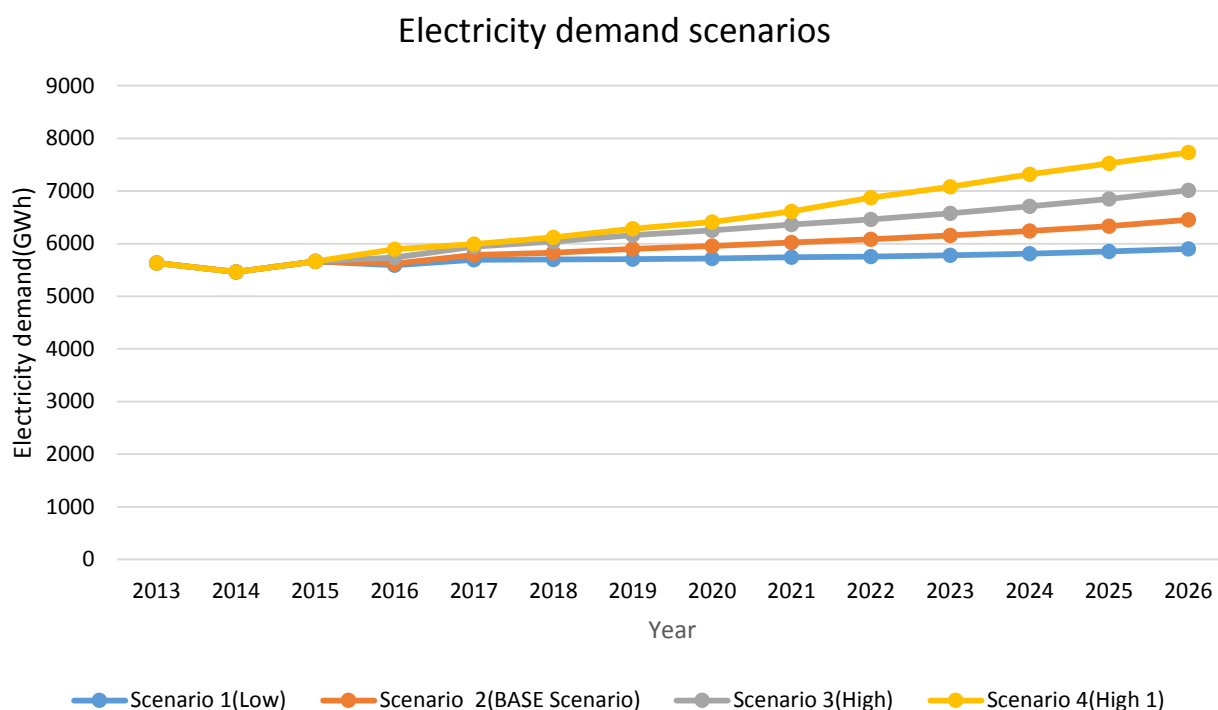


Figure 4. The curved lines of electric energy demand in Kosovo in 2013-2026

All four scenarios predict different electricity demand growth depending on: the annual rate of economic growth, efficiency measures either on the part of the consumer or on the distribution network, and the diversification of energy sources<sup>25</sup>.

Alternative strategies<sup>26</sup> were analyzed against three criteria: 1) the security of a continuous electricity supply; 2) the operating criteria of ENTSO-E for an independent control system; and 3) environmental impact.

<sup>25</sup> Annex 2 provides a description of the methodology of electricity demand, factors that were considered and the demand for each type of costumers

<sup>26</sup> See annex 3



*The strategy selected for achieving **Objective 1** is based on the following 14 measures:*

- 1. The construction process of the new TPP Kosova e Re will continue, following the environmental criteria set in the Industrial Emissions Directive and the possibility for co-generation use of at least 10% its net capacity. The target for its commissioning is set to the beginning of 2023 at the latest. Furthermore, this capacity will enable an intensive integration of RES generation and will encourage regional market integration.*
- 2. To prevent endangering the security of electricity supply, TPP Kosovo A will operate until its replacement by TPP Kosova e Re.*
- 3. TPP Kosovo B will continue to carry the main burden of security of electricity supply.*
- 4. The process of rehabilitation of TPP Kosovo B will take place in two phases:*
  - a. The first phase will include interventions in environmental components in all the elements that do not affect the production of electricity;*
  - b. The second phase includes the complete rehabilitation that begins after the start of operation of TPP Kosova e Re.*
    - Both phases will be developed by completing the rigorous requirements of Directive 2010/75/EC on industrial emissions.*
- 5. To facilitate and complete the rehabilitation of TPP Kosovo B as soon as possible, the GoK will decide on financial models for this project during the first half of 2017.*
- 6. Uninterrupted coal supply for operational needs will be ensured by opening a new coal mine (Sibovc South). These measures will be defined in the Action Plan for Mines and Minerals.*
- 7. After starting the operation of TPP Kosova e Re, the process of decommissioning TPP Kosovo A will begin according to a previously prepared plan.*
- 8. Continuous support will be ensured on the developments for electricity generation as determined by the National Action Plan on RES (PKVBRE), throughout the next ten-year period, based on policies mandated by the Energy Community.*
- 9. Technical and commercial losses in the electricity distribution system will be reduced according to the DSO Master Plan with a target of 12% until 2025.*
- 10. Measures will be taken to promote the involvement of local enterprises throughout the process of building TPP Kosova e Re, the rehabilitation of TPP Kosovo B, and projects related to the decommissioning of TPP Kosovo A and other projects designed to achieve other strategic objectives.*
- 11. Measures will be taken to adapt University programs with labor market needs arising in the process of building TPP Kosova e Re, the rehabilitation of TPP Kosovo B, the decommissioning of TPP Kosovo A, the development of natural gas infrastructure, and the development of district heating in large cities.*



12. *In order to mitigate the upward pressure on prices that will occur as a result of generation capacity construction or rehabilitation with clean coal technology, the Government will develop a program for protection of vulnerable customers based on a detailed study and in line with Energy Community requirements.*
13. *In order to mitigate the adverse consequences of the new power projects and associated mine development, the Government will, with the support of other state institutions, international institutions, and donors, implement the best practices of countries similar to Kosovo, for the treatment of communities affected by the electricity activities.*
14. *Taking into account a range of regional and European initiatives that are based on very long-term visions for the development of the energy sector, a comprehensive set of studies of different energy sector aspects covering the period through 2050 will be undertaken on behalf of the Government. A detailed list of supporting documents that will be developed upon adoption of this Strategy is given in Annex 8.*

All the above measures will be included in Program for Energy Strategy Implementation which is a mandatory policy document approved by the Government.

## OBJECTIVE 2

### INTEGRATION IN THE REGIONAL ENERGY MARKET

Full integration into the regional energy market by all Energy Community contracting parties, including Kosovo, implies de facto as well as de jure implementation of the *Acquis Communautaire* on energy as defined in the Third Package of EU energy legislation including Directives on the:

- internal electricity market;
- internal natural gas market;
- energy efficiency;
- renewable energy; and
- environmental protection.

Kosovo is committed to implement all obligations deriving from the Energy Community Treaty and from the SAA. Kosovo has made substantial steps towards transposition of EU legislation as well as reforming the energy sector, through:

- the privatization of electricity distribution and supply, and legal separation of these activities to open the way for open access for interested third parties to the distribution network;
- ownership unbundling of the TSO as per the requirements of the Third Package of EU legislation and the process of certification is underway by the ERO;



- operationalization of an independent Energy Regulatory Office and development and consultation on a complete regulatory framework compliant with EU requirements; and
- statutory establishment of the State Aid Office.

However, there is still much work to be done towards the full liberalization of the energy market and the implementation of environmental criteria for electricity generation.

*The following milestones are still to be achieved before **Objective 2** can be fully realized:*

1. *Approval and implementation of secondary legislation for the implementation of energy sector laws approved in June 2016 by the Assembly of Kosovo (Law on Energy, Law on Energy Regulator, Law on Electricity, Law on Natural Gas).*
2. *Phased deregulation of generation prices.*
3. *Appointing and licensing of the supplier of last resort.*
4. *Licensing of more suppliers in the energy market following due process.*
5. *Preparation and approval of the Action Program for the protection of vulnerable customers.*
6. *Implementation of “soft measures” according to the EnC guidelines.*
7. *Creation of an integrated electricity market between Kosovo and Albania as a first step towards integration into a common Energy Community market.*
8. *Strengthening the capacities of the ERO, the Competition Authority, and the State Aid Office to monitor the liberalized energy market.*
9. *Adherence to the energy exchange that is currently being established in Albania.*
10. *KOSTT certification by ERO and full membership in the ENTSO-E.*
11. *Obtaining full membership of ERO in ACER*
12. *Undertaking a comprehensive supporting studies for the energy sector further development till 2050, including, but not limited to, electricity and gas market studies.*

All the above measures will be included in the Program for Energy Strategy Implementation which is a mandatory policy document approved by Government.

## OBJECTIVE 3

### ENHANCEMENT OF EXISTING THERMAL SYSTEM CAPACITIES AND CONSTRUCTION OF NEW CAPACITIES

Prior to setting out the measures that the Government will take to achieve this strategic objective, it is necessary to define the heating demand projection scenarios<sup>27</sup>. It is given in the following Table and Figure.

Table 5: District heating demand scenarios till 2026

District heat demand (GWh)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Scenario1	292	328	381	406	427	444	462	479	497	515
Scenario 2	292	338	397	432	461	486	506	527	548	568
Scenario 3 <sup>28</sup>	292	349	414	481	522	557	587	611	636	661

Scenario 1 of district heat demand growth assumes an average annual growth rate of 6.51% in the given period of 2017 – 2026. Scenario 2 assumes an average annual growth rate of 7.67%, while Scenario 3 assumes an average annual demand growth of 9.5%.

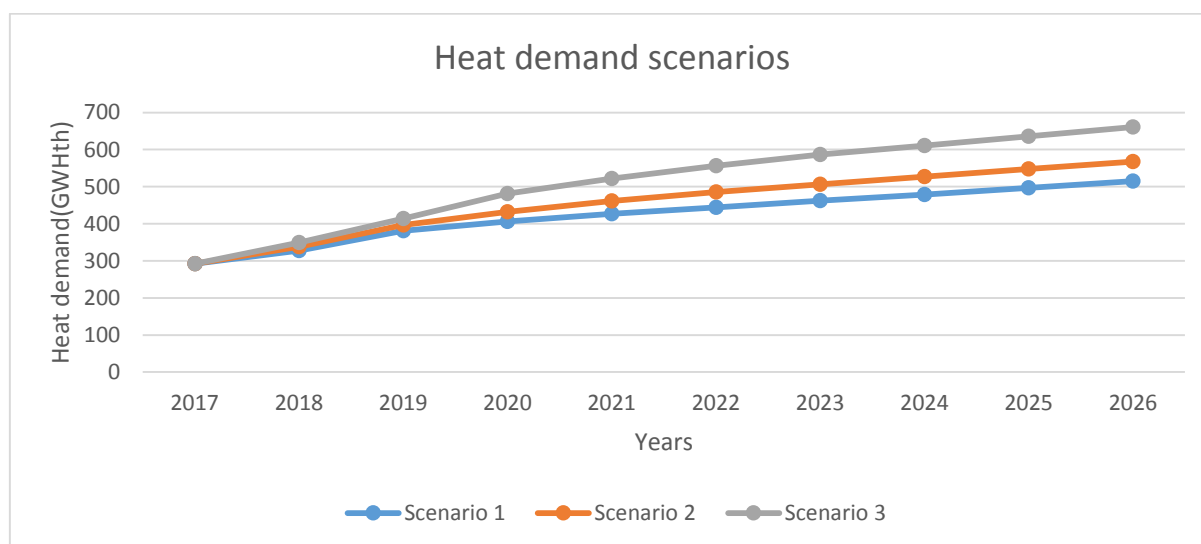


Figure 5. Heat demand scenarios in Kosovo in the period 2017 - 2026

The increasing urbanization of Kosovo's population has created the need for an adequate energy supply for heating the spaces of collective buildings. Installation of cogeneration in TPP Kosovo B and the plan to develop a similar system in TPP Kosova e Re has created the opportunity to provide a stable thermal energy supply for a significant portion of citizens and small enterprises not only in Prishtina, but also in other areas in the vicinity of the power plants. This Strategy supports the full utilization of the thermal energy potential of TPP Kosovo B and TPP Kosova e Re for new thermal installations, as deemed cost-effective.

<sup>27</sup> Detailed data are provided in Annex 5.

<sup>28</sup> Scenarios 1 and 2 correspond with planning scenarios of enterprises, while scenario 3 is developed in the framework of analyses for an aggressive scenario for reduction of electricity demand. Measures for the period of extending the existing capacities correspond with scenario 1.



Obsolete thermal systems in cities such as Gjakova, Mitrovica, and Zvečan need comprehensive rehabilitation in order to expand services to new and planned buildings. This Strategy also supports the improvement of existing systems and expansion of their capacity.

The study conducted by MED analyzed financing options for the construction of thermal power systems in several developed cities in Kosovo. Cases of the cities of Peja, Prizren, Gjilan, and Ferizaj have proven their cost-effectiveness. This Strategy therefore supports its development. In order to limit the burden on the public purse, the projects will be undertaken with the involvement of private capital through public-private partnerships.

*To achieve **Objective 3** of the enhancement of existing thermal system capacity and the construction of new capacities, the Government will implement the following measures:*

- 1. Expansion of the TERMOKOS network in line with the existing Master Plan for expansion, connecting municipalities neighboring Prishtina to optimize use of co-generation capacities provided by TPP Kosovo B and TPP Kosova e Re.*
- 2. Construction of a new thermal energy generation plant in the existing Djakova City network, together with strengthening the existing network for optimal usage of new planned thermal energy capacity.*
- 3. Upgrades to the thermal energy systems in the cities of Mitrovica and Zvecan.*
- 4. Reduction of the technical losses up to 8% in 2026 in all networks.*
- 5. Preparation of conditions for the start of construction of thermal energy systems in large municipalities of Kosovo (Peja, Prizren, Gjilan, Ferizaj). It is based on the project approved by KKI, subject to pre-feasibility and feasibility studies that will be conducted prior to this measure.*
- 6. Feasibility study on the use of existing systems for the provision of other thermal energy products (in addition to space heating).*
- 7. Reduction in energy losses arising from technological processes of production of foundries by the utilization of heat produced by smelting for space heating of buildings in local urban areas.*
- 8. Carrying out of a comprehensive study for the energy sector through to 2050, which will encompass district heating in details.*

All these measures will be included in the Program for Energy Strategy Implementation which is a mandatory policy document approved by the Government.

Annex 5 shows the development projections of existing district heating systems (TERMOKOS and DH Gjakova), and a general description of the Project: *Improvement of district heating in Kosovo through the implementation of the district heating system in municipalities with a high heating potential* approved by the KKI<sup>29</sup>.

<sup>29</sup> Project no. 2 The list of priority infrastructure projects adopted by the National Investment Council was established on the basis of the Berlin Process for the Western Balkans countries WB6





## OBJECTIVE 4

### DEVELOPMENT OF NATURAL GAS INFRASTRUCTURE

The development of the natural gas infrastructure for a small market such as Kosovo is a major challenge. However, being a part of the larger market as the EnC Contracting Party, the development possibilities are certainly more open. However, even though Kosovo in cooperation with Albania has applied for the common gas project, being selected as a project of Energy Community interest, it is not likely that the preparation for a natural gas infrastructure in Kosovo will happen in the near future. Annex 6 gives a more detailed description of the application for the Natural Gas project, submitted together with Albania (ALKOGAP).

*Given the lack of studies, infrastructure, concrete agreements, etc., the Energy Strategy for the mid-term period envisages some of the following measures for **Objective 4**:*

- 1. Development of secondary legislation to implement the law on natural gas, approved in June 2016.*
- 2. Development of institutional capacity for managing activities necessary for the process of developing a natural gas infrastructure.*
- 3. Carrying out of a feasibility study for the construction of natural gas system infrastructure.*
- 4. Developing a master plan for gasification of Kosovo.*
- 5. The preparation and adoption of the necessary model agreements.*

Depending on the findings of the studies mentioned above, other detailed measures will be taken to enable the construction of a natural gas infrastructure in Kosovo.



## OBJECTIVE 5

### FULFILLMENT OF TARGETS AND OBLIGATIONS IN ENERGY EFFICIENCY, RENEWABLE ENERGY SOURCES, AND ENVIRONMENTAL PROTECTION

Considering:

- Unsatisfactory level of security of energy supply and in particular of electricity in Kosovo;
- Unaffordability of the energy costs for a significant number of customers;
- High untapped potential for energy savings;
- Unsatisfactory results of private financial institutions' programs in the field of energy efficiency;
- Lack of functioning of energy services as a multilateral profitable business;
- Lack of adequate institutional organization at the central and local level for the effective implementation of national and local plans on energy efficiency;
- Kosovo's obligations as a Contracting Party to the Energy Community and obligations to the SAA for energy efficiency and climate change; and
- The Government priorities as set in the National Development Plan 2016-2021.

For the achievement of Objective 5 of this Strategy a series of measures need to be taken: legal, fiscal, financial, educational, and other.



*The GoK will also undertake the following measures to achieve **Objective 5 for energy efficiency**:*

- 1. Implementation of the third intermediate plan 2016-2018.*
- 2. The transposition of the European Directive on Energy Efficiency 2012/27/EC through the review of the existing Law on Energy Efficiency.*
- 3. Drafting and approval of sub-legal acts of the new Law on Energy Efficiency.*
- 4. Completion of the establishment of KAEE with required staff and development of capacities at central and local levels for implementation of the energy efficiency policies.*
- 5. Development of an Action Plan for energy efficiency for the period 2019 and beyond according to the requirements of the Directive 2012/27/EC and the previous study.*
- 6. The adoption of secondary legislation for implementation of the Law on Energy Performance in Buildings in line with Directive 2010/31/EC.*
- 7. Drafting and approval of the Program for the mobilization of investments for the renewal of the stock of residential and commercial buildings in the public and private sector, according to the Ministerial Council Decision of the EnC.*
- 8. Establishment of the Energy Efficiency Fund in consultation with the financial institutions and in line with best practices.*
- 9. Completion of the EE-RES project funded by a WB loan, along with the reporting.*
- 10. Completion of the project of EE - RES funded by KfW loan, along with the reporting.*
- 11. Approval of the Energy Code for the energy certification of buildings.*
- 12. Implementation of the energy efficiency measures outlined in the Paris Declaration in relation to the Charter of Sustainability of the Western Balkans (WB6).*

Energy efficiency measures will be extended to all sectors of energy consumption (households, industry, transport, services, agriculture). A roadmap will be developed for the public sector for the implementation of energy efficiency measures. The GoK will put in place support measures to ensure achievement of the strategic objectives, including instruments of fiscal policy and financial mechanisms, and adequate programs and projects listed in the national action plans on energy efficiency. These programs and plans will be delivered to stimulate economic development and add value.

The above mentioned set of comprehensive studies for energy sector development until 2050 will also include the energy efficiency sector. All these measures will also be included in the Program for Implementation of the Strategy.

**Renewable Energy Sources** also comprise an important segment of Kosovo's energy sector, which improves the security of energy supply, increases economic growth, diversifies sources of usable energy, and reduces CO<sub>2</sub> emissions, thus protecting the environment. The use of such



resources for energy generation is a long-term objective, which must take into account the obligations arising from the Energy Community Treaty and the SAA. As a party to this Treaty, Kosovo is obliged to meet targets for the share of energy from RES in the gross final consumption of energy for the period up to 2020, pursuant to Directive 2009/28/EC and in accordance with the Decision of the Council of Ministers of the Energy Community D/2012/04/MC-EnC. This share is in line with the required target of 25% which is projected to be completed by available resources: hydropower; solar energy; solid biomass and other forms of biomass; wind power; and biofuels used in transport for consumption.

When planning RES generation capacities, a major potential source is taken into account, as well as the lower cost of its use (such as HPP). Whereas with regard to the feed-in tariffs, the further analyses will consider the issue of its financial and economic sustainability, as well as other aspects of the evaluation of RES impact to the society as a whole.

Since the process of issuing authorization permits by ERO is a very dynamic process, there is no need to indicate in the Strategy a table of issued permits of authorization for RES. Development of RES projects to maximize their use in the economic development and environmental protection in the period covered by this Strategy will be based on the economically and technically exploitable renewable energy potential of Kosovo. In terms of long-term development perspective, the use of RES will be based on the opportunities offered by the development and advancement of technologies of each type of the resource.

In practical terms, GoK will establish a coordinating and information body in line with a Decision of the National Council on Economic Development taken in December 2015. It will continue to pursue a process of harmonization and streamlining of the administrative procedures that underpin access of RES to the electricity network, facilitating RES projects.



*In specific terms, therefore, GoK will implement the following measures to achieve Objective 5 on RES:*

- 1. Continued implementation of the Action Plan for Renewable Energy 2011-2020 and its revision by 2018 in order to achieve the target set at 25% for gross final consumption, based on the strategic objectives defined in this strategy for new electricity generation capacities from RES.*
- 2. Implementation of new EU policies for meeting the target with more cost reflective in accordance with the rules of ECT for RES with a focus on the application of supporting schemes suitable to attract investments.*
- 3. Development of the Action Plan for RES for the period from 2021 and onwards in compliance with the requirements of the RES Directive and based on previous studies.*
- 4. Simplifying authorization procedures for RES projects and harmonization of the legal terms of approvals and permits required in consonance with the longevity of technologies.*
- 5. Promote the development of the woody biomass market, considering its use format such as pellets and briquettes.*
- 6. Establishment and functioning of One Stop Shops for RES.*
- 7. Supporting generation projects for thermal energy systems using RES as fuel.*
- 8. Implementation of measures for RES as set out in the Paris Declaration concerning the Charter of the Western Balkan Sustainability (WB6).*
- 9. Carrying out of a comprehensive study for energy sector through 2050, which will also include a study on RES.*

All these measures will be included in the Program for Implementation of Strategy which is a mandatory policy document approved by the Government. In the financial term, consideration will be given on the implementation of incentive schemes in form of feed-in tariffs, or a feed-in premium as necessary.

Finally, the implementation of **environmental protection** obligations arising from the Treaty establishing the Energy Community and those reflected in the SAA, represents one of the more complex and costly challenges facing Kosovo's energy sector.

The construction of new generation capacities, rehabilitation, or eventual reconstruction of existing ones, must be consistent with the obligation set by the decisions of the Ministerial Council of the Energy Community.

The drafting of national plans and programs for the reduction of environmental pollution from large combustion plants, such as thermal power plants and thermal generators, is a short-term priority.



*In order to improve the environmental conditions of all energy activities and to implement international obligations under the ECT and SAA in the environmental field, the following measures are envisaged under **Objective 5**:*

- 1. Completion and harmonization of legislation with the applicable environment acquis and its implementation within the period 2018-2027, ensuring that the construction of new plants' environmental policies are harmonized as much as possible with security of supply policies in a more affordable fashion.*
- 2. Approval of plans on the reduction of emissions from large combustion plants under the requirements laid down by the Energy Community for the period 2018-2027.*
- 3. Decommissioning and dismantling of gasification facilities, fertilizer, heating, and other facilities that do not impede the normal operation of active units of TPP Kosovo A, in accordance with the decision of the GoK, no. 04/156 "The use of lignite, in accordance with all environmental protection requirements (construction, rehabilitation and reconstruction of new power plants) must meet environmental criteria as defined within the Energy Community which are a reflection of the EU criteria); 04/156."*
- 4. Development and adoption a master plan for rehabilitation of the environment from impacts of the operation of KEK.*
- 5. The carrying out of a comprehensive study for energy sector through 2050, which will also include a study on environmental impact deriving from the policies recommended by the study.*
- 6. Implementation of environmental measures set out in the Paris Declaration concerning the Charter of the Western Balkan Sustainability (WB6).*

All these measures will be included in the Program for Energy Strategy Implementation.



## INSTITUTIONAL FRAMEWORK STRENGTHENING

An important aspect of the implementation of Strategy objectives is institutional framework strengthening. For the period 2017 – 2026 it assumes the following:

1. *Strengthening of capacities of ERO in the field of natural gas and thermal energy;*
2. *Strengthening of capacities of the Energy Efficiency Agency of Kosovo;*
3. *Strengthening of capacities of municipalities for the energy sector;*
4. *Strengthening of capacities of the State Aid Office;*
5. *Establishment of transmission and distribution operators for natural gas ;*
6. *Establishment of a fund for Energy Efficiency;*
7. *Establishment of new district heating enterprises on municipalities in which are expected the construction of district heating systems;*
8. *Establishment of a One Stop Shop for RES;*
9. *Establishment of ESCO.*



## CHAPTER VI – OVERVIEW OF KEY ACTIVITIES, ESTIMATED COSTS AND NEXT STEPS

For the implementation of the Energy Strategy of the Republic of Kosovo 2017-2026 the Energy Law requires MED to prepare a three-year implementation program, approved by the GoK. Accordingly, the Implementation Program of the Energy Strategy shall be developed for the period 2017-2019. This document will be developed as a separate document, after the approval of this Energy Strategy by the Assembly of Kosovo.

The Program for the Implementation of the Strategy will specify all actions under each measure, indicating timelines of implementation, responsible institutions and supporters of the implementation of actions, time of the action and the overall cost of the plan for the period, as well as the source of funding. Monitoring of the implementation of the program will be conducted by MED, through regular annual reports.

Finally, the following Table gives an overview of key activities in the Kosovo energy sector in the period 2017 – 2026 as foreseen in this Energy Strategy of Kosovo.

Table 6: Overview of key activities in Kosovo energy sector in the period 2017 - 2026

Period	2017-2019	2020-2023	2024-2026
<b>Generation capacities</b>	Coal fired PP similar to 2016  RES capacity to increase for additional 65 MW, compared to 2016	TPP Kosovo A to be shutdown and replaced with TPP Kosova e Re  RES capacity to increase for 85 MW, compared to 2019	To rehabilitate TPP Kosovo B  To put TPP Kosova e Re in operation  RES capacity to increase for 54 MW, compared to 2023  New flexible generation capacities (up to 200 MW) for system regulation needs
<b>Reduction of total network losses</b>	4.6% reduction of losses compared to 2016	6.2% reduction of losses compared to 2019	2.3% reduction of losses compared to 2023
<b>Net import</b>	Around 16% of the SEE demand will be a net-importer	Net-importer, in the same level of the volume of imports (16%)	After 2024 SEE will be a net exporter
<b>Implementation of "soft measures"</b>	All soft measures not reliant to the KOSTT-EMS Agreement to be implemented		
<b>Heating surface area from thermal systems</b>	1.620.539	1.955.539	2.180.530
<b>Natural gas infrastructure</b>			All preparation activities to be completed to initiate the natural gas infrastructure construction





<b>RES Targets</b>	23%	25%	According to new targets
<b>EE targets</b>	9% (92 ktoe)	According to new targets	According to new targets
<b>Environmental targets</b>	To resolve legal consequences in the facilities near TPPs	Defined targets as per ECT to be completed	Defined targets as per ECT to be completed
<b>Long-term policy orientation document on the de-carbonization</b>	To be approved		

The following Table shows an overview of preliminary estimated costs for the implementation of measures to meet the Strategy objectives. More precise estimation of the overall cost and the sources of funding will be given in the Program of the Energy Strategy Implementation.

Table 7: Overview of estimated costs for the implementation of measures to meet the Strategy objectives

<b>Estimated cost of measures to achieve objectives of ESRK 2017-2026</b>	
<b>Objective 1</b>	<b>Cost (million EUR)</b>
Construction of TPP Kosova e Re	1000
Rehabilitation of TPP Kosovo B	350
Decommissioning of facilities around TPP Kosovo A	65
New Coal Mine <sup>30</sup>	150
Reduction of technical and commercial losses in the electricity distribution system	200
HPP for regulatory needs of the electricity system	200
<b>Total Objective 1</b>	<b>1965</b>
<b>Objective 2</b>	
Action program for protection of consumers in need	45
<b>Total Objective 2</b>	<b>45</b>
<b>Objective 3</b>	
Expansion of existing capacities of thermal energy (district heating)	50
Construction of new thermal energy systems in larger cities of Kosovo <sup>31</sup>	150
<b>Total Objective 3</b>	<b>200</b>
<b>Objective 4</b>	
Gas pipeline Albania-Kosovo(ALKOGAP) <sup>32</sup>	150
<b>Total Objective 4</b>	<b>150</b>
<b>Objective 5</b>	
Energy efficiency measures <sup>33</sup>	100
HPPs, wind plants, solar plants, photovoltaic plants	600
<b>Total Objective 5</b>	<b>700</b>
<b>OVERALL TOTAL</b>	<b>3060</b>

<sup>30</sup> Project of the list of priority infrastructure projects approved by the National Investment Council and the Government

<sup>31</sup> Investments costs are based on Projects of the list of priority infrastructure projects approved by the National Investment Council and the Government.

<sup>32</sup> Project of the list of priority infrastructure projects approved by the National Investment Council and the Government. Estimation of costs is taking into account only the transmission of gas, and not the costs of distribution.

<sup>33</sup> In addition to ongoing projects (World Bank and KfW project) the EE project listed in the list of priority infrastructure projects approved by NIC and Government was included.

## ANNEX



**REPUBLIKA E KOSOVËS**  
**REPUBLIKA KOSOVA - REPUBLIC OF KOSOVO**  
**QEVERIA – VLADA - GOVERNMENT**

**Ministria e zhvillimit ekonomik**  
**Ministarstvo ekonomskog razvoja**  
**Ministry of economic development**

**ENERGY STRATEGY**  
**OF THE REPUBLIC OF KOSOVO**  
**2017-2026**  
**(ANNEXES)**



**March 2017**



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## ANNEX 1 CURRENT STATUS OF KOSOVO ENERGY SECTOR

### ELECTRICITY

#### Meeting electricity consumption and the peak load

The problem of electricity supply in Kosovo originates from the intentional destruction of the power system in all its elements by the former occupying regime during the 1990s.

There have been no construction of electricity generation capacities in Kosovo since 1984, except some minor hydro capacities which had no impact in solving the problem of the security of the electricity supply. Currently most thermo power plant units are at the end of their technical life cycle. Had there been a sustainable development of electricity supply, practically all generation capacities of TPP Kosovo A should have been either decommissioned or rehabilitated by now (as was the case in many similar instances in South East European countries).

Despite all the problems and difficulties faced by the electricity generation system, it has had constant growth, except in 2014 (see the diagram below).

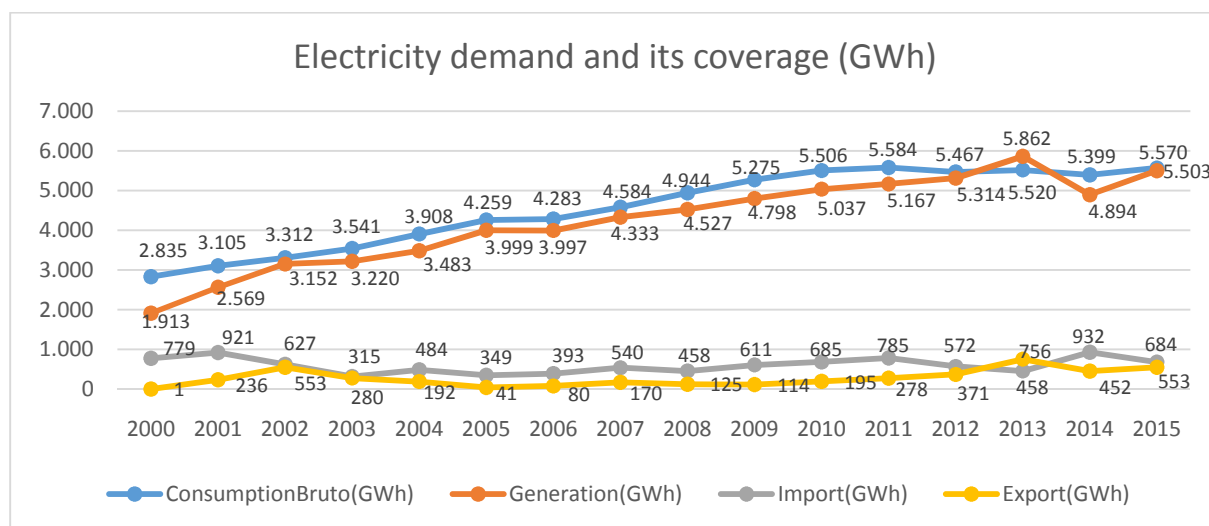


Figure 1. Evolution of electricity demand and its coverage

Figure 2 shows the historical evolution of the Kosovo power system's peak load and total electricity consumption for the past thirty years (1985-2015).

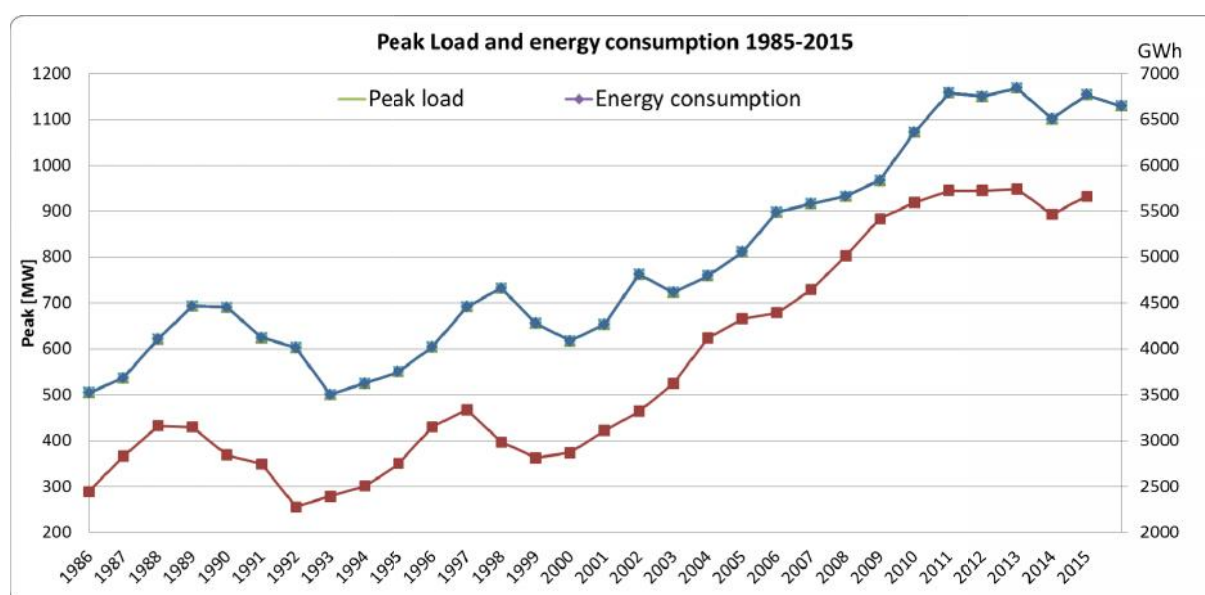


Figure 2. Evolution of power system peak load and total consumption in the past three decades

Although there has been a constant increase in electricity generation in the existing TPPs and HPPs, it is not an indicator of sustainable generation or a sustainable secure electricity supply. Operations with old capacities in need of rehabilitation make the reliability of the generation system unsustainable.

Electricity generation has been facing serious problems from the technical security point of view, as a consequence of old and outdated devices. Therefore, it is necessary to undertake adequate measures as soon as possible. When considering the environmental problems stemming from the outdated generation technology in addition to international obligations that Kosovo has to reduce environmental pollution as a consequence of electricity production, the need to improve generation conditions becomes even more urgent. However, this should be done taking into consideration the security of the supply within the existing limited operational conditions.

Increasing electricity demand is covered by the production from two lignite-fired thermal power plants (TPP Kosovo A and TPP Kosovo B), which account for 97% of national electricity production, while the rest is produced in the hydro power plants and imported. In the case of an inability to provide adequate power supply, load shedding has been applied.

Over the last decade there have been significant improvements in meeting electricity demand with domestic generation capacities. Electricity imports ranged from 10-14% of total electricity demand. Electricity production in 2000 was 1913 GWh, while in 2015 it increased to 5503 GWh. Generation increase during this period was 287.66%. The electricity generation growth trend continued from 2000 to 2013, while in 2014 there was a slight decrease in production, in comparison to 2013, due to a mishap that occurred at TPP Kosovo A<sup>1</sup>.

<sup>1</sup> Annual reports of the ERO



Electricity demand was mostly covered by domestic production and partly from import. In situations of power system overload, planned cuts were applied (According to the ABC plan). Cuts decreased in recent years. Despite the fact that this plan was not abolished, it was not used by the public supplier (KESCO)<sup>2</sup>.

Considering that Kosovo depends on electricity imports, we have presented hereunder a diagram of electricity import prices for the period covering 2000 - 2015.

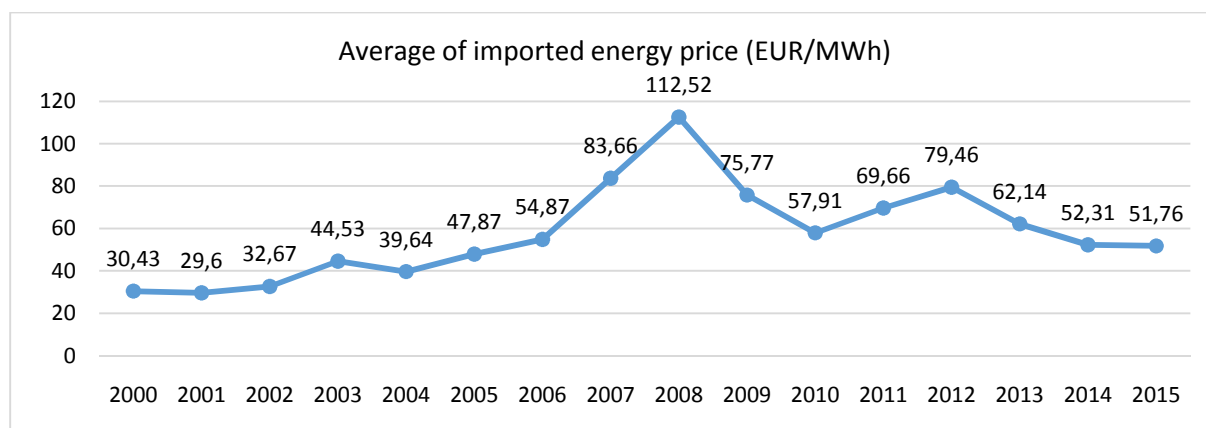


Figure 3. Evolution of imported energy price

The electricity import price has been constantly changing, from 29.6 EUR/MWh in 2001 (see Figure 3<sup>3</sup>). In the period 2000 - 2015 Kosovo spent 538.25 million EUR on electricity imports. In some cases the Government intervened with subsidies. The import subsidies were terminated in 2012. After the privatisation of the electricity distribution and supply company, the cost of electricity imports decreased significantly, as a consequence of more efficient purchasing procedures.

The biggest remaining problem in the electricity sector is the generation capacity to cover the peak load and system reserve, in line with ENTSO-E requirements. Existing generation capacities cannot cover the peak load, while on the other hand the tertiary system reserve (needed for emergency replacement of the largest unit), cannot be ensured from existing generation capacities. This ancillary service is usually ensured with flexible units (hydro or natural gas fired) which can replace the outaged generation capacity within a few minutes or up to one hour. According to the operational rules of the ENTSO-E, the control area is obliged to ensure at least 50% of system reserve capacities (primary-secondary+tertiary) in its domestic generators, whereas the rest can be ensured from abroad. Currently, in the case of unplanned unit failure, load shedding is applied in Kosovo, for as long as the capacity of the lost unit is not ensured from the regional market, with the sole purpose of maintaining balance of the electricity system.

<sup>2</sup> KESCO – Enterprise licensed for electricity supply

<sup>3</sup> ERO Annual reports





During the minimum load regime at night, there is a problem of energy surplus, which cannot be reduced due to the technical characteristics of existing units TPP Kosovo A and TPP Kosovo B.

Activities undertaken in recent years on energy market integration between Kosovo and Albania, when finalised and implemented, will have a significant impact on the improvement of operational conditions in both power systems. Following the completion of the technical infrastructure of the LFC, KOSTT and OST (Albania) signed an agreement to secure the secondary reserve with the capacity of 25 MW from HPP units in Albania, which represents the first concrete step towards the integration of both markets with optimal diversity of electricity generation.

## Electricity distribution and supply system

With the growth in the economy and improvement in the wellbeing of citizens, the demand for electricity has constantly increased. The infrastructure capacities of the energy distribution system were unable to meet this increased demand to the proper degree due to few investments in the distribution network in the past. Consequently, the electricity distribution system is constantly overloaded, especially during the winter. The following tables show the assets of the distribution network.<sup>4</sup>

*Table 1. Electricity network distribution system lines*

Voltage (kV)	Owner	Aerial network (km)	Cable network (km)	Total (km)
35 kV	KEDS	361	12	373
10(20) kV	KEDS	1,146	393	1,539
10 kV	KEDS	4,584	917	5,501
6 kV	KEDS	42	8	50
3 kV	KEDS	3.5	1.0	4.5
0.4 kV	KEDS	16,598	2,017	18,615

*Table 2. Transformers installed in the electricity distribution system*

Transformation (kV/kV)	Owner	No. of Sub. St.	No of TR	Power (MVA)
35/10	KEDS	44	90	632
10(20)/0.4	KEDS	2,158	2,251	780
10/0.4	KEDS	2,865	2,865	868
6/0.4	KEDS	65	65	9

<sup>4</sup> Source: KEDS



In May 2013, the electricity distribution and supply system was transferred to private ownership. At the end of 2014 the process of legal unbundling of the DSO from the supply activity was completed.

In recent years, particularly after the privatisation of the distribution network, many investments were made in the network (around 20 million per year). Investments are currently continuing based on projects planned by the DSO.

Regardless of the improvements in recent years, technical and commercial losses in 2015 were around 31.8%<sup>5</sup>. This was expected because it takes some time until network investments show results.

Due to the inability to control the distribution and supply system, a certain amount of energy in several municipalities in the north of Kosovo, namely around 5% of the entire amount of electricity with which the distribution system is charged, remains unbilled.

The graphs in the following figure present the situation of the supply and distribution system from the aspect of both technical and non-technical losses.

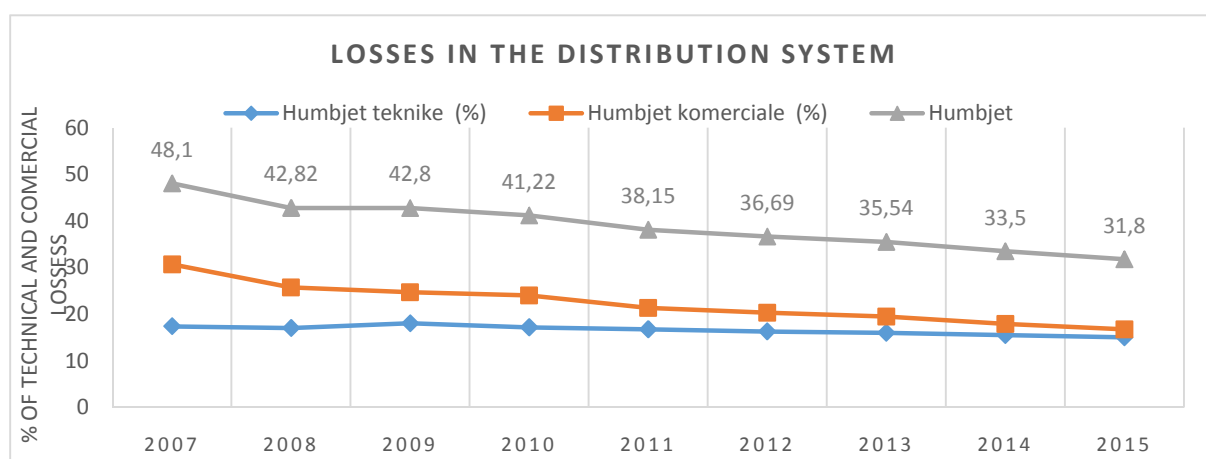


Figure 4: Technical and non-technical losses 2007-2015<sup>6</sup>

As the indicators presented in the figure above show, in recent years there have been improvements, but a lot more remains to be done with regards to further reduction of technical and commercial losses and establishing control over the entire distribution network system and electricity supply.

A positive indicator is the fact that the public supplier (KESCO) constantly improved their performance with respect to the collection of the amount of billed energy. The diagram hereunder shows the development with respect to collection<sup>7</sup>.

<sup>5</sup> Source: KEDS

<sup>6</sup> Source: KEDS

<sup>7</sup> Source: KESCO

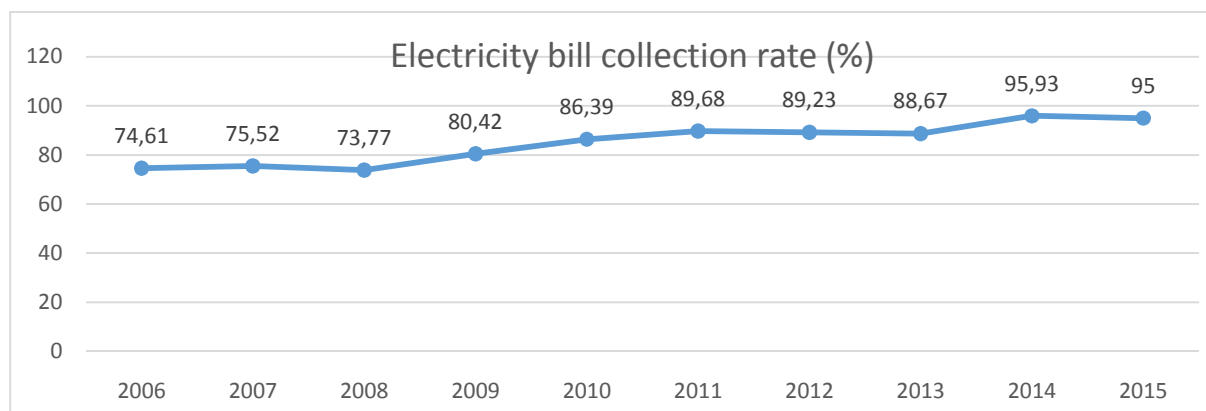


Figure 5. Evolution of collection of billed electricity

## THERMAL ENERGY SYSTEM<sup>8</sup>

The district heating sector in Kosovo is comprised of four systems: DH Termokos – Prishtina, DH Gjakova, DH Termomit – Mitrovica, and Zveqan. This sector has a pretty limited spread on the national level meeting only around 3 – 5% of the overall demand for the heating of premises in Kosovo.

### Developments in DH “Termokos” – cogeneration project

The most important development in 2015 was the completion of the cogeneration project TPP “Kosova B” – DH “Termokos”, as well as the continuation of other stages of rehabilitation of network and thermal sub-stations. This project was developed through WBIF and the leading financial institution was the German Bank for Development (KfW). Through this project, DH “Termokos” was enabled to get supplied with thermal energy from TPP “Kosova B” with an overall nominal capacity of 140 MW<sub>TH</sub> (2 x 70 MW<sub>TH</sub>). The financing of this project was enabled by donations from the European Commission, the German Government, the Governments of Sweden and Luxemburg, the Government of Kosovo, and Pristina Municipality. Of the total amount for this project, 86.54% were donations and 13.46% soft loans.

In May 2015, the cogeneration equipment was also connected to the B2 generator of TPP “Kosova B” with a nominal capacity of 70 MW<sub>TH</sub>; the security of the operation and the supply to consumers with thermal energy was subsequently increased. Stage 3 and 4 of the project are currently in the process of implementation, including the following:

- The rehabilitation and modernisation of 50 substations of thermal energy in the distribution network, apart from the installation of mechanical and electrical

<sup>8</sup> The situation of the thermal energy sector for 2014/2015 season was described based on the annual report of the ERO 2015



equipment, also included the installation of a Remote Monitoring and Controlling System (PSC/SCADA) in these sub-stations and their integration with the central system (PSC/SCADA), which enables the reception of data electronically and the remote monitoring of sub-stations.

- The rehabilitation of the primary distribution network and installation of new pre-insulated pipelines with DN 100 – DN 450 [mm] dimension, for a length of around 5 km.
- Likewise, within a short time period, it is planned to expand the distribution system, in order to enable the connection of other parts of Prishtina City which are currently not covered by the district heating supply service to the distribution network.

In the following table we have presented the situation of billing and collection from “Termokos” Enterprise.

*Table 3. Some indicators of District Heating Plant “Termokos”*

Billing and collection in DH Termokos –season 2014/2015				
Heating season 2014/2015	Heating surface (m <sup>2</sup> )	Billing with VAT (EUR)	Collection (EUR)	Collection rate (%)
Households	660,444	2,141,448	835,338	39.01
Commercial and Institutions	458,569	2,413,576	1,749,082	72.47
Total	1,119,013	4,555,024	2,584,420	56.74

## Developments in DH of Gjakova – Substitution of fuel and cogeneration

With regards to DH of Gjakova, initially it should be emphasised that it did not operate at all during the 2014/2015 season due to financial difficulties that disallowed it from obtaining a supply of fuel (mazut), which consequently did not allow for production or a thermal energy supply for consumers. Nevertheless, thanks to subsidies from the Kosovo budget and financial means from Gjakova Municipality, the DH Gjakova managed to improve its financial situation and at the end of 2015 it started production and was able to supply consumers with thermal energy for the 2015/2016 season.

With regards to the substitution of fuel and rehabilitation of the district heating system of DH Gjakova, it is worth mentioning that, in the beginning of 2015 a feasibility study was conducted together with the social and environmental impact assessment (SEIA). Throughout this year, there was a coordination of efforts in order to perform other arrangements related to financial support for implementation of the project as well as other issues regarding institutional and legal ownership. With regards to financial support, these efforts were crowned in October 2015 with the approval by the European Commission – Office in Kosovo with support for the project with a donation in the amount of around EUR 12 million.



The key components for the substitution of fuel and rehabilitation of the DH Gjakova system are:

- Substitution of mazut burners with biomass burners, which includes 2 production units: one with a capacity of 8 MWTH solely for the production of thermal energy, whereas the second unit is foreseen to be a co-generation unit for generating both thermal energy and electricity with the capacity of 8 MWTH and 1.57 MWEL. It also includes an overall revamp of the equipment for the production of thermal energy–heating facility;
- Rehabilitation of the distribution network, including a more concrete rehabilitation of the northern part of the network, which includes the replacement of around 3.3 km of existing pipelines with pre-insulated pipelines;
- Complete rehabilitation of 20 thermal substations identified as a priority.

## RENEWABLE ENERGY SOURCES

Renewable Energy Sources (RES) represent an important energy source available in Kosovo, with a potential that is still insufficiently tapped. The use of such sources for energy production represents a long term objective for the implementation of the three objectives of the country's energy policies, including: support for overall economic development; increasing the security of the energy supply; and protection of the environment. Within the function of these objectives, there is a need to apply fiscal and financial incentive measures for all types of RES and the green certificate system.

In order to incentivise the use of renewable energy sources, Kosovo established a feed-in tariff system for water, wind, solar, and biomass, sources including biogas. These incentivising policies aim to meet the requirements of respective European Union (EU) directives, whose transposition and implementation is done under the monitoring of the Energy Community Secretariat.

Renewable energy sources are especially important for heating purposes, particularly the production of thermal energy. As such, they have become a part of the Heating Strategy. Considering that there is a need to minimise the use of wet lignite and the unsustainable use of wood for heating purposes, the use of solar energy, municipal waste, and waste wood are seen as promising sources for heating premises and sanitary water.

The development policies of the forestry sector, drafted and implemented by the Ministry of Agriculture, Forestry, and Rural Development, support the greater use of renewable energy sources. Such policies continue to consider wood as an important source of thermal energy. Due to this reason, the Forestry Development Strategy (2010-2020) prioritized support for using these systems and methods, leading to a better use of the forest fund for the production of energy.



The energy sector laws, especially the Law on Energy, support the promotion, optimisation, and use of Renewable Energy Sources, including the determination of annual and long-term goals of energy generation from such resources. With the view of supporting and promoting the use of Renewable Energy Sources, the Ministry of Economic Development drafted a ten-year action plan for RES as a policy document for this important energy sector. In line with the legal obligations, and those deriving from the Energy Community Treaty (ECT), the MED has determined RES goals for the period covering 2011-2020, by taking into consideration the opportunities and potentials of Renewable Energy Sources available in Kosovo. Fulfilment of such goals is monitored by the Ministry of Economic Development, which is also responsible for reporting on the progress achieved to the Energy Community Secretariat (ECS) in Vienna.

MED also monitored the secondary legislation relating to specific measures for the promotion of the greater use of RES.

An important role in the promotion of Renewable Energy Sources is also played by the Transmission and Distribution System Operators. They are bound by the Law to prioritise energy produced by renewable energy sources, according to the limits specified in the Network Code. The system operators determine and publish rules regarding the costs for the necessary technical adaptation to integrate RES into the system. Such rules are approved by the Energy Regulator Office (ERO). ERO also ensures that transmission and distribution tariffs for the producers of RES are non-discriminatory, especially those from remote regions. Additionally, ERO is responsible for issuing certificates of origin for electricity produced from RES, which is a responsibility defined in the Law on Electricity.

One incentive for Renewable Energy Sources is the legal obligation on the part of the public supplier of electricity to purchase the entire amount of energy produced from RES from producers under a regulated tariff, determined by the ERO through its determined methodology, which takes into consideration compensation from the public supplier of the additional costs of purchasing electricity from renewable energy sources.

ERO is responsible under the law to conduct regulatory activities in the field of Renewable Energy Sources. It develops the methodology on regulated tariffs and issues licenses for energy activities and authorisations for the construction of energy capacities from renewable energy sources.

Under the Law on Central Heating, the ERO is also obliged to issue certificates of origin for thermal energy produced from renewable energy sources, or the energy produced in a co-generation process from the generation of electricity and thermal energy. Thermal energy for which the certificate of origin was issued, has precedent to be purchased from the public supplier over other energy sources for which no certificate of origin was issued. Based on that, the producer of thermal energy has the right to issue and sell green certificates.



## Support schemes for Renewable Energy Sources

In order to meet the objectives for energy from renewable energy sources, the ERO issues special regulations in the following areas:

- determination of the level of necessary energy capacities;
- other requirements and procedures for acceptance of the support scheme;
- the rights and obligations of producers of electricity from renewable sources for which the certificate of origin was issued and accepted under the support scheme;
- the rights and obligations of the public supplier in relation to electricity for which certificate of origin was issued;
- rights and obligations of KOSTT;
- financing of the support scheme; and
- integration of electricity produced from renewable energy sources into the electricity system.

## Feed-in tariffs and the duration of transaction agreements for electricity from renewable energy sources

The primary sources of energy from RES used for generating electricity acceptable under the support scheme are: water, wind, biomass, and photovoltaic.

The RES projects with capacities within the planned goals are supported under the feed-in tariff scheme which is determined by the Energy Regulatory Office. The applied feed-in tariff is different for different technologies, as following:

- water energy (small hydro power plants): 67,3 EUR/MWh;
- wind energy: 85 EUR/MWh; and
- biomass energy 71.3 EUR/MWh and photovoltaic energy 136.4 EUR/MWh.

During the review of the support scheme of feed-in tariffs for energy from water and wind, in 2016, the Energy Regulatory Office increased the feed-in tariffs for water energy from 63.3 to 67.3 Euro/MWh, whereas for wind energy the deadline for its transaction was extended from 10 to 12 years. The 12 year deadline for the energy transaction agreement also applies to photovoltaic, whereas for the small HPPs it is still 10 years.

## Studies and assessments of the Potential of Renewable Energy Sources

As the first step for incentivising the use of renewable energy sources for the generation of energy, the Government of the Republic of Kosovo conducted an assessment of the potential of available sources. In this regard, in 2006, 2009, and 2010, MED conducted preliminary studies and assessments on the country's potential for small HPPs. Development of the HPPs is foreseen to be done with the investment of private capital. According to these studies, the water energy potential was assessed to be around 130 MW of new installed capacities with an annual average production of 621 GWh.



During 2008, the potential of solar, wind, biomass, and geothermal energy was assessed with the assistance of consultants from the Danish company COWI.

## Goals of Renewable Energy Sources

There are three distribution hydro power plants (HPPs) in Kosovo as: HPP Dikanci, HPP Radavci, and HPP Burimi. HPP Lumbardhi was connected to the transmission network. These HPPs were rehabilitated from 2009-2010 and increased their production since they were given with concession by their title holder, the Kosovo Electro-Energy Corporation.

HPP Lumbardhi was rehabilitated and commissioned in 2005 by a company which will be renting it for 20+ years. The installed capacity of this HPP is 8.08 MW.

HPP Dikanci was rented and made operational in 2010; its installed capacities have increased to 1 MW since its revamp. The HPP Radavci was rehabilitated in 2010 from the company that took it with concession. The installed capacities of this HPP were also increased to 0.9 MW.

HPP Burimi was taken with concession and its capacity was increased from 0.56 MW to 0.86 MW.

HPP Ujmani also contributes in the electric system of Kosovo with an installed capacity of 35 MW and annual production of around 88-90 GWh. This HPP is owned by the Hidrosistemi Iber-Lepenc.

In 2009, the first capacities of wind energy were installed with a capacity of 1.35 MW in the Golesh hills in the vicinity of Prishtina. In the following period, ERO received other requests from private companies for investments in wind energy capacities in Artana, Dardana, Shtime, Rahovec (Zatriq), Suhareka (Budakovë), and Drenas.

Solar collectors for the heating of sanitary water have been installed in a series of buildings such as the University Clinical Centre of Kosovo and the Student Centre in Pristina, with financing from the state budget (during 2008-2009), and in three other public buildings as part of the project for the implementation of energy efficiency, with financing from the European Commission (during 2010).

In 2015, photovoltaic energy with a capacity of 102 kW was installed in the vicinity of Klinë for commercial purposes and HPP Brodi II with a capacity of 3.89 MW was commissioned. In the beginning of 2016, the construction of two new small HPPs was finished: HPP Lumbardhi II with a capacity of (9.2+8.4) MW and HPP Albaniku III with a capacity of 4.3 MW.





In the meantime, as a result of private investors' interest in small HPPs, ERO issued the final permits of authorisation for 76 MW and preliminary permits of authorisation for 89.54 MW and is in the process of reviewing requests for the authorisation of 513 MW of new capacities.

There was also similar interest from private investors in wind energy, which resulted in the ERO issuing preliminary authorisation permits for a capacity of 87.75 MW and is in the process of authorisation for an additional 51 MW.

## National Renewable Energy Action Plan

Kosovo is a member of the Energy Community Treaty, therefore like all other member states, it is obliged to meet the energy targets for RES, based on the Decision of the Council of Ministers of the Energy Community D/2012/04/MC-EnC for the implementation of Directive 2009/28/EC. Therefore, it drafted and approved the mandatory target for RES by 2020. This target is a participation rate with 25% of energy from RES in the final gross consumption of energy. A higher target (29.47%) was set by the Administrative Instruction for the Renewable Energy Sources Target 01/2013.

The RES targets were planned to be achieved from photovoltaic energy; solid biomass; wind; existing small HPPs; and new small and big HPPs.

With respect to electricity and the foreseen capacities, in 2020, according to the promoted target, the plan is to install 240 MW of energy from TPPs. Whereas in terms of other types of RES, wind energy is foreseen to have and installed capacity of 150 MW; photovoltaic energy 10 MW; and energy from biomass 14 MW. Installed capacities of thermal energy by 2020 are expected to be as following: Geothermal energy 10 MW; Solar energy 70 MW; and energy from fire wood biomass 264.5 ktoe.

The national renewable energy action plan (NREAP) (2011-2020) with targets and measures that are to be fulfilled by 2020 represents the overarching policy of the government for incentivising the use of RES in Kosovo.

The NREAP was prepared based on the model compiled by the European Commission (EC) and presented in the Commission Decision 2009/584/EC. It meets all the requirements of Directive 2009/28/EC adopted pursuant to the Decision of the Council of Ministers of the Energy Community D/2012/04/MC-EnC for the implementation of Directive 2009/28/EC and the amendment of Article 20 of the Energy Community Treaty.

The energy targets determined under AI 01/2013 and decided under the NREAP have been determined through a Decision of the Energy Community Council of Ministers D/2012/04/MC-EnC for the implementation of Directive 2009/28/EC. They are an estimation of RES energy participation in the consumption of electricity, heating, and transportation. Nevertheless, for promotional purposes, Kosovo has determined another high target of RES



energy which corresponds with a participation of h 29.47% in the final gross consumption of energy by 2020.

In the future, for the purposes of meeting RES energy targets beyond 2020, it is expected that different flexible state mechanisms of cooperation between states will be used for RES, such as statistical transfer and joint support schemes. In line with the operating agenda of the Task Force, the coordination group for RES within the Energy Community Secretariat which Kosovo is part of, the first report related to the implementation of the NREAP and fulfilment of the RES energy targets was presented at the end of 2014. If other biennial reports for implementation of this NREAP and progress in fulfilment of energy targets suggest that Kosovo will not be able to fulfil the mandatory targets through the national generation of energy, we should look into the possibility of undertaking adequate steps in using the additional mechanisms.

### ENERGY EFFICIENCY (EE)

The feasibility study on Energy Efficiency and measures of its implementation in public buildings in Kosovo, implemented with the support of the World Bank, has identified the potential save energy in:

1. Government buildings at the central level: 4.28 ktoe (54% of energy)
2. The local/municipal level: 4.28 ktoe (23% of energy)
3. Total electricity consumption Q/L: 8.56ktoe / 99.55 Gwh
4. Public Enterprises: 0.774 ktoe
5. Rented buildings: 0.274 ktoe
6. Sub-stations: 1.15 ktoe
7. TOTAL = (8.56+2,17) ktoe= 10.731 ktoe/125 Gwh

Note: The significantly big potential for the implementation of EE measures which includes increasing energy savings, improving the quality of life for citizens, creating new jobs, and developing local businesses in the field of EE, is an indicator of the importance of having a Strategy that focuses on strategic and investment planning that would be in line with European strategic targets and concepts deriving from the EU *Acquis Communautaire*.

Current activities and achievements based on investments in the field of EE in all energy sectors – both transformed and final. The achievements have been described and reported at the Energy Community Secretariat in Vienna according to the NEEAP1 (2010-2018), and those that are on-going from NEEAP2 (2013-2015), whereas the projected ones will be covered in NEEAP 3 (2016-2018).



The data and predictions presented hereunder show the fulfilment of the savings targets based on the planned measures and those currently being planned.

Target assumptions and projections for saving primary energy (the energy transformation sector):

1. A total of long term energy savings by 2017/18 (TPP A/TPP B) for each EE measure;
2. Total energy savings for the production of lignite from Plan 2: 1.770 (TPP A) + 0.540 (TPPB) = 2.31 GWh/annually = 0.199 ktoe/annually;
3. Total energy savings for the production of lignite from Plan 3 are assumed to be higher than that foreseen under Plan 2, since we are not dealing with the rehabilitation of existing excavators but their replacement with new ones;
4. Total energy savings for the production of electricity from Plan 2:  
 $146 + 264 + 3.2 + 6.96 + 25.6 + 37 + 104 + 155 = 741.76 \text{ GWh/annually} = 63.78 \text{ ktoe/ annually};$
5. Total energy savings for the production of electricity from Plan 3:  
 $231 + 314 + 5.09 + 8.414 + 6.29 + 1.55 + 4.06 + 5.86 + 246 = 822.26 \text{ GWh/ annually} = 77.353 \text{ ktoe/ annually};$
6. Total targets for increasing capacities for electricity generation from Plan 2:  
 $25 + 25 + 20 = 70 \text{ MW};$
7. Total targets for increasing capacities for electricity generation from Plan 3:  
 $25 + 34 = 74 \text{ MW};$
8. Target EE savings for the electricity transmission system from Plan 2:  
 Reduction of losses of 0.06% of the overall energy demand as a result of implementation of projects until 2016:  $467.67 \text{ ktoe} \times 0.06\% = 28.06 \text{ ktoe}$  respectively 326.34 GWh; and
9. Special energy efficiency measures and targeted projections have been included in the following tables for each energy sector throughout 2016-2018.

## Planned and achieved energy savings

The savings target of 31.00 ktoe determined under the first NEEAP has been met at 31.915 ktoe. Preliminary assessments indicate that energy savings achieved during the first mid-term period (2010-12) are even higher than the reported ones; however, due to a lack of statistical data, energy savings cannot be assessed and reported accurately. Energy savings achieved in the sectors of transport and industry, have not been assessed at all in the first NEEAP. The table below shows the national indicative target and its achievement.



Table 4. EE targets

National indicative target for 2018			91.89 ktoe			
The middle target for 2012			31.00 ktoe			
Division of targets according to sectors	Sector target		Energy savings in 2012		Rough estimate of energy savings in 2018	
	2012	2018	Total (TD)	From measures (BU)	Total (TD)	From measures (BU)
<b>Households (ktoe)</b>	12.40	30.64		28.05 ktoe		46.98
<b>Services (ktoe)</b>	9.30	12.26		3.865 ktoe		18,91
<b>Industry (ktoe)**</b>	7.905	24.84		not assessed	14.00	
<b>Transport (ktoe)</b>	1.395	24.15		not assessed	12.00	
Total (equivalent units): ktoe	<b>31.00</b>	<b>91.89</b>		<b>31.925 ktoe</b>	<b>91.89 ktoe</b>	
Total (GWh):	<b>360.53</b>	<b>1068.68</b>		<b>371.17 GWh</b>	<b>1068.68 GWh</b>	
<b>Percentage (%) (compared to referent consumption ESD)</b>	<b>3 %</b>	<b>9 %</b>		<b>3.1 %</b>	<b>9.00%</b>	

\*The fields highlighted in grey are from first NEEAP

\*\*Agriculture sector was included in the industry sector

Note: In the first NEEAP there was no national objective for buildings with almost zero energy consumption.

Energy efficiency in Kosovo, along with the need and effort to ensure sufficient energy from production from existing thermo power plants and other alternative sources, is considered by the Kosovo Government as an essential component of the strategic and economic planning and development of Kosovo.

In the field of EE, important policy-programmatic, legal, and institutional steps for the promotion of EE were undertaken. The Kosovo EE Agency and the Certification Commission of Energy Auditors and Managers were established. Likewise, considerable investments in the improvement of EE were made.

The legal framework and EE projects implemented/on-going in Kosovo. In this instance it is worth emphasising that in addition to the basic laws of the energy sector, we now have the Law on Energy Efficiency and a series of different Administrative Instructions (AI) and regulations, including:

1. Administrative instruction on the promotion of energy efficiency by the end user and energy services;
2. AI on labelling equipment that use energy;
3. AI on energy audits;
4. Technical regulation for energy audits;
5. Regulation on the internal organisation of the Kosovo Energy Efficiency Agency;



6. Regulation on the establishment of the Commission for the Certification of Energy Auditors and Managers.

## Strategic Plans in the field of Energy Efficiency

1. National Energy Efficiency Action Plan of the Republic of Kosovo (NEEAP) 2010-2018, was approved and projects for energy savings in the range of 9%, or around 92 ktoe, by 2018;
2. The first mid-term National Energy Efficiency Action Plan of the Republic of Kosovo (NEEAP) 2010-2012, was approved and projects for energy savings of 3%, or around 31 ktoe, by 2012;
3. The first report on the National Energy Efficiency Action Plan of Kosovo, indicates that 3.1% was achieved, over the total projected target of 3% for these three years;
4. The second mid-term National Energy Efficiency Action Plan (NEEAP) 2013-2015, which projected savings in the range of 3%, or around 31ktoe;
5. Draft Law on the Energy Performance of Buildings was approved by the Government;
6. Draft Law on Energy Efficiency is being prepared for delivery to the Government;
7. Development Plan for EE Third Intermediate supported by ORF and funded by the German Ministry for Economic Cooperation and Development; and
8. 27 municipalities have drafted Municipal EE Plans 2014-2020 and been approved by their municipal assemblies.

## Projects financed by the RKB:

1. Annual energy audit of public service buildings, for 2011-2016, EUR 144,000.00 per year ;
2. Annual public campaign on Energy Efficiency and Renewable Energy Sources (RES), for 2011-2016, EUR 50,000.00 per year;

## Projects financed by donors/loans:

1. Oversight and monitoring, verification and assessment of energy efficiency measures in schools and hospitals in Kosovo, financed by the European Commission, in the amount of 15.6 million EUR. The project includes 63 schools and 2 hospitals.



2. Study and implementation of energy efficiency measures in public buildings- at the central level, financed by the WBIF/WB, in the amount of \$31 M. Negotiations between MED-MF-WB ended in May 2014 and in June the WB Board approved the loan. After signing the agreement between MF and WB, the project was ratified by the Assembly of Kosovo. The project started implementation.
3. Implementation of energy efficiency in public buildings at the municipal level, financed by WBIF/KfW, in the amount of 7,500,000 EUR.
4. Support to private and residential sectors for undertaking EE measures, financed by EBRD, with a value of 12M. A special emphasis was put on the private sector (Small and medium enterprises (SME) and the first contracts with the commercial bank TEB were already signed (amount 5mEUR) as well as with “Kreditimi Rural i Kosovës” (KRK) (amount EUR 1.5M). The project is in the implementation stage.
5. Several projects for the promotion of EE were developed through the UNDP, by helping two municipalities draft their municipal EE plans 2014-2020 as well as drafting concrete measures for public lighting in municipalities.
6. With the support of the German Government through GIZ ORF it has developed the Monitoring and Verification Platform for the implementation of KEEP
7. Being a signatory party to the Energy Community Treaty, Kosovo takes an active part in the meetings of the Energy Community in Vienna. It also takes an active part in the coordination group on EE, by approximating its legislation on respective EU directives.

All these activities, plans, and measures, developed or being developed, are providing a significant effect in the reduction of consumption and the need for the import of energy. They provide a possibility for the better strategic planning of energy and more effective implementation policies. Nevertheless, this is only the beginning of an adequate journey, and a lot more work remains to be done, because the potential for the implementation of energy efficiency in Kosovo is great, alongside the need for improving the quality of life of citizens in Kosovo, particularly in the residential sector. The following table gives a summary of data for all three EE mid-term action plans.

Table 5. Summary of data for all three EE mid-term action plans

Table 5. Energy efficiency measures included in the 2nd National Energy Efficiency Action Plan (NEEAP)															
1st NEEAP				2nd NEEAP				3rd NEEAP				TOTAL			
Residential															
	mill. Euro	ktoe	%	mill. Euro	ktoe	%	mill. Euro	ktoe	%	mill. Euro	ktoe	%			
	20.00	28.06	88	23.50	9.50	29		14.00	40.0	43.50	51.56	0.0			
EBRD/EC	R1			3.00	2.00						2.00				
ProCredit	R2			20.00	7.00			5.00			12.00				
Multi-apartment	R3			0.50	0.50			9.00			9.50				
KEK campaign	R4			0.10							0.00				
											0.00				
											0.00				
Measures 1st NEEAP <sup>1</sup>		28.06									28.06				
Services		3.865	12.1	49.9	295	9.85	30.0	17.0	7.00	20.0	66.90	17.71	0.0		
					ktoe/b	buildings			ktoe/b	buildings		ktoe/b	buildings		
EC	S1			15.6	0.033384615	65	2.17				15.6	0.033384615	65	2.17	
WB/EC <sup>3</sup>	S2			11.8	0.033384615	150	5.01	5.0	0.033384615	70	2.34	16.8	0.033384615	220	7.34
KfW/EC	S3			7.50	0.033384615	30	1.00				7.5	0.033384615	30	1	
Municipalities	S4			15.0	0.033384615	50	1.57	12.0	0.033384615	50.0	1.57	27	0.033384615	100	3.34
KEEA energy audits	S5					550 Eas								550 Eas	
Measures 1st NEEAP <sup>2</sup>		3.865									3.855				
Industry				19.0	8.50	26			7.00		19.00	15.50	0.0		
EBRD/EC	I1			9.00	3.50										
ProCredit	I2			10.0	5.00										
Transport					5.00	15			7.00		0.00	12.00	0.0		
Campaign	T1														
Inspection	T2														
Pristina busses	T3			5.5											
Horizontal <sup>4</sup>											0.00		0.0		
					kWh/m2	m2/y			kWh/m2	m2/y					
EE Law	H1														
Green procurement	H2														
Building code	H3				30	800000	6.00		30	1200000	9.00				
	20.00	31.925	100	92.40		32.85	100	17		35.00	100	129.40		99.77 <sup>5</sup>	100.00
												108.77 <sup>6</sup>			
												91.89	Target		

<

<sup>1</sup> (Reported for R1, R10, R12)<sup>2</sup> (Reported for S7,S13,S15,S16,S17)<sup>3</sup> The three year program includes 200-250 buildings, with a cost estimated to be US\$2 mil.<sup>4</sup> Cumulative<sup>5</sup> not including horizontal measures<sup>6</sup> including horizontal measures

Note: Not all subtotals are included, some of them are estimations

- values in red are values which are included in subtotals and in the total

- values in brown are values that are not included in subtotals and in the total

## ENVIRONMENTAL IMPACT FROM ENERGY GENERATION ACTIVITIES<sup>9</sup>

It is widely known that thermo power plants have an impact on air pollution at the local, regional, and global level. Thus, the impact of pollution at the local level includes several tens of kilometres from the source, which is known as local impact in air quality. In this case, the air pollutant's concentration is compared against the air quality standards determined through criteria. We are referring to increase of concentration of SO<sub>2</sub>, NO<sub>x</sub>, CO, organic gases, particles, heavy metals, poisonous organic composition, etc. Thermo power plants emit huge amounts of nitrogen and sulphide oxides (NO<sub>x</sub> dhe SO<sub>x</sub>). These are pollutants which, through chemical transformation in the environment, turn to sulphates and nitrates, which form secondary particles. Secondary particles are responsible for the increase of the concentration of particles at the regional level, and as such are responsible for regional pollution with PM10 and especially with PM2.5. The regional impact is connected with acidification, photo oxidation, eutrophication (NO<sub>x</sub>, NH<sub>3</sub>), and the increased concentration of over-earth ozone.

Likewise the pollution of the ozone is also linked at the regional level, because the ozone and ozone precursors, such as the NO<sub>x</sub>, are subjected to transfer at bigger distances.

<sup>9</sup> The material was taken from the report on environmental situation in KEK which is an official document published by KEK annually.



The impact at the global level mainly from thermo plants is related to the impact of greenhouse gas emissions, namely emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and CFC. Small amounts of other materials are also emitted, such as heavy metals, hydrogen chlorides, and hydrogen fluorides, un-burnt carbohydrates, unstable organic non-methane components. CO<sub>2</sub> is a greenhouse gas with a global impact on climate and as such it requires a special treatment.

The “Kosova B” TPP contains analysers for the measurement of gas and dust emissions. In the KEK thermo power plants, emission of pollutants in the environment is higher than the allowed emission lines due to inadequate projection designs of electrostatic precipitators, a lack of plants for reduction of pollutants such as NO<sub>x</sub> dhe SO<sub>2</sub>, and a high concentration of inorganic materials of lignite and other problems during the burning process. In “Kosova A” TPP (Unit A3, A4 and A5) we measure the emission of particles and calculate the emission of gasses.

Dust (particle) emissions: In thermo power plants the exhaust gases go through electrostatic precipitators where the dust particles are separated. Then gases go through the chimney, where the amount of flying ash is further reduced before being released to the environment. Other emissions in the air are mainly so-called mobile emissions, by referring to local emissions of dust, by-products of burning (secondary products), during transportation and so on. It should be emphasised that the emission of particles in “Kosova B” TPP is not in line with strict standards deriving from Directive 2001/80/EU which determines the limits of dust emission 50 (mg/Nm<sup>3</sup>). After the installation of electrostatic precipitators in “Kosova A” TPP and operating with a design that ensures the emission of particulars under the foreseen criteria, we can conclude that there were significant environmental improvements from this power plant.

Emission of Carbon Dioxide. Carbon dioxide is a significant factor with an impact on global warming. Emission of CO<sub>2</sub> is proportional with the content of carbon in fuels and the quality of burnt fuels. There is no commercially available method for capturing CO<sub>2</sub> from a discharge source and the best option for reducing its emission is to increase the efficiency of equipment and the rational burning of fuels. Carbon dioxide emission in “Kosova A” TPP is based on calculations according to the quality of lignite and the power of blocks based on the stehiometric ratio of chemical reaction, while in “Kosova B” it is measured.

Emission of Carbon Monoxide: The burning process is followed by the emission of carbon monoxide (CO), which is always present as a transitional product in the burning process, especially under the conditions of sub-stoicometric burning. The burning process is followed by carbon monoxide emission. Power plants always try to reduce the formation of CO, because CO is an indicator of dangerous corrosive and un-burnable fuel, which is an indicator of reduced efficiency. Such emission causes an increase in fuel consumption and is an indicator of the low efficiency of a power plant. Thus, the emission of CO is a consequence of a bad and incomplete burning process. With coal-fuelled thermo power plants, CO and NO<sub>x</sub> act with the same relationship. If we are to reduce the NO<sub>x</sub> emissions, the amount of air supplied in the tank should be reduced, in which case the production of CO increases. Thermo





power plants should maintain the balance of these two parameters of emissions, in order to preserve the allowed limits. In the “Kosova B” TPP the emission of CO is measured whereas in Kosova A it is not.

Emissions of SOx: In thermo plants, SOx is emitted when the coal burns, due to the presence of sulphur. Most sulphur oxides are in the form of sulphur dioxide (SO<sub>2</sub>); the metal acts as a catalyst, whereas 1-3% of sulphur is oxidized in sulphur trioxides (SO<sub>3</sub>). SOx is the common denominator for SO<sub>2</sub> and SO<sub>3</sub> emissions, thus, SOx is mainly an emission of SO<sub>2</sub>. The sulphur dioxide emission (SO<sub>2</sub>) is based on the composition of SO (organic Sulphur) in lignite, as well as alcalite character of lignite, and the self desulphuration that occurs within the furnace. After the burn, a part of sulphur ends up as ash and scum SO<sub>3</sub>, and a part of it is transferred with exhausting gases up to the electrostatic filter, and finally the remaining part is moved through the chimney into the atmosphere. Neither Kosova A thermo plant nor Kosova B have installed De-SO<sub>2</sub> (system for desulphuration of exhausting gases). In the Kosova A TPP the SO<sub>2</sub> is calculated while in “Kosova B” they are measured.

NOx emissions: The reason for NOx emissions is the content of nitrogen in lignite and feeding air. The product of burning fossil components is nitrogen oxide in the form of nitrogen monoxide (NO), Nitrogen Dioxide (NO<sub>2</sub>), and nitrogen suboxide (N<sub>2</sub>O). Emission of NOx is caused from the burning of nitrogen which is contained in lignite and from the presence of nitrogen in the air. When the lignite burns the NO is mainly created, and the production of NO<sub>2</sub> comprises some percentages of the total volume of NOx. The amount of N<sub>2</sub>O is very small. The nitrogen oxides are formed from the chemical reaction of nitrogen and oxygen dissociated from the air, which is conducted in the flame. Thus the formation of NOx occurs mainly through the following mechanisms: As a result of the reaction between oxygen and nitrogen from the air (thermal NOx), and Nitrogen contained in the fuel.

In the case of lignite, it is assumed, based on different sources, that 80% of nitrogen oxides will be created from nitrogen contained in the fuel, and only 20% from the nitrogen in the air. For the oxidation of nitrogen, it is necessary to have a certain value of temperature in the burner and a certain amount of oxygen. By undertaking primary measures in the burner, a satisfactory reduction of nitrogen oxides emissions is achieved in lignite burning thermo plants, such as with burners with less NOx and other good techniques available (such as BAT). In the Kosova A and Kosova B TPPs there are no methods or techniques used for the reduction of NOx emissions. In “Kosova A” NOx emissions are calculated whereas in “Kosova B” they are measured.

Heavy metals: Lignite contains heavy metals and other elements. Despite small concentrations, they can cause harm to the environment and human health. Most heavy metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Se, Zn, V) are released as components (e.g. oxides, chlorides etc.) bound with the particles. Only Hg and Se are partially present in the stage of steaming. Mercury (Hg) is a heavy metal that causes the biggest problems, with respect to emission from the coal burning process. A part of mercury and lignite stops in the stage of steaming, which means that it is not condensed in the surface of ash particles, therefore its removal by



the device for controlling the emission of particles fluctuates very much. Most heavy metals are bound with the flying ash in the working temperatures of burner equipment.

The situation of environmental pollutants is presented in Table 6.

Table 6. Emissions released from thermo power plants in 2015 and 2014

TPP Kosova	Electric Energy MWh			Dust (mg/Nm3)			SO <sub>2</sub> (mg/Nm3)			Nox(mg/Nm3)			Co <sub>2</sub> (mg/Nm3)		
	2015	2014	%	2015	2014	%	2015	2014	%	2015	2014	%	2015	2014	%
TPP KA3	925997	984471	-5.94	52.9	59.2	-10.64	282	417	-32.37	708	713	-0.70	257.66	263.16	-2.09
TPP KA4	773348	403998	91.42	39	53	-26.42	281	392	-28.32	749	717	4.46	260.71	263.29	-0.98
TPP KA5	357335	249418	43.27	33	54	-38.89	260	424	-38.68	724	715	1.26	260.97	264.95	-1.50
TPP KA	2056680	1637883	25.57	44	57	-22.81	289	418	-30.86	725	714	1.54	259.67	262.91	-1.23
TPP KB1	1986124	1597707	24.31												
TPP KB2	1935890	2048927	-5.52												
TPP KB	3922014	3646634	7.55	645	860	-25	327	511	-36	821	814	0.86	220.7	216.04	2.16
EU requirements*				50			400			500					

## COMPARION OF THE MAIN ENERGY INDICATORS WITH COUNTRIES IN SOUTH EAST EUROPE AND SOME EU MEMBER STATES

### Dependency on electricity imports<sup>10</sup>

In Figure 6, we have presented a comparison of countries in the region and some EU member states with respect to their dependency on electricity imports.

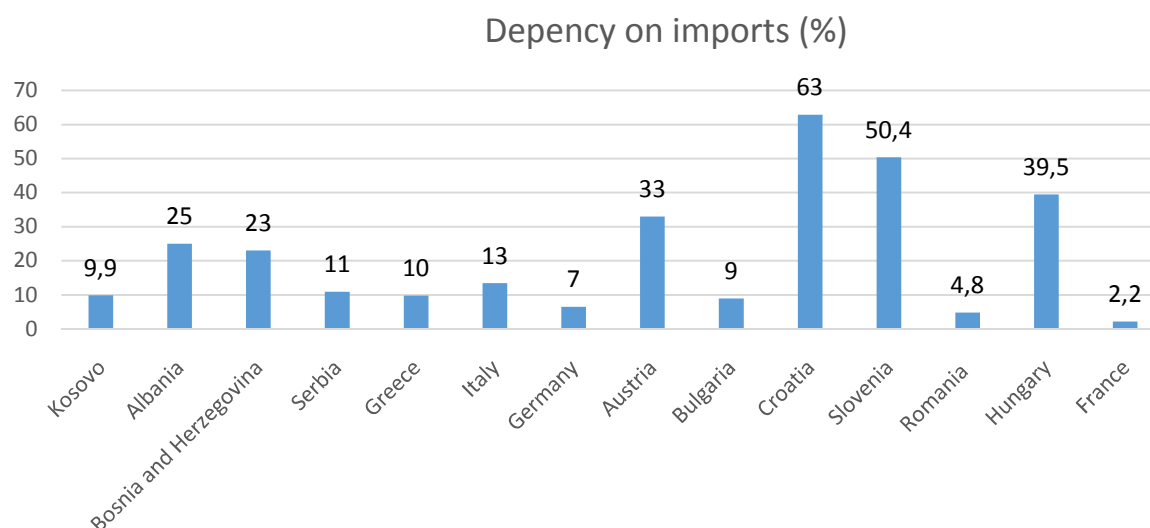


Figure 6. Comparison of dependency in electricity imports

<sup>10</sup> IEA official data from 2013



All countries in South East Europe depend on electricity imports<sup>11</sup>. Kosovo, in comparison with other countries, is not as dependent on imports; however this should be taken with reserve in terms of sustainability, because its outdated generating capacities do not generate long term security. The electricity generation capacities in Kosovo are more unsustainable in comparison to the capacities of other countries.

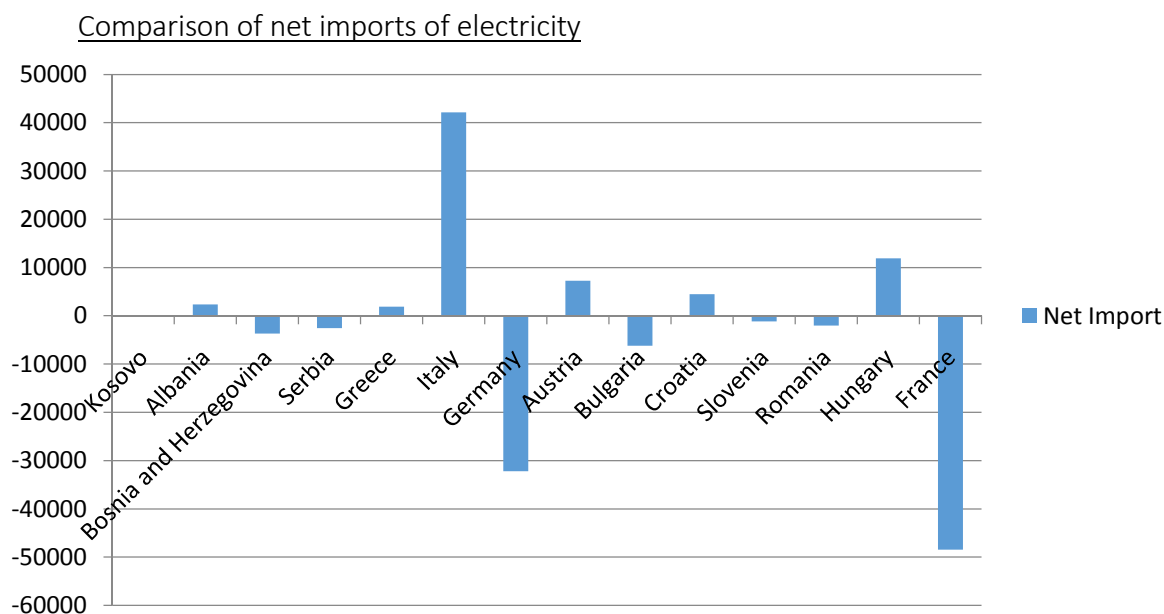


Figure 7. Net imports (Import-Export) (GWh)

#### Share of sectors in the total energy consumption of all types

The percentage share of economic sectors in the final consumption of energy represents a qualitative indicator. The following diagram indicators represent comparative data on the distribution of the final consumption of energy in the SEE countries<sup>12</sup>. The household and transportation sectors are the biggest consumers of energy in all SEE countries. In Kosovo and Montenegro, the household sector represents the biggest consumer of energy. Participation of industry in the final consumption in Macedonia is 32% and in Albania this participation is only 13%, while in Kosovo is 21%.

<sup>11</sup> IEA data for 2013 (ew.iaa.org)

<sup>12</sup> IEA official data from 2013(ew.iaa.org)



## Comparison of energy consumption in SEE countries

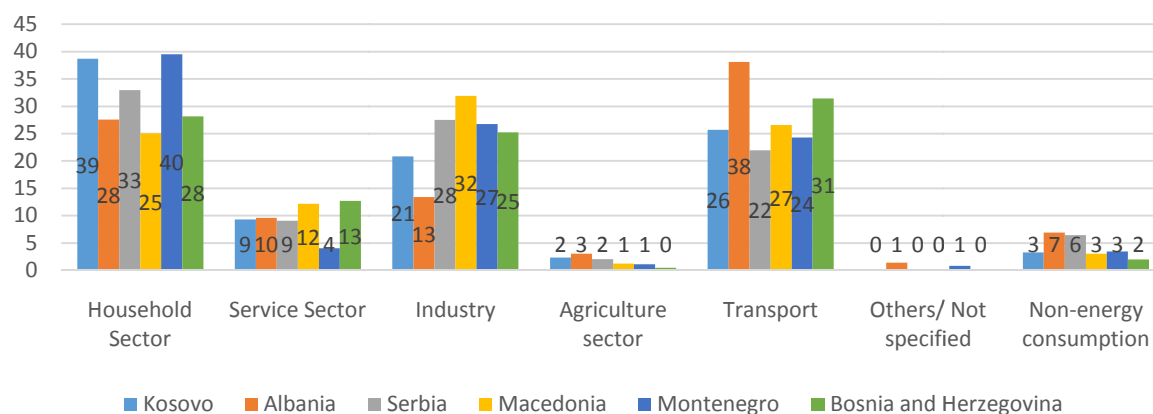


Figure 8. Comparison of share of energy sectors in the final energy consumption in SEE countries

While some countries in the region, such as Macedonia, Serbia, and Bosnia and Herzegovina, have a diversity of supply with different products of energy for fulfilling the main demand of the main sectors of the economy, Kosovo, Albania, and Montenegro are quite restricted in this respect. The share of oil products was not presented since its use is in most cases for transportation purposes in all these countries<sup>13</sup>.

### Share of different types of energy in total energy consumption

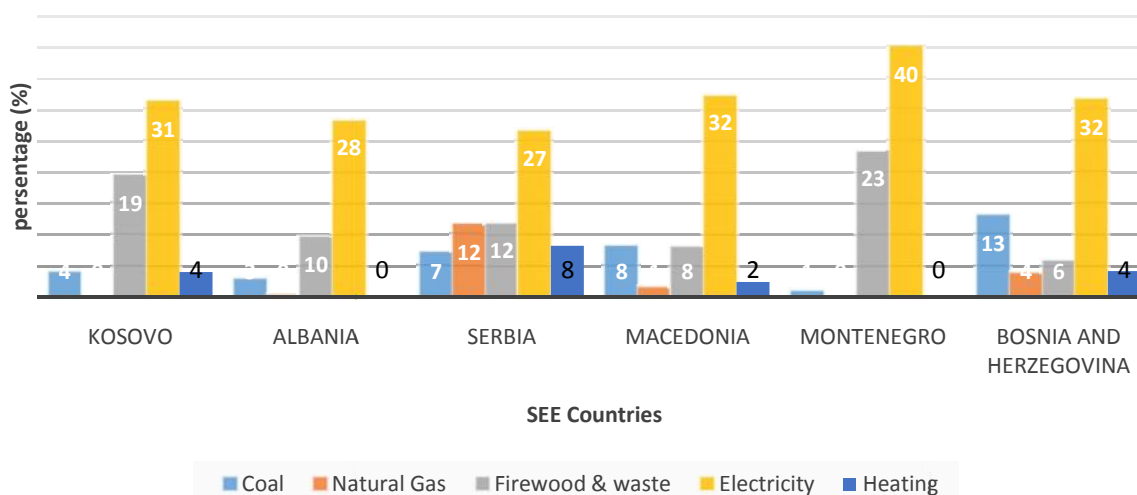


Figure 9. Comparison of share of different energy products in SEE countries

<sup>13</sup> IEA data from 2013([www.iea.org](http://www.iea.org))



## Electricity Consumption per capita<sup>14</sup>

### Consumption of electricity per capita (MWh/capita)

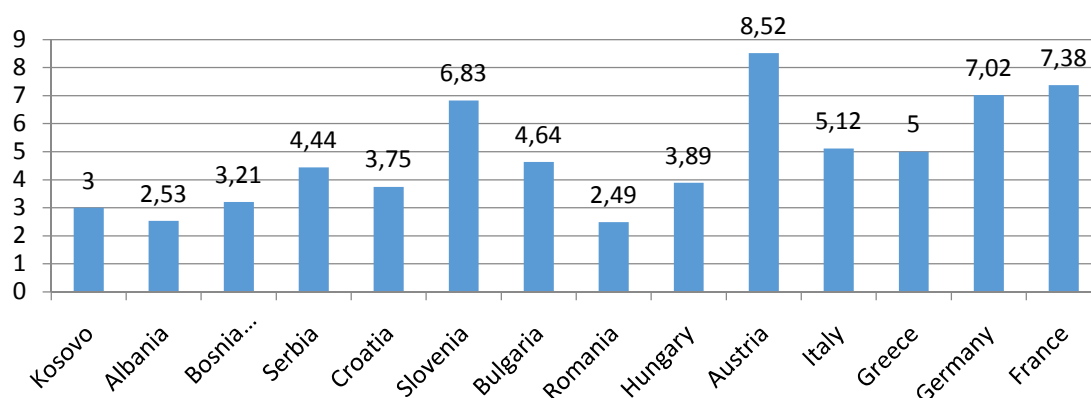


Figure 10. Comparison of consumption per capita in the SEE countries and some of the biggest countries in the EU.

As indicated Kosovo has a bigger per capita consumption of electricity than Albania and Romania.

## Electricity prices

The diagram below shows the electricity prices for SEE countries and some EU member states<sup>15</sup>.

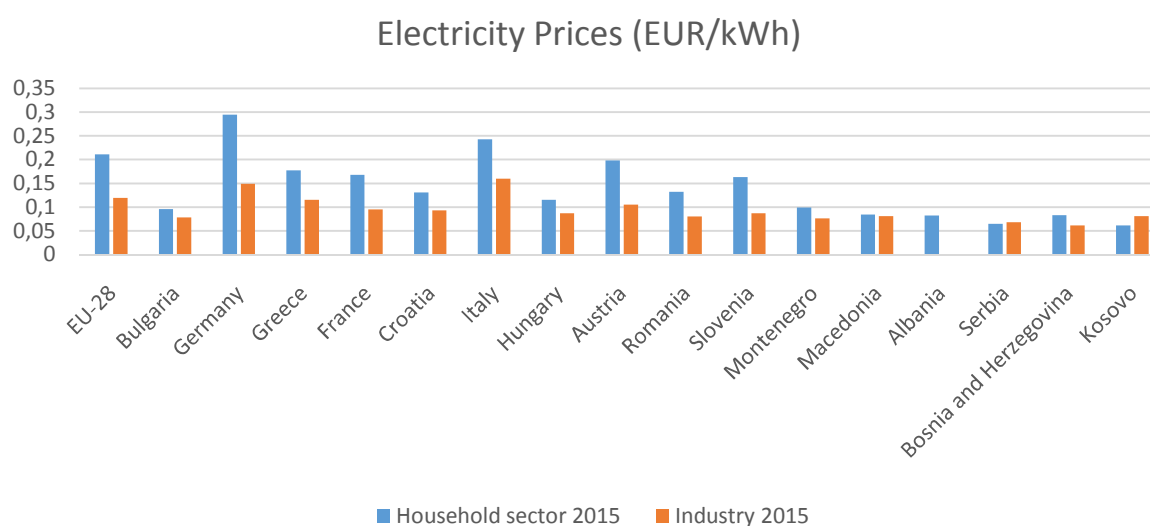


Figure 11. Electricity Prices for SEE countries and some EU member states

<sup>14</sup> IEA official data from 2013(ew.iea.org)

<sup>15</sup> EURTAT data belong to 2015



As observed, electricity prices in the household sector are lower than prices for the industry sector. Thus, in Kosovo, the burden of the cost of the power system falls with the industry sector.

## ANNEX 2 ELECTRICITY DEMAND PROJECTIONS

### THE BASIS FOR ANALYSIS OF ELECTRICITY DEMAND

With the aim of determining strategic policies for the energy sector, we first need to define electricity system demand. This represents a basis for the drafting of strategic documents for the energy sector. For this purpose, the working team for drafting the Draft Strategy on Energy has adopted the model of projections of electricity demand based on variables including economic growth, the gradual reduction of technical and commercial losses, industrial development, foreseen measures of energy efficiency, and the diversification of energy sources for meeting demand. The projection of electricity demand was done based on four consumption scenarios.

Electricity demand represents the gross consumption of electricity including:

1. Electricity demand from end consumers;
2. Electricity losses in the level of DSO;
3. Electricity losses in the level of TSO;
4. Unbilled energy in the north of Kosovo;
5. Demand in the areas of mining and generation (LLOMAG);
6. Impact of GDP on the electricity demand;
7. Impact of Energy Efficiency measures;
8. Impact of penetration of district heating systems;
9. Demand for electricity for end consumers (net consumption) was used to project the electricity demand for the electricity system. The distinction between the net and gross consumption was done with the intention of reducing the energy demand as a consequence of:
  - a. Development of thermal systems – Annex 5;
  - b. Energy Efficiency – 11 GWh annual reduction of electricity demand;
  - c. Use of solar energy for heating sanitary water – 3.65 GWh annual reduction of electricity demand as a consequence of use of solar energy for heating water for household use;
  - d. Reduction of technical and commercial losses by 12% up to 2025

Development of such elements in the energy sector was considered to play an important role in the amount of electricity demand as well as its cost, because with the reduction of demand the amount of imports is also reduced. All these factors with an impact

on electricity demand are considered as inputs that are included in the projection model of electricity demand.

The methodology used to project electricity demand was presented for each scenario hereunder. Projections of economic growth are based on the Economic Reform Program as presented in Table 7.

Table 7. Projections of economic growth according to the document: Economic Reform Program

	Proj.	Proj.	Proj.	Proj.	Proj.
Real growth of GDP	2016	2017	2018	2019	2020-2025
Low scenario (1)	1.1	2.5	2.2	2.2	2.2
Basic scenario (2)	4	4.3	4.3	4.3	4.3
High scenario (3)	4.5	6.2	5.4	5.4	5.4

## Scenarios forecasting electricity demand

Scenario 1 is based on the following inputs:

- The projection of electricity demand for industrial consumers was done by applying a percentage of GDP (Table 7) based on the lower scenario (1), whereas the projection of demand of commercial and household consumers was done via the following: In years where the consumption is not realistic, we initially normalised it and continued based on the trend through linear equations and other impacts in order to reflect a real projection.
- The level of technical and commercial losses for all scenarios was done based on the Development Plan of the DSO (according to the master plan, by 2025 technical and commercial losses will be in total 12%).
- The impact of inputs (expansion of thermal energy systems, implementation of energy efficiency measures, and the use of solar energy for heating the water for family needs) in this scenario is a continuation of the trend of recent years which also included the impact of efficiency measures undertaken under the action plan.

Table 8 represents a projection of electricity demand based on Scenario 1 (low).

Table 8. The final electricity demand based on the scenario 1.

Consumption by type of consumers (GWh)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
220 kV	586	601	616	632	651	670	690	711	732	754	760
110 kV	91	93	95	98	101	104	107	110	113	117	118
Total 220 kV & 110 kV	<b>677</b>	<b>694</b>	<b>711</b>	<b>729</b>	<b>751</b>	<b>774</b>	<b>797</b>	<b>821</b>	<b>845</b>	<b>871</b>	<b>878</b>
Industry (35 kV,10kV)	249	255	262	268	276	285	293	302	311	320	323
Service sector	776	789	803	817	833	849	862	875	888	901	908
Household sector	2,171	2,208	2,245	2,286	2,329	2,375	2,410	2,446	2,483	2,520	2,541
Consumption in distribution	<b>3,196</b>	<b>3,253</b>	<b>3,310</b>	<b>3,371</b>	<b>3,438</b>	<b>3,508</b>	<b>3,565</b>	<b>3,623</b>	<b>3,682</b>	<b>3,742</b>	<b>3,773</b>



Following the inclusion of the impact of losses and other types of consumption, the gross demand will be as outlined in table 9.

Table 9. Gross electricity demand

Gross total consumption (GWh)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(Low scenario)	5691	5694	5700	5706	5715	5741	5751	5776	5809	5849	5897

Scenario 2 is based on the following inputs:

- The projection of electricity demand for industrial consumers was done by applying a percentage of GDP based on scenario 2 (basic), whereas for projections of demand of commercial consumers, we applied 0.8 of the GDP.
- The level of technical and commercial losses for all scenarios was done based on the Development Plan of the DSO (Master Plan).
- The impact of inputs (expansion of thermal energy systems, implementation of energy efficiency measures, and the use of solar energy for heating the water for family needs) in this scenario was based on the planned measures of energy efficiency. The penetration of district heating is based on scenario 2 of district heating projections.

Table 10 represents a projection of electricity demand based on Scenario 2.

Table 10. Demand for electricity based on scenario 2 of electricity final consumption

Consumption by type of consumers (GWh)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
220KV	608	634	661	689	719	750	782	816	851	888	888
110 KV	91	95	99	103	108	112	117	122	127	133	133
<b>Total 220KV&amp;110KV</b>	<b>699</b>	<b>729</b>	<b>760</b>	<b>793</b>	<b>827</b>	<b>862</b>	<b>899</b>	<b>938</b>	<b>978</b>	<b>1020</b>	<b>1021</b>
Industry (35KV,10KV)	273	285	297	310	323	337	352	367	383	399	399
Service sector	832	861	891	921	953	986	1020	1055	1091	1129	1129
Household sector	2171	2208	2245	2286	2329	2375	2410	2446	2483	2520	2522
<b>Consumption in distribution</b>	<b>3277</b>	<b>3354</b>	<b>3433</b>	<b>3517</b>	<b>3606</b>	<b>3698</b>	<b>3782</b>	<b>3868</b>	<b>3957</b>	<b>4048</b>	<b>4050</b>

Following the inclusion of the impact of losses and other measures in electricity demand, the gross demand will be as outlined in table 11:

Table 11. Demand for gross electricity based on scenario 2 of electricity consumption

Gross total consumption (GWh)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(Basic scenario)	5802	5784	5826	5902	5955	6024	6084	6156	6238	6330	6455

Scenario 3 is based on the following inputs:

- The projection of electricity demand for industrial consumers was done by applying a percentage of GDP based on the high scenario (Scenario 3 of GDP growth, Table 7);
- The electricity demand forecast was done similarly with the second scenario;
- The level of technical and commercial losses for all scenarios was done based on the requirements of the Strategy and Development Plan of the DSO (Master Plan); and
- The impact of inputs (EE and RES) is similar with scenario 2.

*Table 12. Electricity final consumption according to Scenario 3*

Consumption by type of consumers (GWh)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
220KV	628	672	712	752	789	829	870	914	959	1007	1031
110 KV	94	101	107	112	118	124	130	137	144	151	154
<b>Total 220KV&amp;110KV</b>	<b>722</b>	<b>773</b>	<b>819</b>	<b>864</b>	<b>907</b>	<b>953</b>	<b>1000</b>	<b>1050</b>	<b>1103</b>	<b>1158</b>	<b>1185</b>
Industry (35KV,10KV)	283	302	320	338	355	373	391	411	431	453	464
Service sector	867	928	983	1037	1089	1144	1201	1261	1324	1390	1423
Household sector	2171	2208	2245	2286	2329	2375	2410	2446	2483	2520	2580
<b>Consumption in distribution</b>	<b>3320</b>	<b>3438</b>	<b>3549</b>	<b>3661</b>	<b>3774</b>	<b>3891</b>	<b>4003</b>	<b>4118</b>	<b>4239</b>	<b>4364</b>	<b>4467</b>

Following the inclusion of the impact of losses and other measures of consumption, the gross demand will be as outlined in table 13.

*Table 13. Demand for gross electricity based on scenario III*

Gross total consumption (GWh)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(High scenario)	5884	5942	6041	6164	6253	6361	6461	6577	6706	6848	7010

Scenario 4 is based on a 3% annual average increase of gross electricity consumption, taking into consideration the following:

- The risk of a lack of implementation of all measures which were forecasted for EE, RES, and the expansion of district heating system as are taken into consideration in the three scenarios;
- The rapid development of the extraction and processing of metals after the expected revitalization of the mining and industrial sector (beyond the third scenario development); and
- A repeat of cold winters

Table 14. Electricity final consumption according to Scenario 4

Consumption by type of consumers (GWh)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
220KV	628	672	716	760	804	848	892	936	980	1024	1068
110 KV	94	101	107	114	120	127	133	140	147	153	160
<b>Total 220KV&amp;110KV</b>	<b>722</b>	<b>773</b>	<b>823</b>	<b>874</b>	<b>924</b>	<b>975</b>	<b>1025</b>	<b>1076</b>	<b>1126</b>	<b>1177</b>	<b>1227</b>
Industry (35KV,10KV)	283	328	374	419	464	509	555	600	645	691	736
Service sector	867	924	981	1039	1096	1153	1210	1268	1325	1382	1439
Household sector	2177	2220	2254	2287	2317	2356	2402	2456	2520	2593	2602
<b>Consumption in distribution</b>	<b>3327</b>	<b>3472</b>	<b>3609</b>	<b>3744</b>	<b>3877</b>	<b>4018</b>	<b>4167</b>	<b>4323</b>	<b>4490</b>	<b>4665</b>	<b>4777</b>

Table 15. Gross electricity consumption based o Scenario IV

Gross total consumption (GWh)	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(Intensive high scenario)	5892	6049	6221	6414	6581	6757	6937	7124	7319	7522	7731

## SUMMARY OF ALL SCENARIOS

Table 16. Summary of scenarios of electricity demand of electric system

Gross total consumption (GWh)	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
<b>Scenario 1</b>	5634	5464	5662	5591	5694	5700	5706	5715	5741	5751	5776	5809	5849	5897
<b>Scenario 2</b>	5634	5464	5662	5620	5784	5826	5902	5955	6024	6084	6156	6238	6330	6455
<b>Scenario 3</b>	5634	5464	5662	5735	5942	6041	6164	6253	6361	6461	6577	6706	6848	7010
<b>Scenario 4</b>	5634	5464	5662	5892	5990	6120	6280	6410	6610	6870	7080	7319	7522	7731

The following figure presents the curves of long term demand projections of electricity for all scenarios.

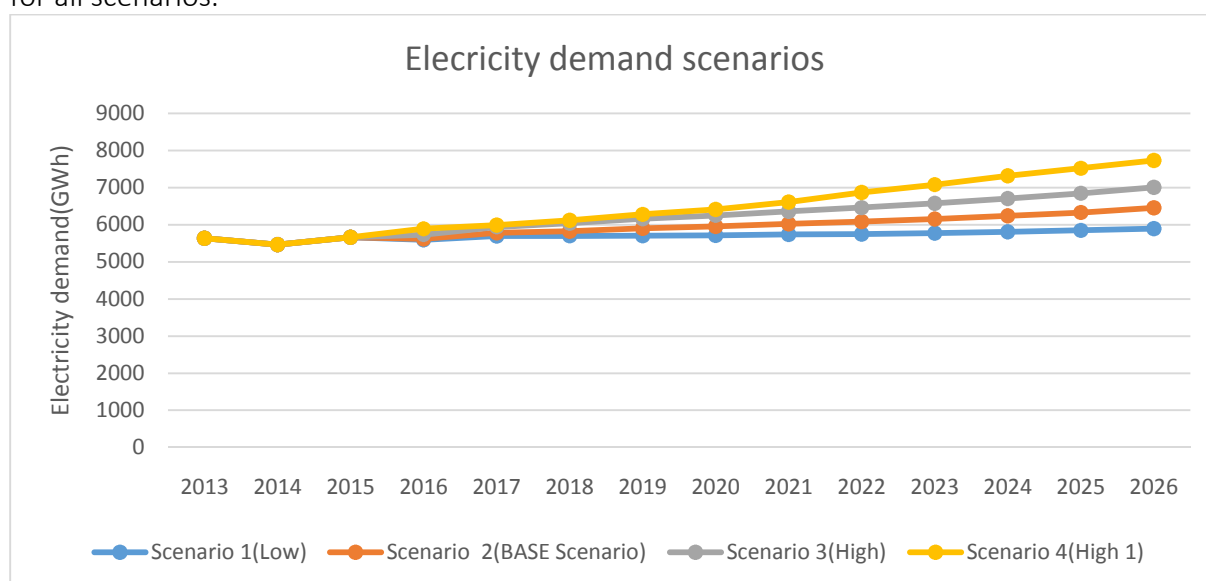


Figure 12. The curved lines of electricity demand

## ANNEX 3 ELECTRICITY SUPPLY ALTERNATIVES

### ALTERNATIVES OF ENERGY SUPPLY NEEDED TO MEET CONSUMER NEEDS AND TO MEET THE NEEDS OF THE POWER SYSTEM

Alternatives for achieving Objective 1 are based on four scenarios of electricity consumption. The scenarios of consumption are based on the increase of the demand for electricity from several factors, including economic growth according to the strategies and programs adopted by the Government and energy efficiency policies and measures, such as energy efficiency in the final consumption of energy, efficiency of the distribution systems of electricity and thermal energy, and expansion of thermal capacities. Thus, the results of the analyses are based on a combination of major factors contributing to electricity demand. The demand analysis is summarized in Annex 2.

The analysis of the adequacy of the electricity system to cope with the load of the system is based on three scenarios of electricity in Kosovo, in combination with the base scenario of electricity generation forecast in Albania. However, the analysis of the balance between generation and demand are also made for the separate system when the system operates within a common area with Albania. Annex 3 shows in detail the analyses and the database of the system adequacy and the balance between generation and demand of both systems.

#### A. Alternative 1 (Referent)

To achieve Objective 1 of the Strategy, security of power supply, Alternative 1 envisages the following measures:

1. Construction of "Kosova e Re" TPP, with a net capacity of 450 MW with the possibility of connecting the cogeneration system with a capacity up to 10% of net capacity of the plant. The plant will be constructed in compliance with all environmental criteria as defined in D 2010/75/EC. Generation is expected to start by 2023(see table);
2. Rehabilitation of TPP Kosovo B to bring it in line with environmental criteria and energy efficiency requirements as per Directive 2010/75/EC on industrial plants and increase its generation capacity. Rehabilitation is expected to start after the beginning of generation of TPP Kosova e Re in 2023. Install capacity is expected to be as it was designed(see table);
3. Continued operation of TPP Kosovo A until the commissioning of TPP Kosova e Re and the decommissioning of TPP Kosovo A(see table);

4. Construction, on the initiative of private investors, of flexible hydro capacities to meet the regulatory system reserve(see table);
5. Construction of generation capacities from renewable energy sources developed as per RES targets (see Annex 3 – First generation scenario);
6. Operation of two power systems within a common trading zone Kosovo – Albania as a first step towards integration in a regional energy market;
7. Reduction of electricity demand as a result of the penetration of district heating (medium scenario) and energy efficiency measures (based on KEEAP annual target of 1% of all energy products);
8. Reduction of distribution losses as per DSO MASTER PLAN (12% in 2025).

#### B. Alternative 2 (Import)

To achieve Objective 1 of the Strategy, security of power supply, Alternative 2 envisages the following measures:

1. Rehabilitation of TPP Kosovo B to bring it in line with environmental criteria and energy efficiency requirements as per Directive 2010/75/EC on industrial plants and increase its generation capacity. Rehabilitation is expected to start before closing TPP Kosovo A(see table);
2. Continued operation of TPP Kosovo A until 2023;
3. Aggressive RES penetration;
4. Operation of two power systems within a common trading zone Kosovo – Albania as a first step towards integration in a regional energy market;
5. Reduction of electricity demand as a result of the penetration of central heating based on the high scenario of district heating expansion;
6. Aggressive reduction of distribution losses(6.5% till 2026);
7. Aggressive energy efficiency measures;
8. The adequacy analyses are focused on the low demand scenario.

#### C. Alternative 3 (export)

To achieve Objective 1 of the Strategy, security of power supply, Alternative 3 envisages the following measures:

1. Construction of TPP Kosova e Re;
2. Rehabilitation of TPP Kosovo B;
3. Construction of additional TPPs based on lignite for export purposes;

4. Second scenario of penetration of district heating;
5. Moderate energy efficiency measures;
6. Reduction of distribution losses as per DSO MASTER PLAN (12% in 2025).
7. Reduction of electricity demand as a result of the penetration of district heating (medium scenario) and energy efficiency measures (based on KEEAP year target of 1% of all energy products);

## ANALYSIS OF ADEQUACY OF GENERATION AND BALANCE BETWEEN ELECTRICITY DEMAND AND GENERATION 2017-2026

### Referent scenario of generation (Scenario 1)

The referent scenario of generation development for time period 2017-2026 considers:

- TPP Kosovo A working until "Kosova e Re" starts operating (beginning of 2023);
- Kosovo B will go in rehabilitation after "Kosova e Re" starts operating;
- A flexible HPP for system reserve needs will be constructed; and
- RES plants as per RES targets (Table 26, annex 7).

### Generation Adequacy Results for January, third Wednesday, 21:00 h (Kosovo Power System Operates as Control Block/Control Area)

Generation adequacy is analysed based on ENTSO-E methodology, with the difference being that the reference point is considered not 19:00 h, but 21:00 h, when Kosovo Power System experiences maximal load (peak).

The availability of existing TPP units is considered based on a common operational regime of units for the January time period, which considers two units in operation in TPP Kosova A and two units in TPP Kosova B. For RES, the availability for the third Wednesday of January at 21:00 h is considered as below:

1. For solar:  $PG_{sol}=0$ ,
2. For small HPP:  $PG_{hpp}=PG(inst)*0.65$ , based on historical hydrology condition
3. For wind:  $PG_{wind}=PG(inst)*0.5$ , (based on wind measurement data)
4. For biomass:  $PG_{bio}=PG(inst)*1.0$

Table 17. Development of generating available capacity in Kosovo Power System for referent scenario (capacity available in January, third Wednesday, 21:00 h)

Available generation capacity in Kosovo Referent Scenario (January 21:00 h)										
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
<b>Actual generation</b>										
Kosova A	270	270	270	270	270	270	0	0	0	0
Kosova B	520	520	520	520	520	520	260	300	600	600
HPP ( Ujman+existing small)	48	48	48	48	48	48	48	48	48	48
<b>Total existing capacities</b>	<b>838</b>	<b>838</b>	<b>838</b>	<b>838</b>	<b>838</b>	<b>838</b>	<b>308</b>	<b>348</b>	<b>648</b>	<b>648</b>
<b>New</b>										
TPP Kosova e Re							450	450	450	450
HPP Flexible							200	200	200	200
New RES	16	81	100	110	134	134	147	147	167	180
<b>Total new</b>	<b>16</b>	<b>81</b>	<b>100</b>	<b>110</b>	<b>134</b>	<b>134</b>	<b>797</b>	<b>797</b>	<b>817</b>	<b>830</b>
<b>TOTAL</b>	<b>854</b>	<b>919</b>	<b>938</b>	<b>948</b>	<b>972</b>	<b>972</b>	<b>1105</b>	<b>1145</b>	<b>1465</b>	<b>1478</b>

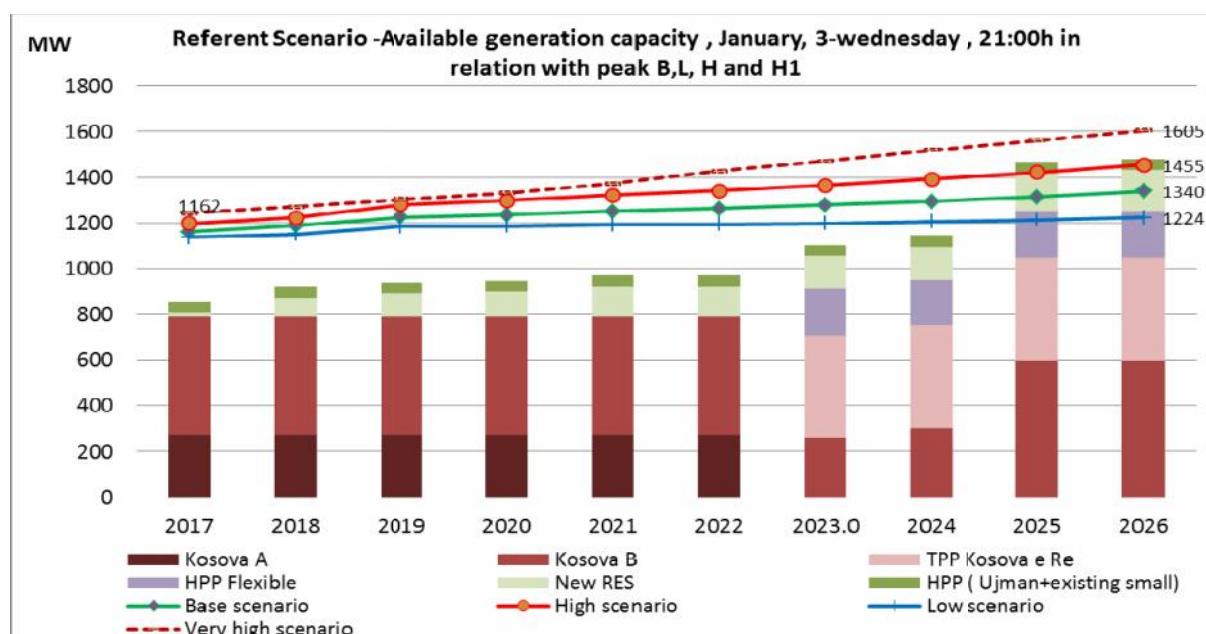


Figure 13. Generation available capacity of Kosovo power system based on generation referent scenario, in relation with system peak demand scenarios

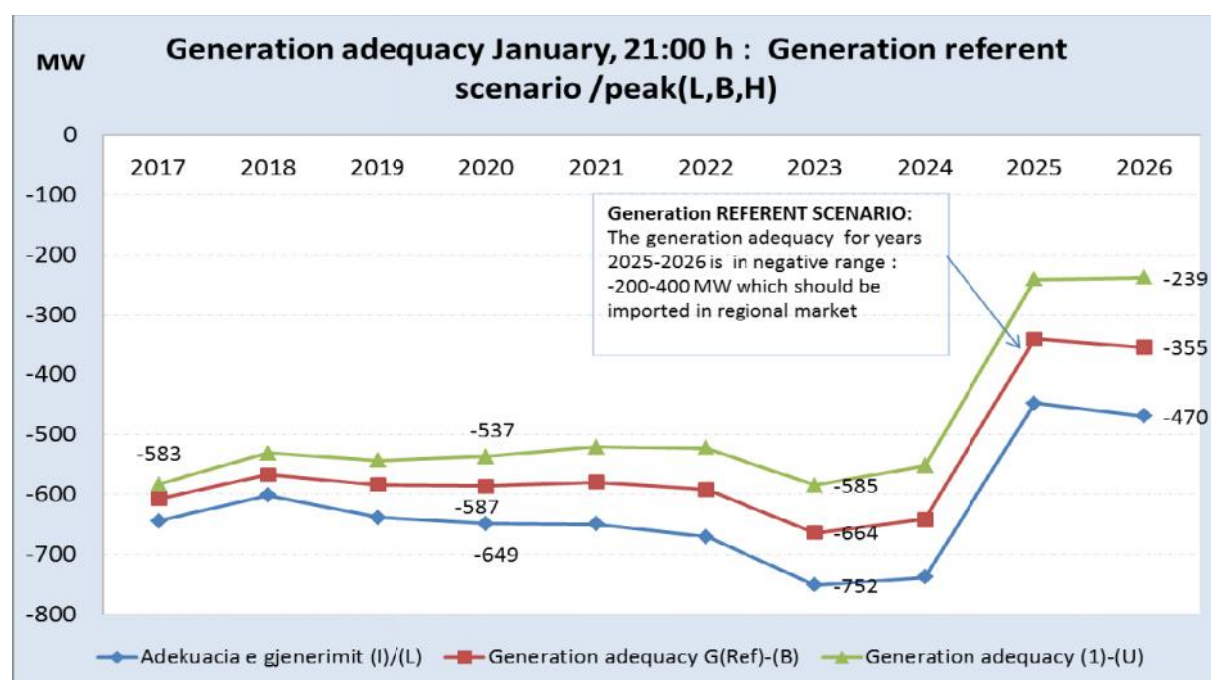


Figure 14. Generation adequacy of Kosovo Power System for Referent Scenario of generation, for the referent point: third Wednesday, January, 21:00 h, in relation with base, low and high peak.

#### Generation Adequacy Results for January, third Wednesday, 21:00 h (in Joint Operation with the Albanian Power System)

For the Albanian Power System, only the base scenario data for generation and peak demand are taken into consideration. The system data are presented below:

Table 18. Development of generating available capacity in Albanian Power System for base scenario (capacity available in January, third Wednesday, 21:00 h)

Generation Capacities in Albania 2017-2026 Scenario I ( January 21:00 h)										
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
<b>Actual generation MW</b>										
HPP (Fierza, V.Dejes, Komani,Ashta)	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
RES (Small HPP, wind,solar)	178	178	178	178	178	178	178	178	178	178
TPP Vlora	97	97	97	97	97	97	97	97	97	97
<b>Total Ekzisting</b>	<b>1325</b>	<b>1325</b>	<b>1325</b>	<b>1325</b>	<b>1325</b>	<b>1325</b>	<b>1325</b>	<b>1325</b>	<b>1325</b>	<b>1325</b>
<b>New</b>										
HPP (Total large HPP)	44	109	185	276	307	325	366	415	482	482
RES (Small HPP, wind,solar)	14	30	52	100	139	149	164	189	209	209
TPP ( totali)	0	0	0	0	0			200	200	200
<b>Total new generation in Albania</b>	<b>58</b>	<b>139</b>	<b>237</b>	<b>377</b>	<b>447</b>	<b>474</b>	<b>530</b>	<b>805</b>	<b>892</b>	<b>892</b>
<b>TOTAL - ALBANIA</b>	<b>1383</b>	<b>1464</b>	<b>1562</b>	<b>1702</b>	<b>1772</b>	<b>1800</b>	<b>1855</b>	<b>2130</b>	<b>2217</b>	<b>2217</b>



Table.19 Join generation capacity of Kosovo and Albanian Power Systems based on referent scenario in Kosovo and base in Albania

Year	Available generation capacity 2017-2026 Albania (base)-Kosovo (Referent) (MW)									
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Existing generation in Albania	1325	1325	1325	1325	1325	1325	1325	1325	1325	1326
New Capacities in Albania	58	139	237	377	447	474	530	805	892	892
Existing generation in Kosovo	838	838	838	838	838	838	308	348	648	648
New Capacities in Kosovo	16	81	100	110	134	134	797	797	817	830
<b>TOTAL Albania+Kosovo</b>	<b>2237</b>	<b>2383</b>	<b>2500</b>	<b>2649</b>	<b>2743</b>	<b>2771</b>	<b>2960</b>	<b>3275</b>	<b>3682</b>	<b>3696</b>

Table 20. Peak demand of joint power systems for the base peak demand scenarios

PEAK MW	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Kosovo Base	1162	1188	1225	1236	1250	1263	1278	1295	1314	1340
Albania Base	1473	1487	1510	1540	1571	1604	1637	1673	1710	1746
<b>TOTAL Peak AL-KS</b>	<b>2635</b>	<b>2675</b>	<b>2735</b>	<b>2776</b>	<b>2821</b>	<b>2867</b>	<b>2915</b>	<b>2968</b>	<b>3024</b>	<b>3086</b>

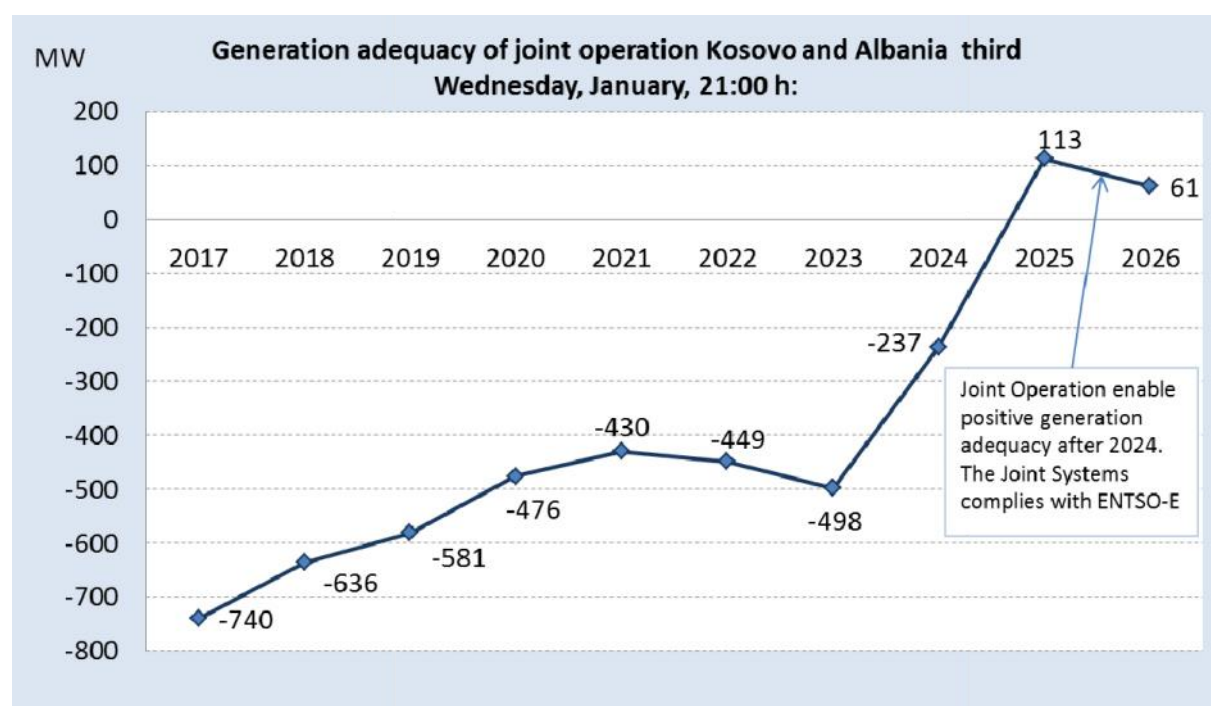


Figure 15. Generation adequacy of Joint Operation of Kosovo and Albanian Power Systems, for Referent Scenario of generation .

Table 21. The impact of Kosovo-Albania LFC blocks implementation in reduction of tertiary reserve for both systems

	Tertiary - Replacement reserve (MW)					
	Big Unit			Block KS+AL	Block KS+AL	Block KS+AL
Power Systems	2017	2021	2023	2017	2021	2026
Kosovo	260	260	450	165	165	338
Albania	150	150	150	95	95	113
<b>Savings for Kosovo</b>				<b>95</b>	<b>95</b>	<b>113</b>
<b>Savings for Albania</b>				<b>55</b>	<b>55</b>	<b>38</b>

## Electricity balance of Kosovo Power System

For Electricity output from different RES, the respective capacity factors are considered:

Ñ Small HPP: CF=0.308

Ñ Solar: CF=0.235

Ñ Wind: CF=0.2 and

Ñ Biomass: CF=0.856

Table 22. Net electricity production from electricity capacities of Kosovo, referent scenario of generation

Energy production from generation 2016-2026 Referent Scenario										
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
<b>Actual generation</b>										
Kosova A	1800	1800	1800	1800	1800	1800	0	0	0	0
Kosova B	3400	3200	3200	3200	3200	3200	2000	1600	3400	3400
HPP existing	200	200	200	200	200	200	200	200	200	200
<b>Total existing</b>	<b>5400</b>	<b>5200</b>	<b>5200</b>	<b>5200</b>	<b>5200</b>	<b>5200</b>	<b>2200</b>	<b>1800</b>	<b>3600</b>	<b>3600</b>
<b>New</b>										
TPP Kosova e Re	0	0	0	0	0	0	3370	3370	3370	3370
Flexible HPP										
New RES	76	349	425	470	565	568	633	639	734	797
<b>Total new</b>	<b>76</b>	<b>349</b>	<b>425</b>	<b>470</b>	<b>565</b>	<b>568</b>	<b>4003</b>	<b>4009</b>	<b>4104</b>	<b>4167</b>
<b>TOTAL GWh</b>	<b>5476</b>	<b>5549</b>	<b>5625</b>	<b>5669</b>	<b>5765</b>	<b>5768</b>	<b>6202</b>	<b>5809</b>	<b>7703</b>	<b>7767</b>

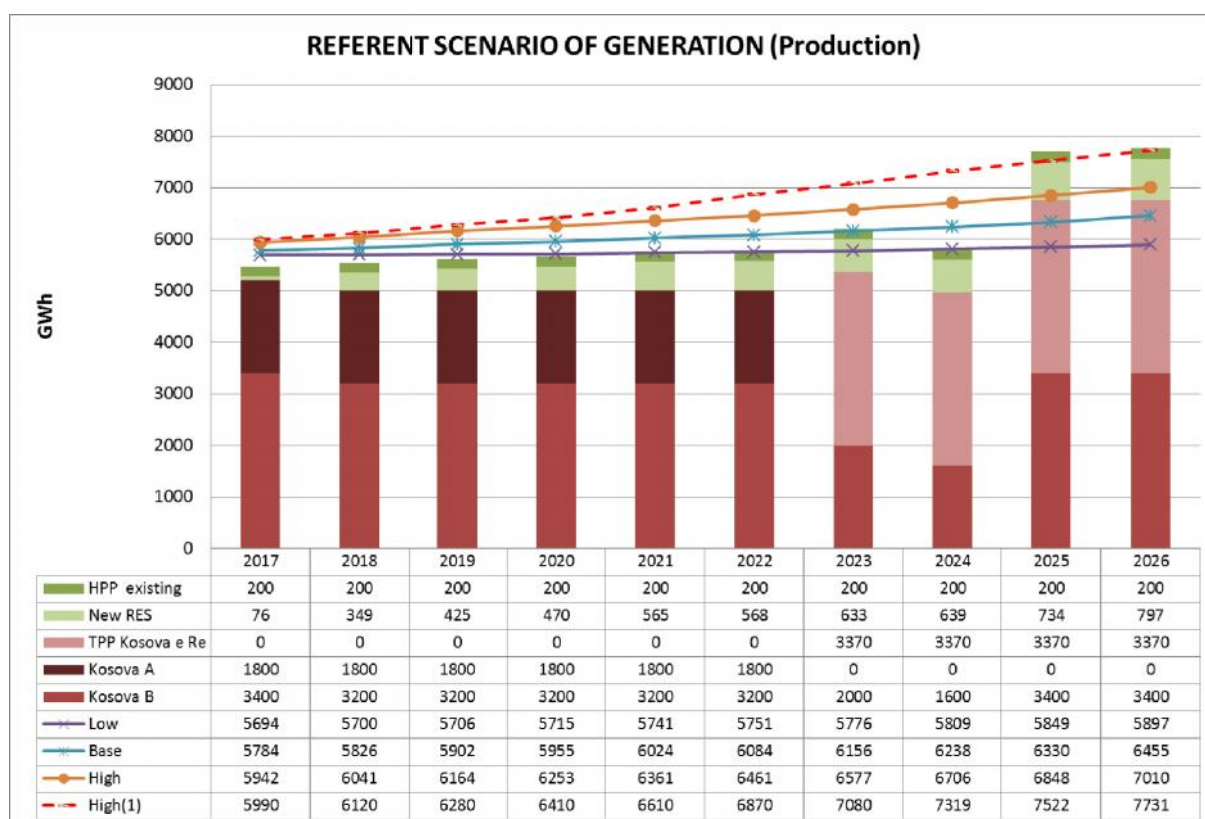


Figure 16. Electricity production (generation mix) of Kosovo Power System based on referent scenario of generation in relation with four demand scenarios

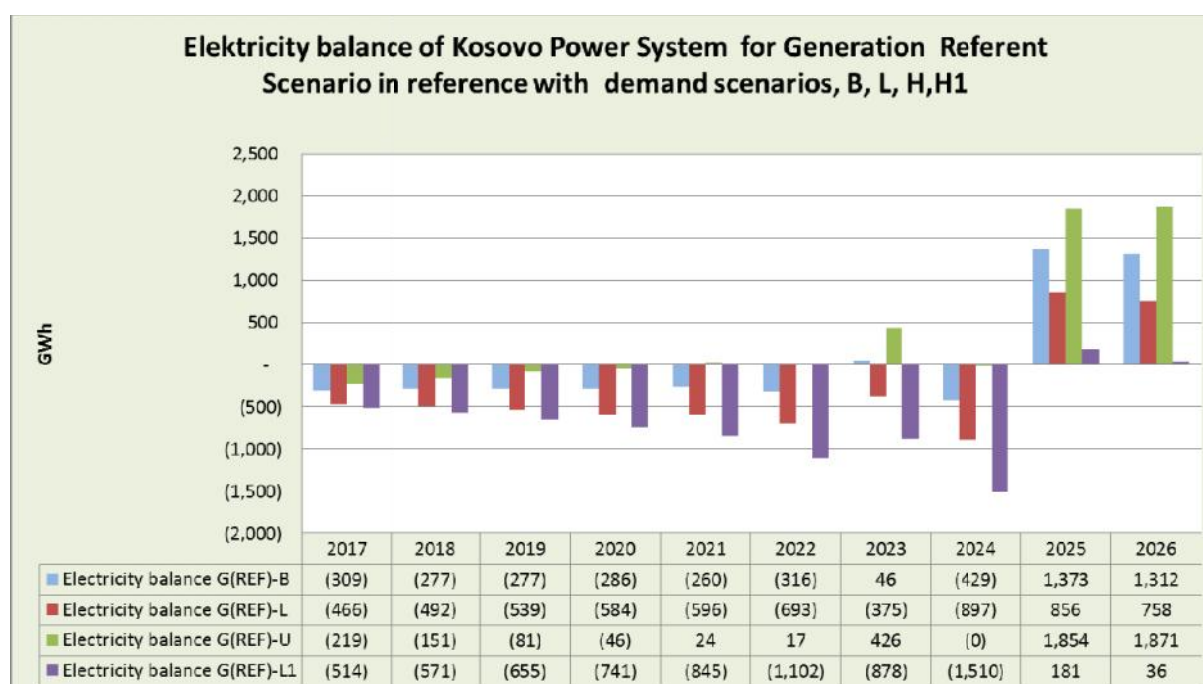


Figure 17. Electricity energy balance of Kosovo Power System based on referent scenario of generation in relation with four demand scenarios

## Electricity balance of Kosovo and Albanian Power System in joint operation

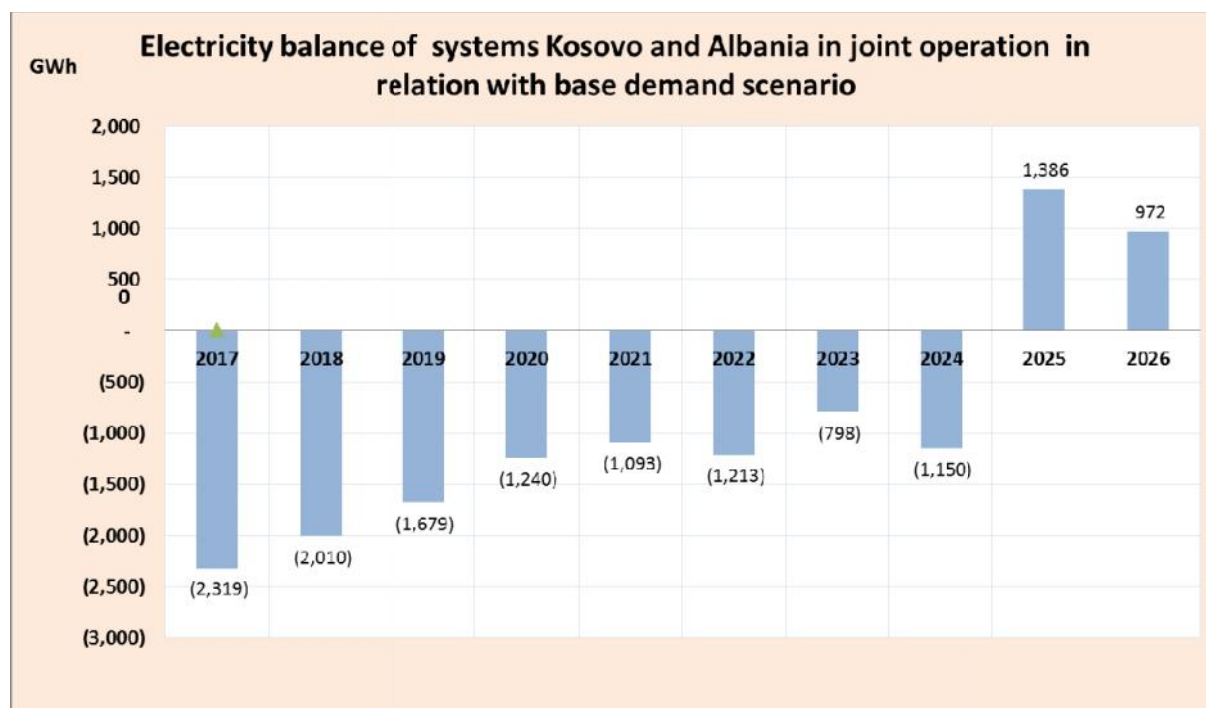


Figure 18. Electricity energy balance of Kosovo and Albanian Power Systems based on referent scenario of generation in relation with base demand scenario

## Level of emissions from TPP based on Referent Scenario of Electricity Generation.

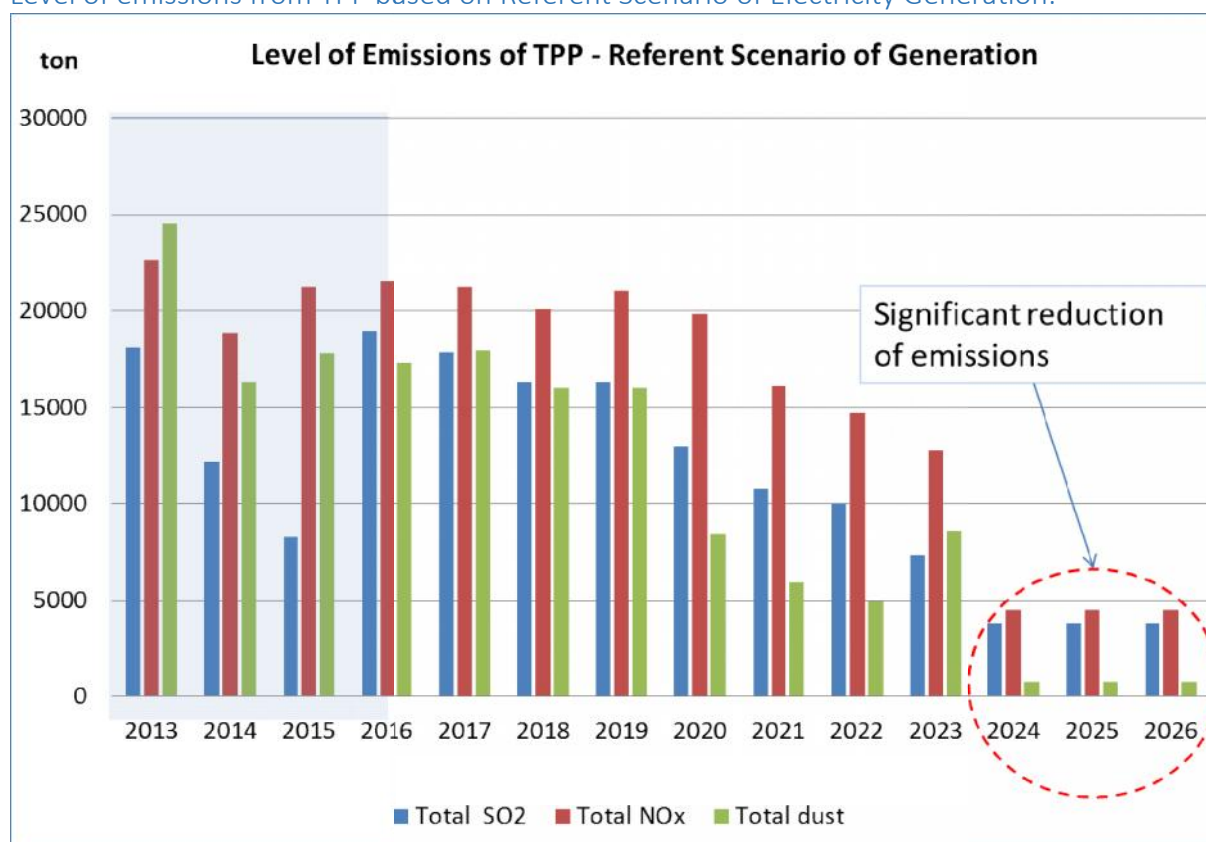


Figure 19. Emissions of NOx, SO2 and dust - referent scenario of generation

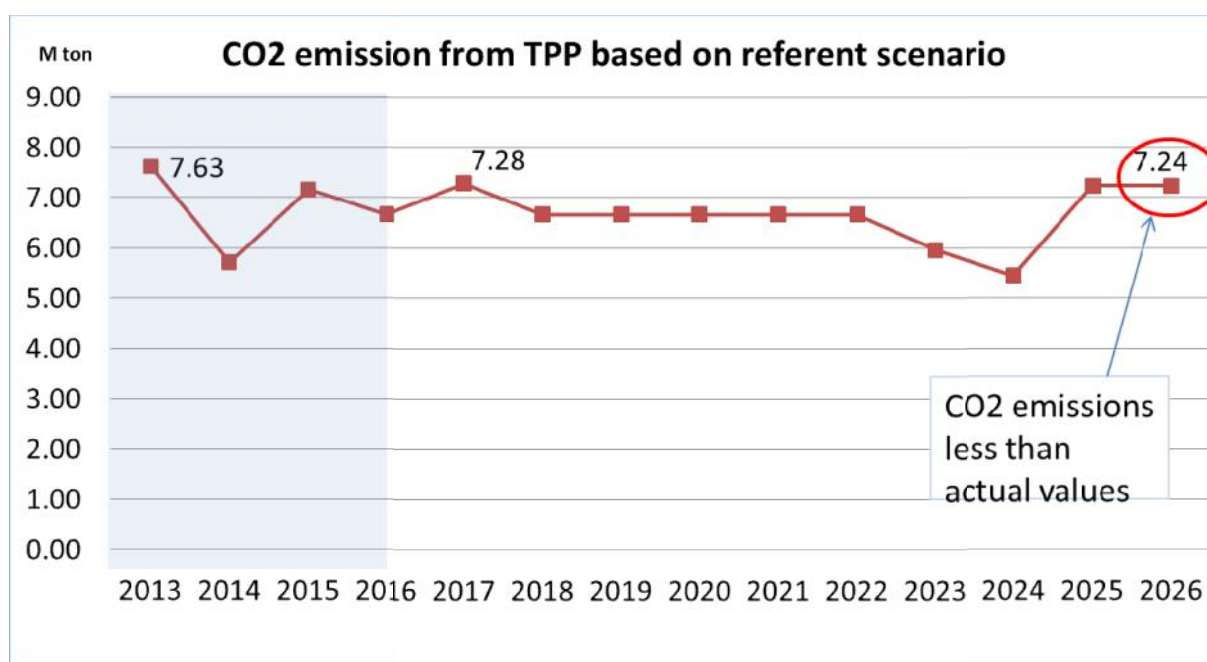


Figure 20. Emissions of CO2 for referent scenario of generation

### Low scenario of electricity generation

The low scenario of generation development for 2017-2026 assumes:

- Ń TPP Kosovo A working until the end of 2022;
- Ń Kosovo B will go in rehabilitation 2021-2022;
- Ń Flexible HPP;
- Ń No TPP Kosova e re;
- Ń RES plants (Table 27- Annex 7).

Generation Adequacy Results for January, third Wednesday, 21:00 h (Kosovo Power System Operates as Control Block/Control Area)

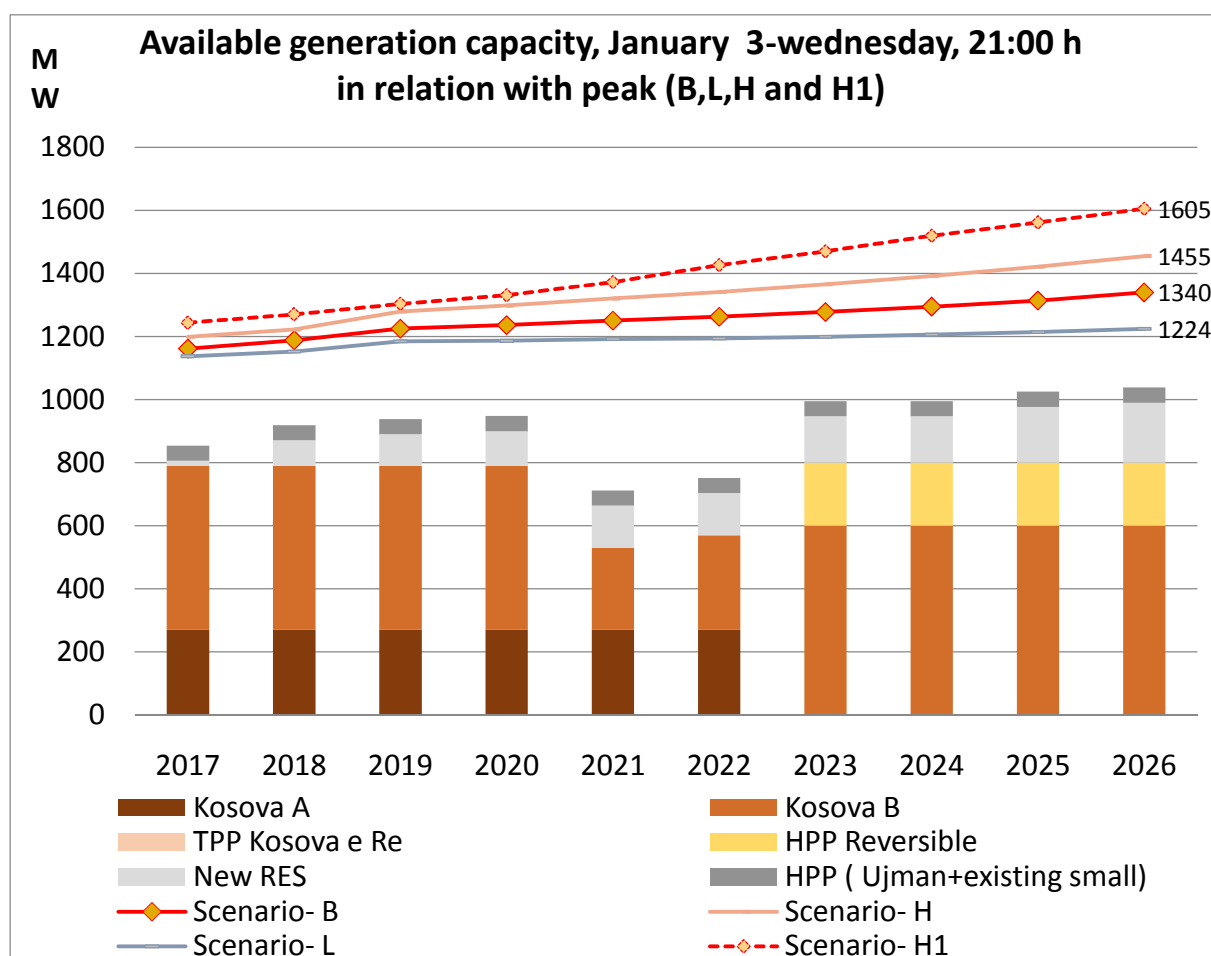


Figure 21. Generation available capacity of Kosovo power system based on generation low scenario, in relation with system peak demand scenarios.

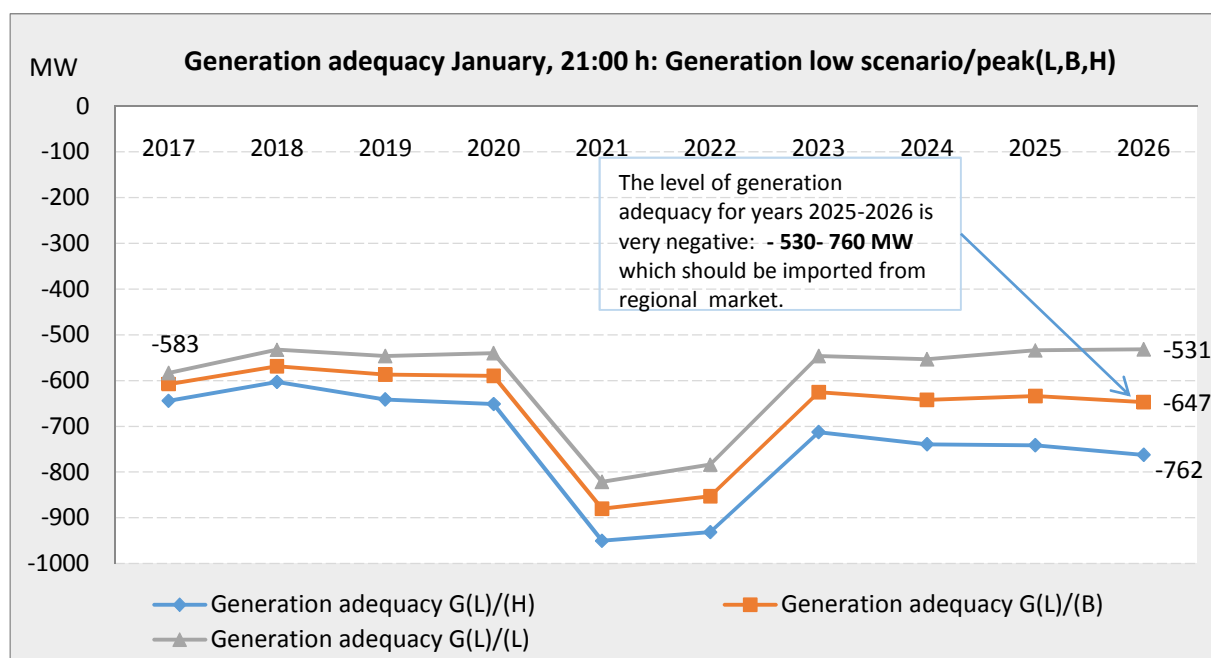


Figure 22. Generation adequacy of Kosovo Power System for Low Scenario of generation, for the referent point: third Wednesday, January, 21:00 h, in relation with base, low and high peak



### Generation Adequacy Results for January, third Wednesday, 21:00 h (in Joint Operation with the Albanian Power System)

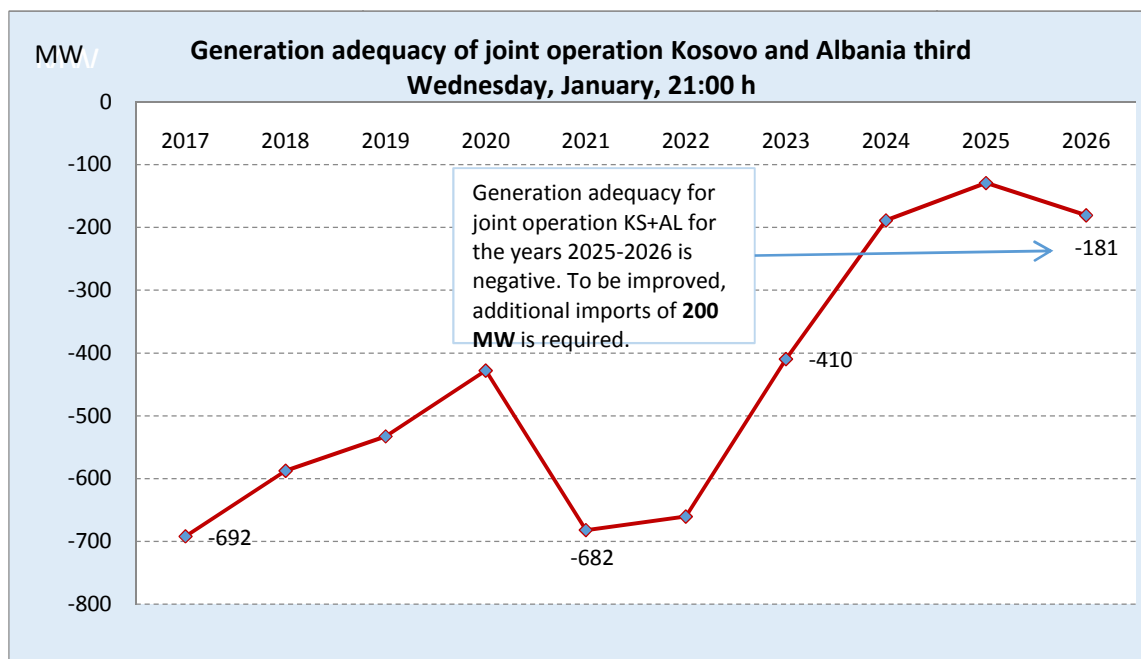


Figure 23. Generation adequacy of the two power system (AL+KS) in joint operation for Low Scenario of generation in Kosovo and base in Albania

### Electricity Balance of Kosovo Power System for low scenario of generation

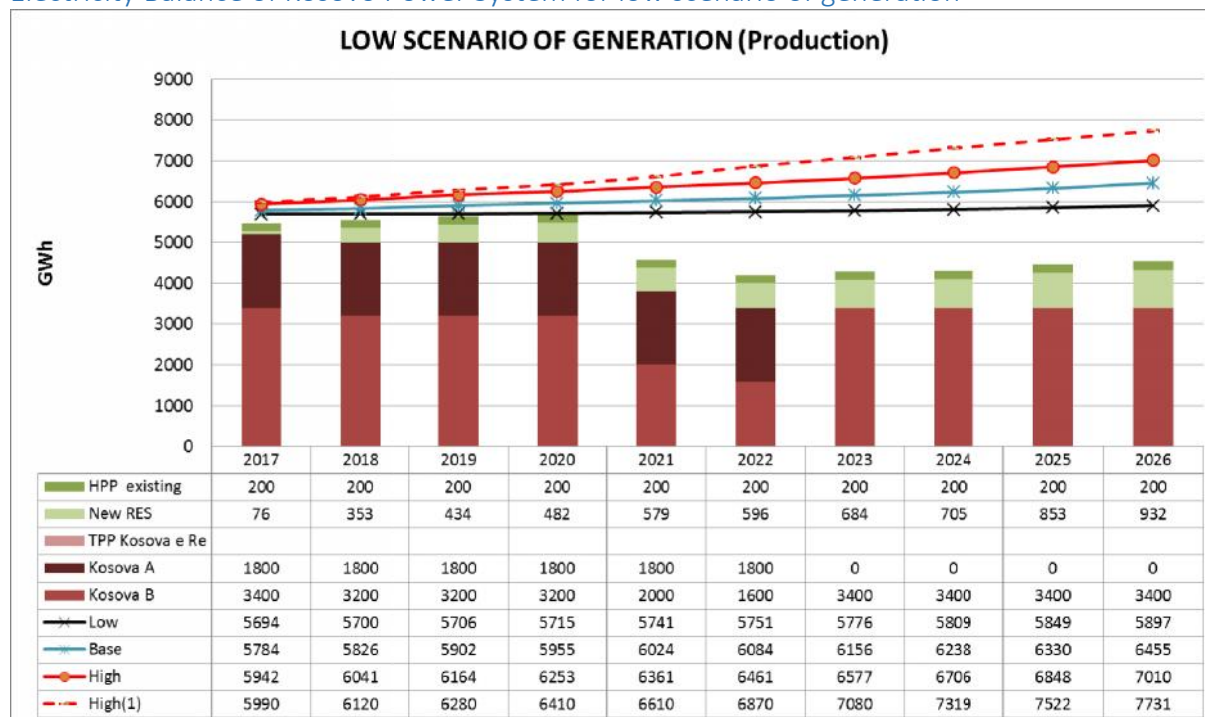


Figure 24. Electricity production (generation mix) of Kosovo Power System based on Low Scenario of generation in relation with four demand scenarios

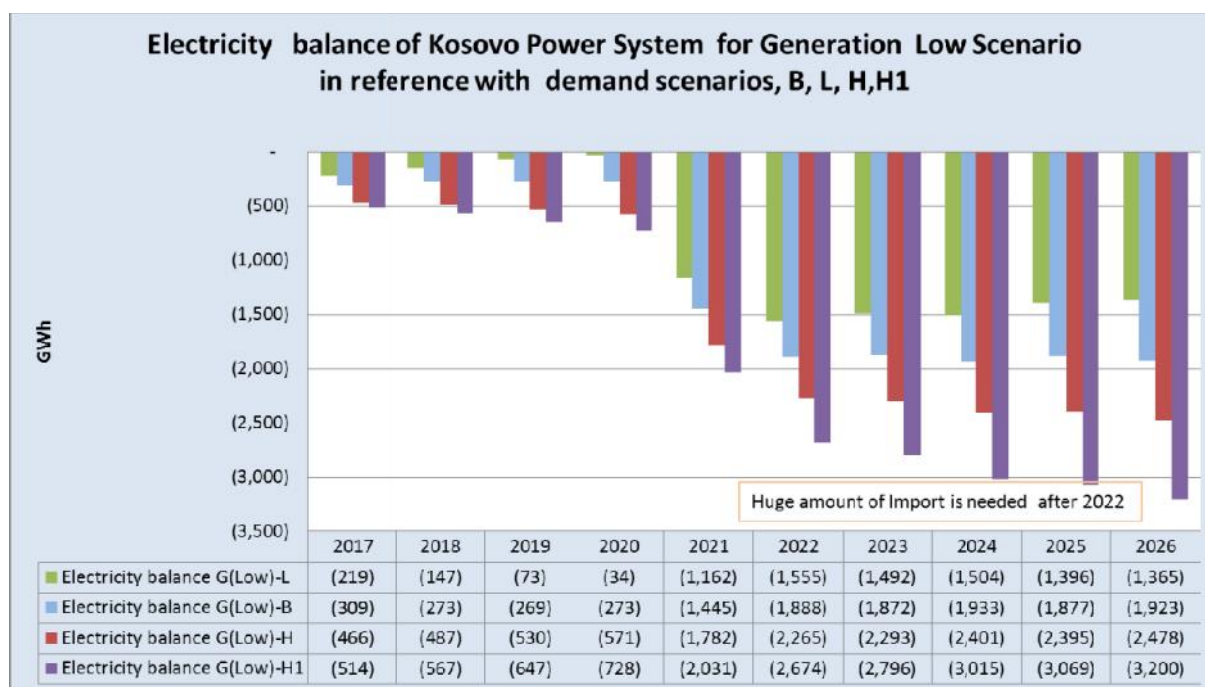


Figure 25. Electricity energy balance of Kosovo Power System based on Low Scenario of generation in relation with four demand scenarios

#### Electricity balance of the Kosovo and Albanian Power Systems in joint operation

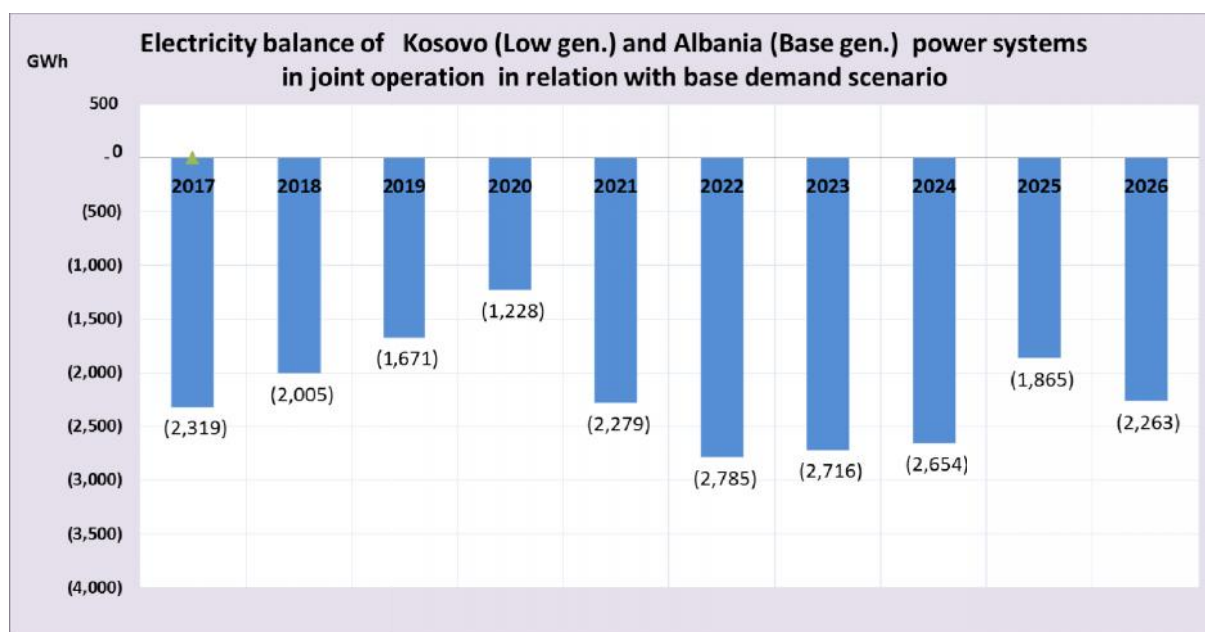


Figure 26. Electricity energy balance of Kosovo and Albanian Power Systems based on Low Scenario of generation in relation with base demand scenario



Level of emissions from TPPs based on the Low Scenario of generation.

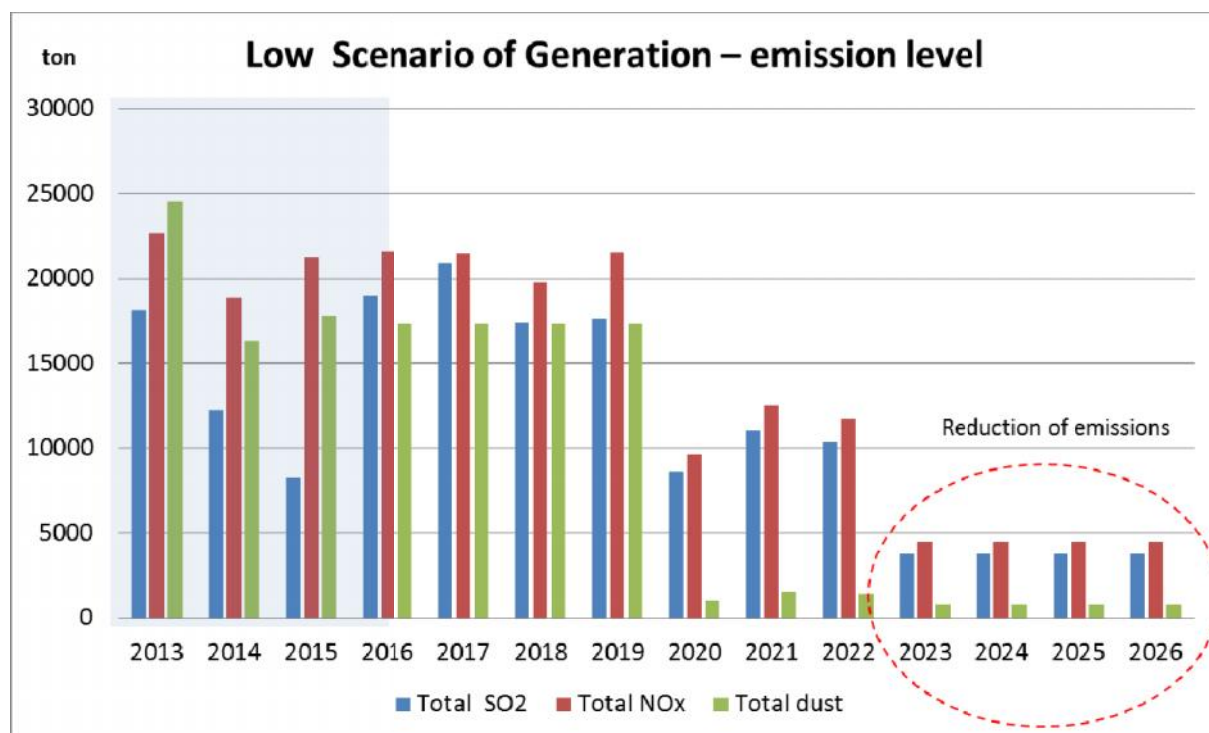


Figure 27. Emissions of NOx, SO2 and dust - Low Scenario of generation

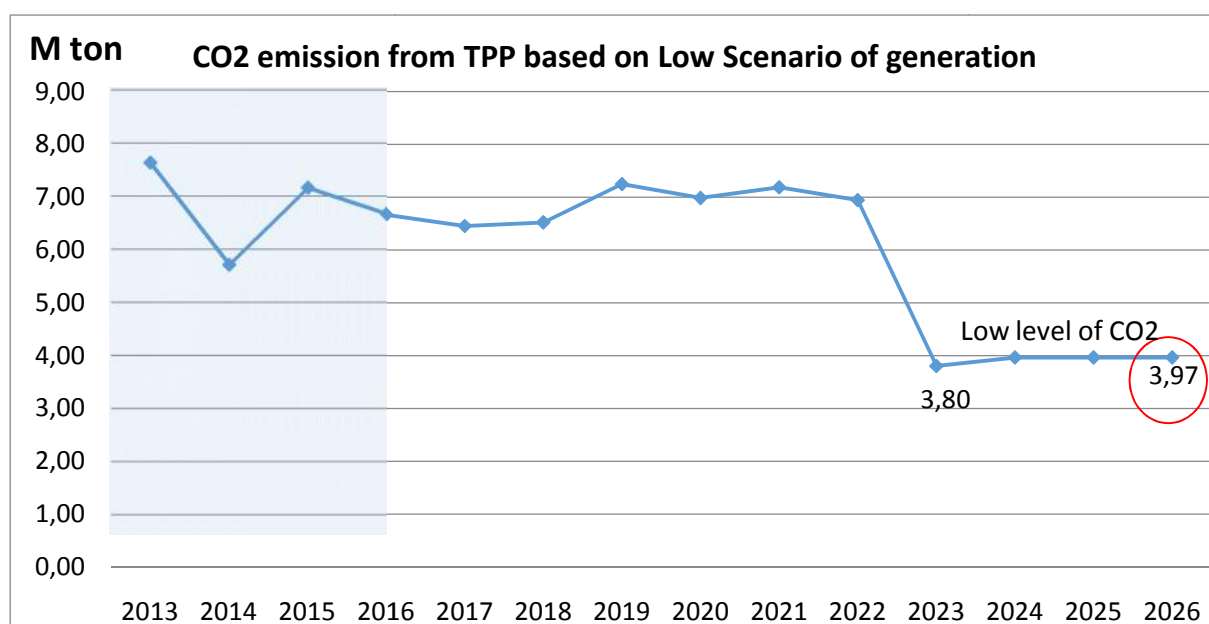


Figure 28. Emissions of CO2 for low scenario of generation

### High scenario of electricity generation (Scenario 3)

The high scenario of generation development for 2017-2026 assumes:

- Ñ TPP Kosovo A working until "Kosova e Re" starts operating (beginning of 2023);
- Ñ Kosovo B will go in rehabilitation after "Kosova e Re" starts operation;
- Ñ Three units of TPP Kosovo A to be completely reconstructed 2024-2025;
- Ñ Flexible HPP for system reserve needs will be constructed; and
- Ñ RES targets (Table 26 - Annex 7);

Generation Adequacy Results for January, third Wednesday, 21:00 h (Kosovo Power System Operates as Control Block/Control Area)

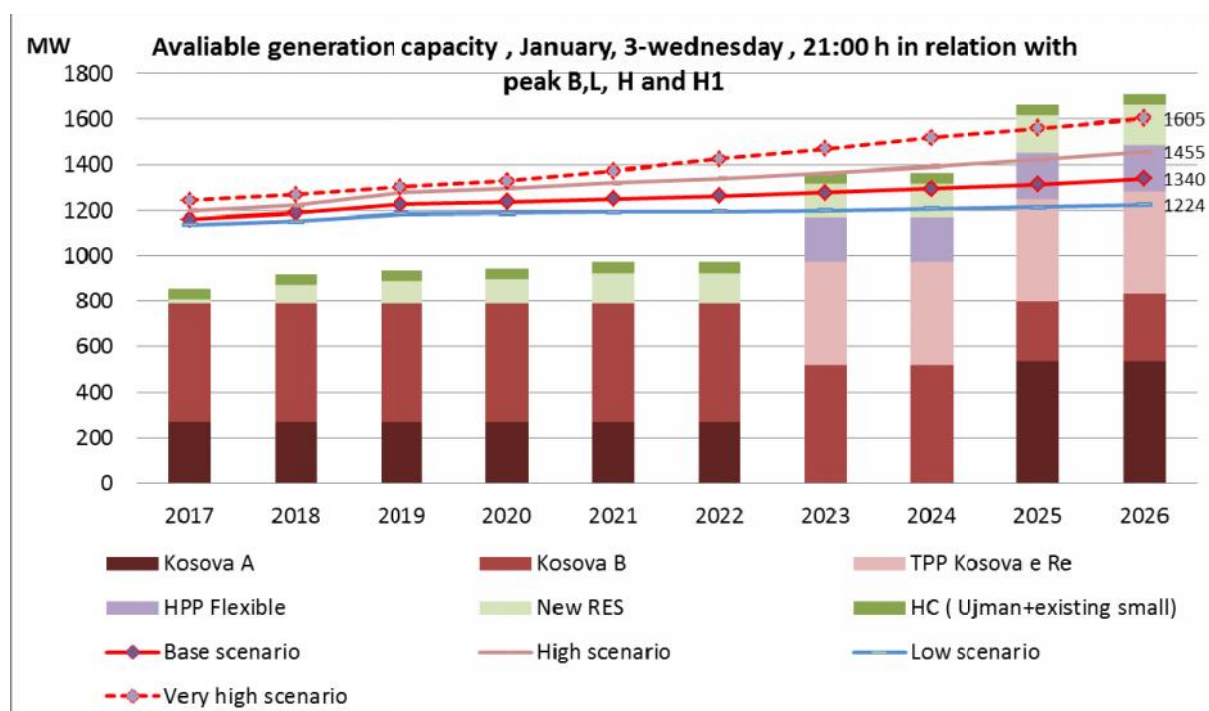


Figure 29. Generation available capacity of Kosovo power system based on high scenario of generation, in relation with system peak demand scenarios.

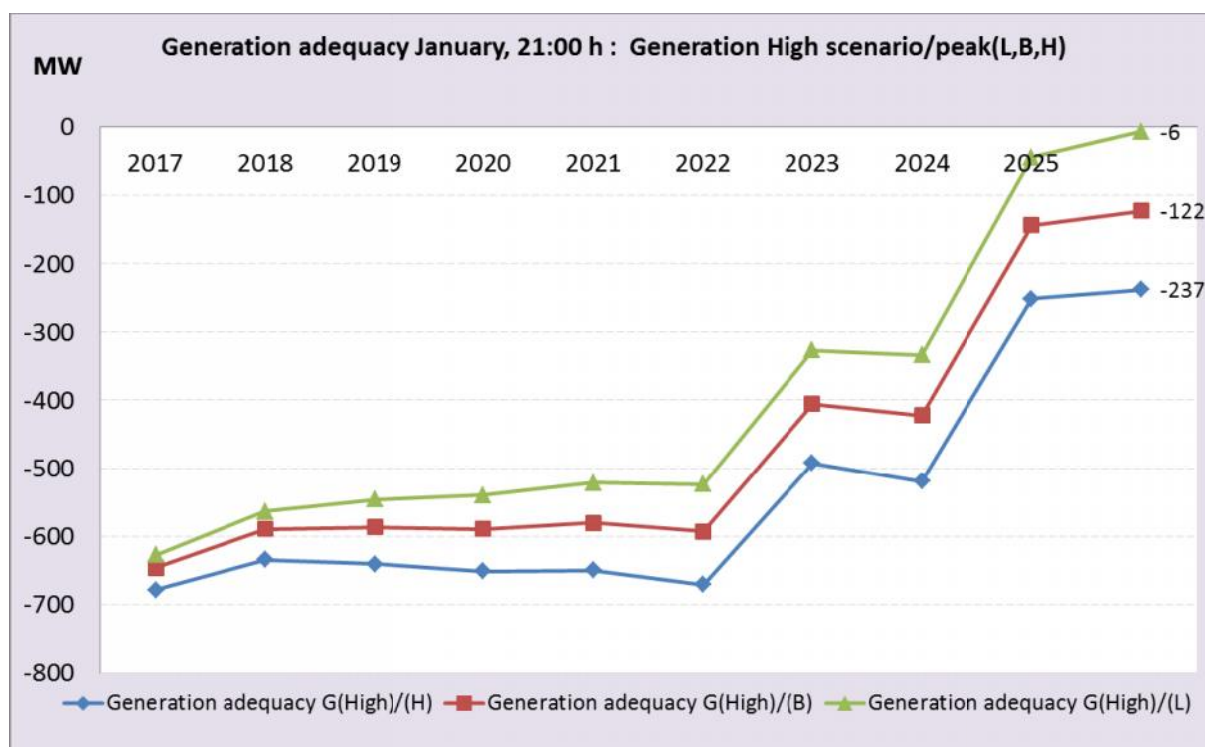


Figure 30. Generation adequacy of Kosovo Power System for High Scenario of generation, for the referent point: third Wednesday, January, 21:00 h, in relation with base, low and high peak

Generation Adequacy Results for January, third Wednesday, 21:00 h (in Joint Operation with the Albanian Power System)

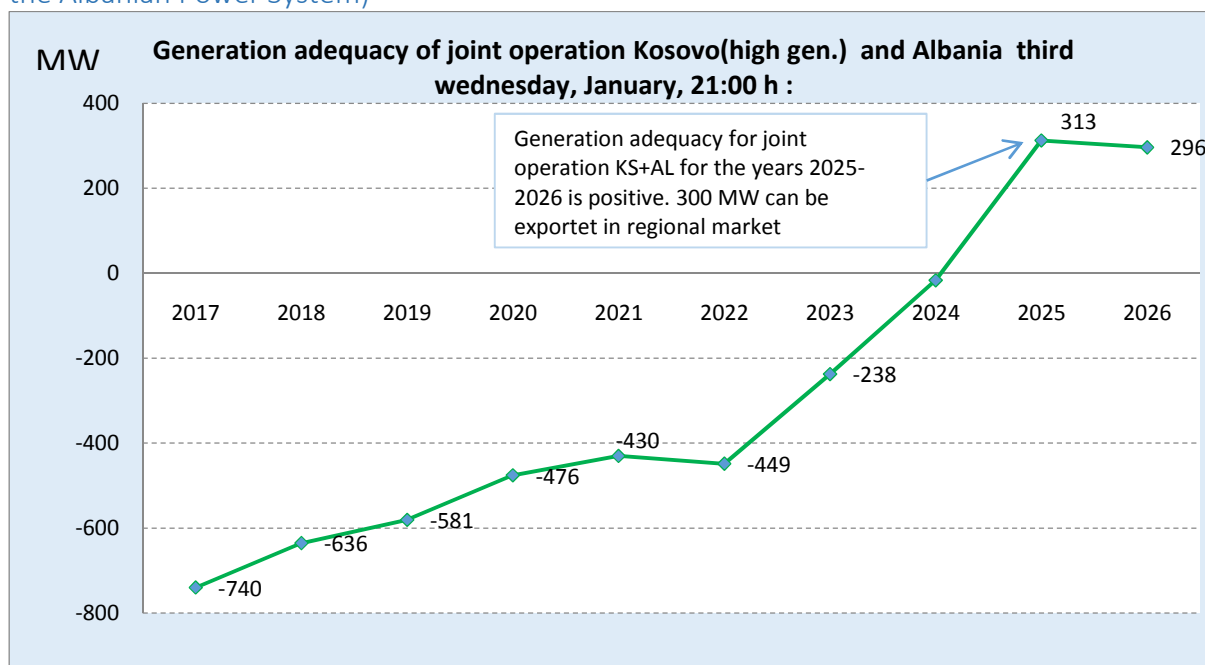


Figure 31. Generation adequacy of the two power system (AL+KS) in joint operation for High Scenario of generation in Kosovo and base in Albania

## Electricity balance of the Kosovo Power System at the low scenario of generation

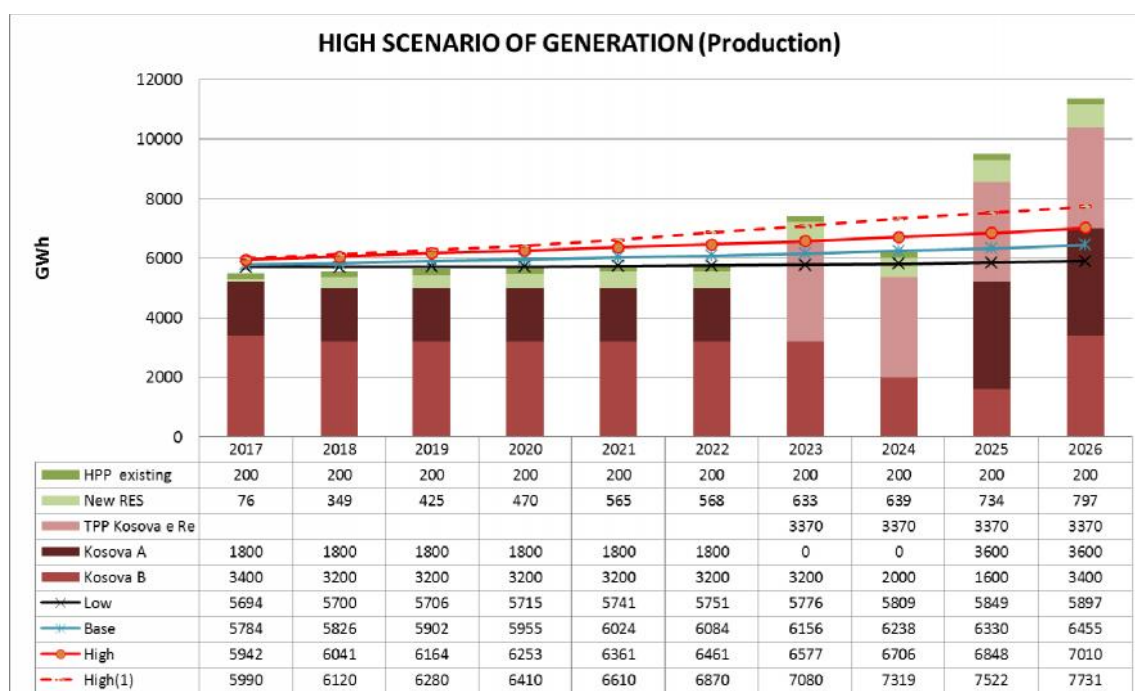


Figure 32. Electricity energy balance of Kosovo Power System based on high scenario of generation in relation with four demand scenarios

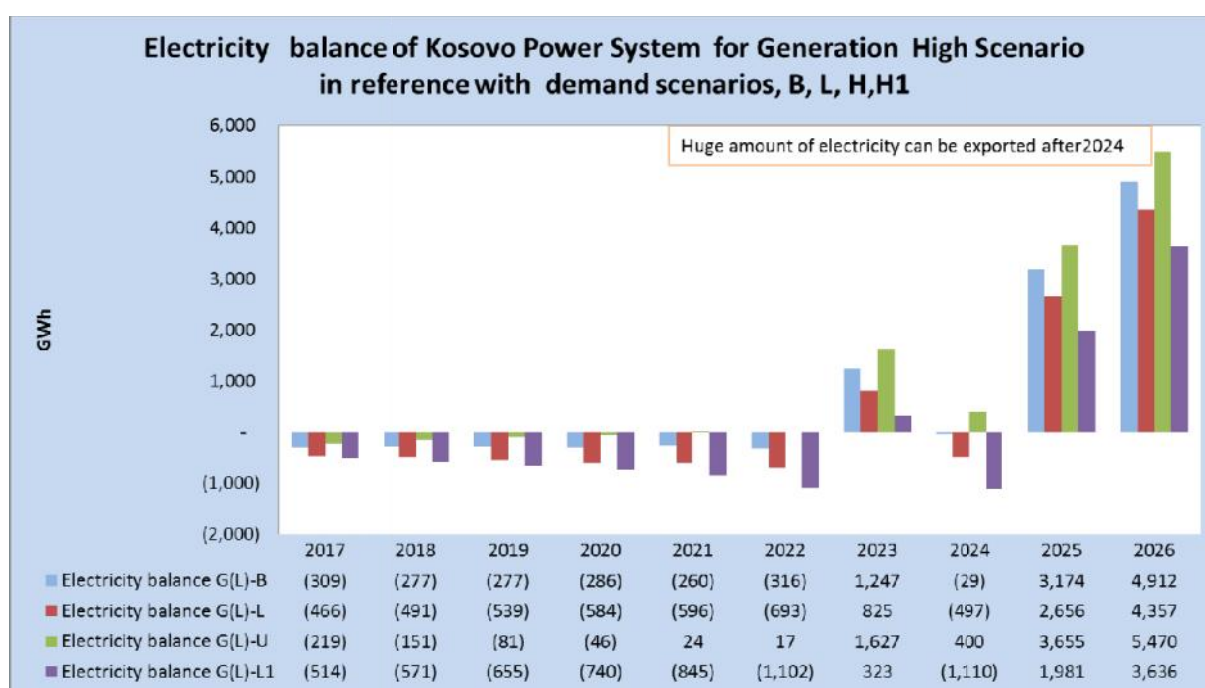


Figure 33. Electricity energy balance of Kosovo Power System based on High Scenario of generation in relation with four demand scenarios

Level of emissions from TPP based on the Low Scenario of generation.

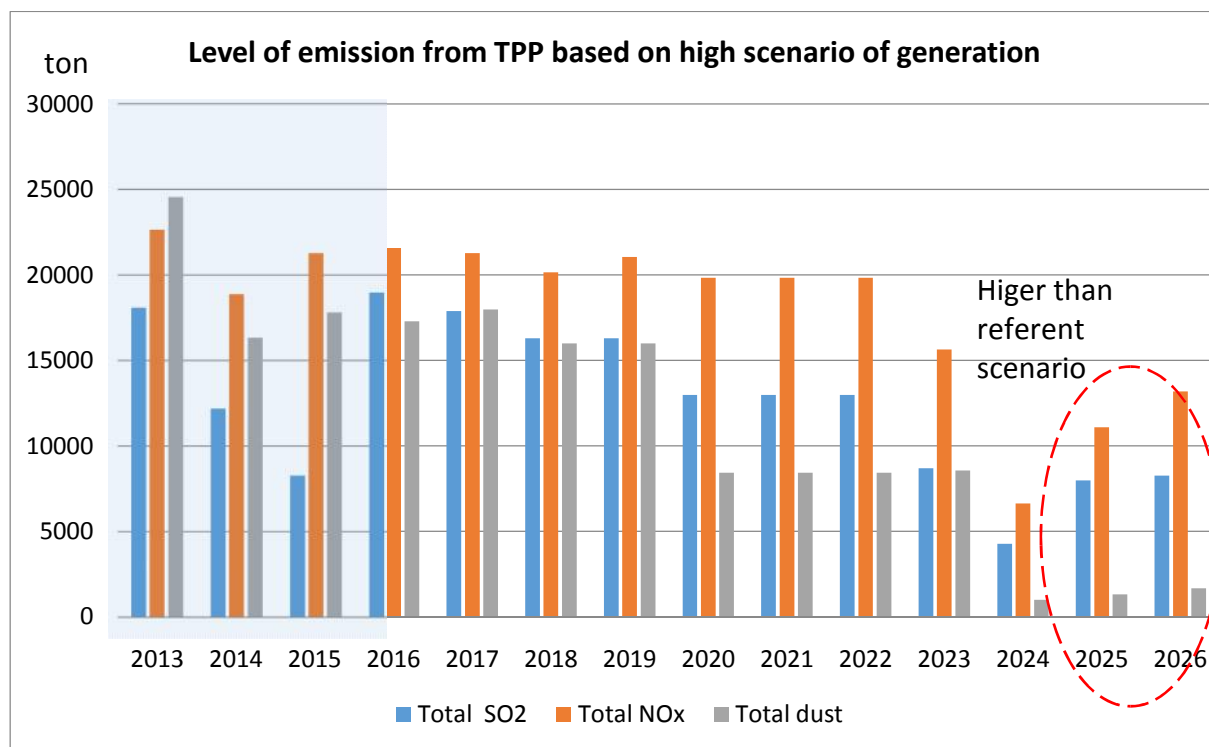


Figure 34. Emissions of NO<sub>x</sub>, SO<sub>2</sub> and dust - High Scenario of generation

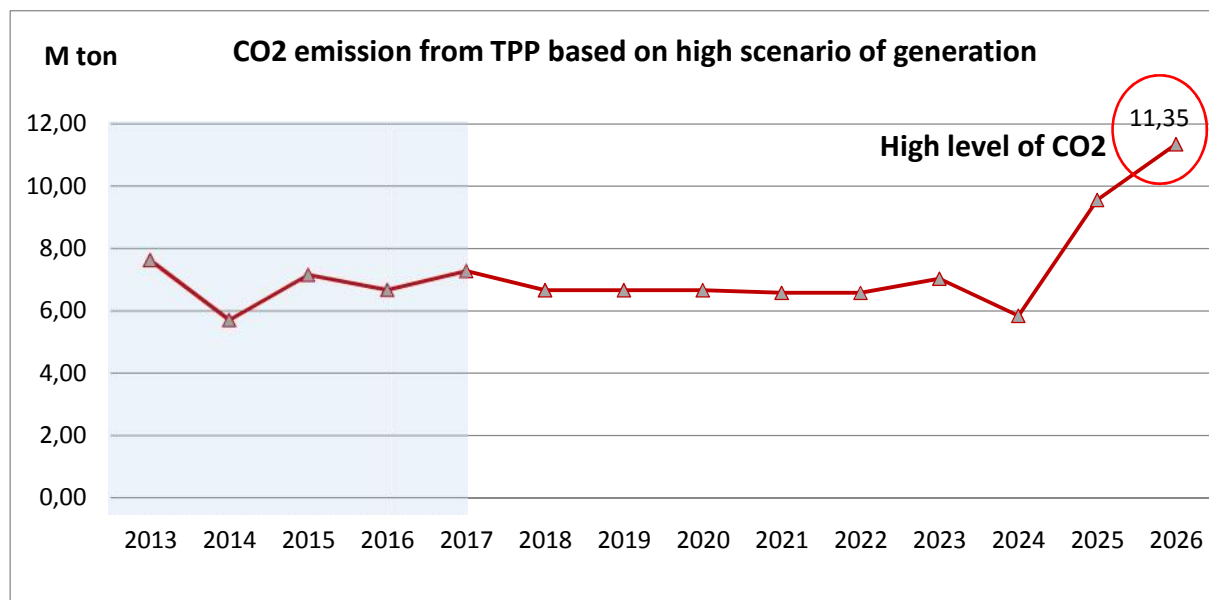


Figure 35. Emissions of CO<sub>2</sub> for high scenario of generation

## SWOT ANALYSIS OF ALTERNATIVES

### Reference Scenario of generation

<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>• High security of uninterrupted and reliable power supply particularly from 2023 onwards;</li> <li>• Security of supply is not affected by unforeseen situations in the electricity market;</li> <li>• Sufficient local capacity of regulatory reserve of the system according to ENTSO-E criteria;</li> <li>• As result of low dependence of import, more affordable prices of electricity;</li> <li>• Financing by IFI in support of the realization of the security of supply;</li> <li>• Support for RES integration in the Power System;</li> <li>• Support for regional market integration; and</li> <li>• Creating the optimal condition for intensive economic development of the country.</li> </ul>	<p><b>Weaknesses:</b></p> <ul style="list-style-type: none"> <li>• Operation in unfavorable environmental conditions as a result of the live extension of TPP Kosovo A until the end of 2022, although the amount of pollution by 2023 will achieve the allowed norms as defined for the entire period 2018-2027; and</li> <li>• Additional short-term investments in old units to maintain the operational capability until the entry into operation of TPP Kosova e Re.</li> </ul>
<p><b>Opportunities:</b></p> <ul style="list-style-type: none"> <li>• Placement of electricity system surpluses at favorable prices taking into account new interconnection lines between the EU and SEE.</li> </ul>	<p><b>Threats:</b></p> <ul style="list-style-type: none"> <li>• Delays in the construction process of Kosova e Re Power Plant.</li> </ul>

### SWOT Analysis of Low Scenario of Generation

<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>• Significant reduction of environmental emissions as a result of the lower use of coal.</li> </ul>	<p><b>Weaknesses:</b></p> <ul style="list-style-type: none"> <li>• Insecure supply of electricity as a result of unforeseen situations in electricity markets;</li> <li>• As a result of high dependence on imports, unaffordable prices of electricity;</li> <li>• High costs of electricity imports in comparison with the cost of domestic generation;</li> <li>• There is a lack of flexible regulatory system capacities which risk the fulfillment of technical requirements of TSO in the future when it becomes a member of ENTSO-E;</li> <li>• Constraints for RES integration in the Power System; and</li> <li>• Constraints for economic development of the country.</li> </ul>
<p><b>Opportunities:</b></p> <ul style="list-style-type: none"> <li>• Increased interest of investors for the development of generation capacities; and</li> <li>• As a result of good precipitations there can be higher quantities of electricity in the regional market and thus more affordable costs of imports.</li> </ul>	<p><b>Threats:</b></p> <ul style="list-style-type: none"> <li>• A repeat of situations with a significant lack of energy in the region as a result of high import prices (see Figure 3, Annex 1);</li> <li>• Energy tariffs with a direct dependency on the cost of imports;</li> <li>• Delays in the process of integrating the energy market regulator; and</li> <li>• New interconnections from SEE to EU states will impact the availability of electrical energy in the region due to expected increase of the price electricity in SEE.</li> </ul>

## SWOT Analysis of High Scenario of Generation

<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>• Security of supply is not affected by unforeseen situations in electricity markets;</li> <li>• Sufficient power system reserves in the system according to ENTSO-E criteria; and</li> <li>• Operation of electricity generation within the criteria defined by the Energy Community.</li> </ul>	<p><b>Weaknesses:</b></p> <ul style="list-style-type: none"> <li>• CO<sub>2</sub> and other emissions are in general much higher than in the other alternatives;</li> <li>• High cost of investment; and</li> <li>• Limited lifetime expectancy of reconstructed capacities and a lack of studies on the economic rationale in investing in some of the generators which have exceeded their operational lifetime.</li> </ul>
<p><b>Opportunities:</b></p> <ul style="list-style-type: none"> <li>• Construction of new interconnection lines between EU and SEE, particularly with Italy, can ignite interest in investments in the reconstruction of power plants which have gone out of operation.</li> </ul>	<p><b>Threats:</b></p> <ul style="list-style-type: none"> <li>• Lack of support to such projects by the European Commission.</li> </ul>

## Summarized matrix of main indicators of generation alternatives

Indicators	REFERENT SCENARIO	LOW SCENARIO	HIGH SCENARIO
Generation adequacy	Positive KS+AL	Very negative	Positive KS+AL
Electricity Balance	Mostly balanced	High imports	High exports
Security of supply	Secured	Not secured	Over secured
Cost of investments/imports	Moderate/low	Low /High	High/zero
Emissions	Moderate	Low	High
RES support	High	Low	High
Marked integration (savings)	Maximal cost savings	Low cost savings	Moderate cost savings





## ANNEX 4 COAL DEMAND IN ELECTRICITY GENERATION SCENARIOS

Table 23. The amount of coal needed to produce electricity production scenarios

Lignite consumption LOW SCENARIO (million ton)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
TE KOSOVA A	3.25	3.12	3.12	3.12	3.12	3.12	0.00	0.00	0.00	0.00
TE KOSOVA B	4.63	4.63	4.63	2.00	4.40	3.79	3.79	3.79	3.79	3.79
TE KOSOVA E RE	0	0	0	0	0	0	0	0	0	0
<b>TOTAL-LIGNITE LOW SCENARIO</b>	<b>7.87</b>	<b>7.75</b>	<b>7.75</b>	<b>5.12</b>	<b>7.52</b>	<b>6.91</b>	<b>3.79</b>	<b>3.79</b>	<b>3.79</b>	<b>3.79</b>

Lignite consumption REFERENT SCENARIO (million ton)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
TE KOSOVA A	3.25	3.09	3.09	3.09	3.09	3.09	0.00	0.00	0.00	0.00
TE KOSOVA B	4.81	4.27	4.27	4.27	4.27	4.27	2.93	2.00	3.79	3.79
TE KOSOVA E RE	0	0	0	0	0	0	3.7449	3.7449	3.7449	3.7449
<b>TOTAL-LIGNITE REFERENT SCENARIO</b>	<b>8.06</b>	<b>7.36</b>	<b>7.36</b>	<b>7.36</b>	<b>7.36</b>	<b>7.36</b>	<b>6.67</b>	<b>5.74</b>	<b>7.54</b>	<b>7.54</b>

Lignite consumption HIGH SCENARIO (million ton)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
TE KOSOVA A	3.25	3.09	3.09	3.09	3.09	3.09	0.00	0.00	4.32	4.32
TE KOSOVA B	4.81	4.27	4.27	4.27	4.27	4.27	4.27	2.40	2.00	3.79
TE KOSOVA E RE	0	0	0	0	0	0	3.7449	3.7449	3.7449	3.7449
<b>TOTAL-LIGNITE HIGH SCENARIO</b>	<b>8.06</b>	<b>7.36</b>	<b>7.36</b>	<b>7.36</b>	<b>7.36</b>	<b>7.36</b>	<b>8.01</b>	<b>6.14</b>	<b>10.06</b>	<b>11.86</b>

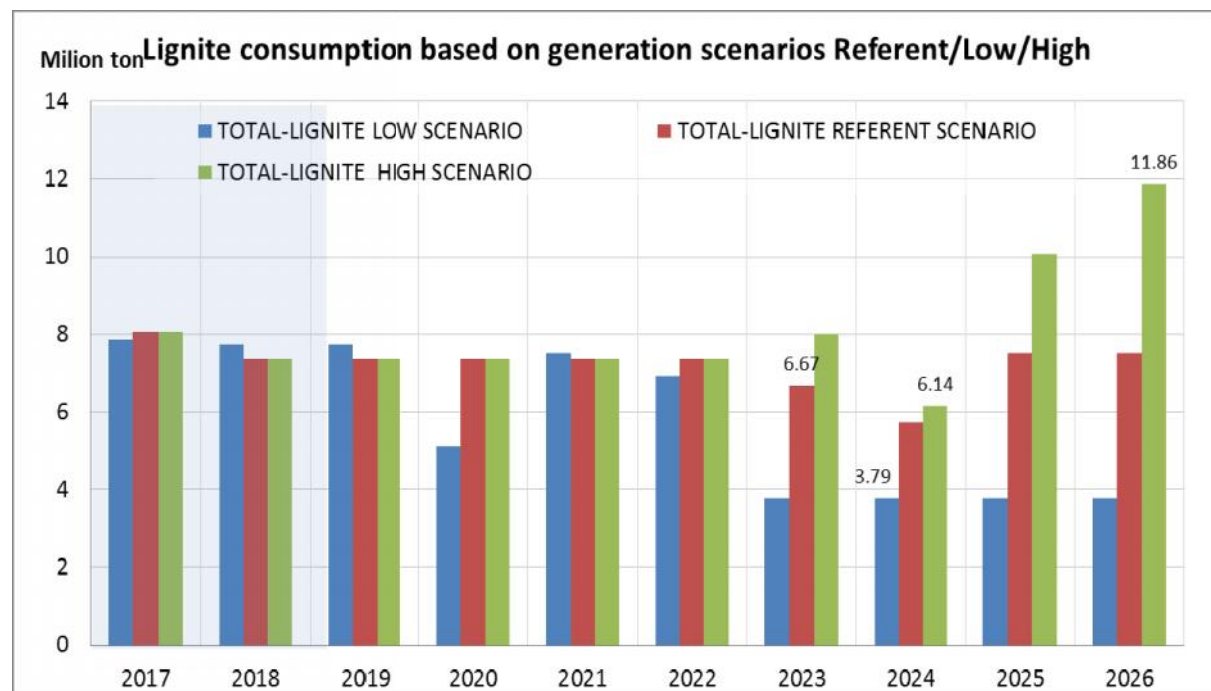


Figure 36. Amount of coal to meet the needs of generators based on two generation scenarios





## ANNEX 5 THERMAL ENERGY SYSTEM DEVELOPMENT SCENARIOS

### DEVELOPMENT PROJECTIONS OF DISTRICT HEATING COMPANY IN PRISTINA CITY “TERMOKOS”

#### Supply of consumers with thermal energy

In November 2014, Termokos started to supply consumers with thermal energy acquired through the cogeneration system. This system allows the use of thermal energy from the turbine steam of Bllocs B1 and B2 of Kosova B. The thermal power available from this system is 2x140MW. However the exchange capacity is 2x70MW in the Heat Extraction Station (HES) and the conducting capacity of the thermo conductor of TPP Kosova B – Termokos, DN600 is around 160 MW, which currently limits the possibility for using this energy with thermal power of up to 140MW.

This project received investments with a value of 37 million EUR, and is financed through donations and soft loans (German Government and KfW, EU, Swedish Government, Luxemburg Government, Kosovo Government, and Pristina Municipality).

The cogeneration project helped Termokos become a company with sustainable technical and financial standards, by gaining the trust of its consumers. Additionally, another important impact of this project is the protection of the environment and reduction of emissions of gases into the atmosphere. Currently, the district heating system of Termokos has connected consumers with installed power of around 110 MW<sub>th</sub>.

#### Development projections of district heating system of TERMOKOS

For the period 2016-2020, the planned investments for Termokos projects from donors and different funds, mainly from the German government through KfW, are assessed to be 21.5 million EUR. These investments aim to increase the performance of the company through enlargement and modernisation of the distribution network, reduction of energy losses, construction of new thermo-sub-stations, and optimisation of the thermal energy distribution system (balancing of system, measurement and billing based on consumption, etc.).

In order to meet the increasing demand of Pristina for thermal energy (scenarios presented above), Termokos plans to expand and modernise its distribution network. In this respect, the main projects for period 2015-2025, financed by donors and its own revenues are:



- Rehabilitation of 300 out of 360 existing substations. Rehabilitation implies replacement of heat exchangers and circulation pumps and the installation of regulatory system and thermal energy measurement system.
- Replacement of distribution network of 10 -20 km pipeline. Critical positions were identified, mainly in the main pipeline and main branching pipelines, where it is considered to have vast losses of water and energy.
- Extension of the heating network in the new neighbourhoods, which will be considered after the hydraulic analysis of the network and energy reserves in certain positions. Such analyses are being conducted by consultants hired by the EU, in cooperation with Termokos and Prishtina Municipality.
- It is planned, based on the scenarios presented above, that the additional surface to be connected to the Termokos network, at the end of this period will be 1,000,000.00 m<sup>2</sup>.
- Supply of Prishtina city, the part that is connected to the district heating network, with sanitary water. This project has a value of 10.5 million EUR and is in the priority list of energy projects which was approved by the government of the Republic of Kosovo.

We are providing two scenarios of network expansion to respectively increase the number of consumers and necessary energy for fulfilling their demand, for the period 2017-2026.

Table 24. Projections of Thermal energy system development by Termokos

	Low Scenario		Medium scenario		High Scenario	
	Connected surface (m <sup>2</sup> )	Energy needed (GWHth)	Connected surface (m <sup>2</sup> )	Energy needed (GWHth)	Connected surface (m <sup>2</sup> )	Energy needed (GWHth)
2017	1221480	254	1221480	254	1221480	254
2018	1395539	290	1445539	301	1465776	361.2
2019	1620539	337	1695539	353	1734647	423.6
2020	1720539	358	1845539	384	2034647	460.8
2021	1805539	376	1970539	410	2214647	492
2022	1880539	391	2075539	432	2364647	518.4
2023	1955539	407	2160539	449	2490647	538.8
2024	2030539	422	2245539	467	2592647	560.4
2025	2105539	438	2330539	485	2694647	582
2026	2180539	454	2415539	502	2796647	602.4



## Reduction of losses and energy saving

The projects that will be implemented in this period, apart from the objectives indicated above, are to reduce energy losses in the network and save it through efficiency measures.

## Reduction of water losses

Water losses in the distribution network in the city are vast and have a direct impact on the quality of service and performance of the enterprise. The Termokos objective is to reduce these losses from the current situation of 18% to 10% at the end of this period. With the reduction of losses and energy saving there will be a possibility for Termokos to use the same capacity for supplying more consumers.

## Measures of efficient use of thermal energy

It is evident that there are a lot of possibilities for improvement in this respect. The planned projects with an impact in this matter are as following:

- Rehabilitation of thermal substations;
- Rehabilitation of substations also implies undertaking all measures for the installation of automatic capacity for the measurement of thermal energy. In this way, there will be hydraulic and energy balancing in the network and as a result the supply of all consumers will have the necessary energy pursuant to the standards.
- The pre-insulated pipelines that will be installed in the rehabilitated network, apart from the insulation of water losses, will have an impact in reducing energy losses as a result of the thermal insulations of tubes according to the standards.

Improvement of the thermo insulation of old public and private buildings is a good opportunity for saving thermal energy. The new consumers, which are planned to be connected to the Termokos network, have acceptable standards of thermo insulations. In this respect, by having in its network consumers who meet the standards of thermal efficiency, Termokos observes the opportunity for increasing the number of consumers by utilising the same generation potentials.

## GJAKOVA CITY DISTRICT HEATING COMPANY

For the period 2016-2020, investments planned for the Gjakova City District Heating Company from donors and different funds the from European Commission, (IPA 2 Program), have been ensured in the amount of 11.5 million EUR for the biomass cogeneration plant. However, distribution, which includes a complete rehabilitation of the network of



thermofication and of 20 substations, will require an additional .5 million EUR which have not currently been ensured. These investments aim to increase the performance of the company and modernisation of the distribution network, reduce energy losses, construct new thermo-substations, and optimize the operation of the thermal energy distribution network operation with positive business, balancing of system, measurement, and billing based on consumption etc.). In the following table, you can see a projection of the expansion of the network in two scenarios.

Table 25. Projections for development of the Gjakova City District Heating Company

	Low Scenario		Medium Scenario		High Scenario	
	Connected surface (m <sup>2</sup> )	Energy needed (GWh th)	Connected surface (m <sup>2</sup> )	Energy needed (GWh th)	Connected surface (m <sup>2</sup> )	Energy needed (GWh th)
2017	85000	19	85000	19	85000	19
2018	89914	19	176933	37	212320	44.4
2019	176933	44	211933	44	254320	52.8
2020	211933	48	232933	48	279520	57.6
2021	232933	51	242933	51	291520	61.2
2022	242933	53	257933	54	309520	64.8
2023	252933	55	272933	57	327520	68.4
2024	262933	57	287933	60	345520	72
2025	272933	59	302933	63	363520	75.6
2026	282933	61	317933	66	381520	79.2

## IMPROVEMENT OF CENTRAL HEATING IN KOSOVO BY APPLYING THE DISTRICT HEATING SYSTEM IN MUNICIPALITIES WITH HEATING POTENTIAL<sup>16</sup>

### Project Aim

The aim of the project is to assess the consumption of heating and construct heating systems based on production and/or the cogeneration concept for district heating systems in municipalities with relevant heating potential.

<sup>16</sup> The Project placed in the list of priority infrastructure projects, approved by the National Investment Council based on the Berlin process platform.

[http://ew.kryeministri-ks.net/tfu/repository/docs/SINGLE\\_PROJECT\\_PIPELINE\\_OF\\_INFRASTRUCTURAL\\_INVESTMENTS.pdf](http://ew.kryeministri-ks.net/tfu/repository/docs/SINGLE_PROJECT_PIPELINE_OF_INFRASTRUCTURAL_INVESTMENTS.pdf)



Through this project, Kosovo will indirectly improve the energy supply and diversify its energy sources for the heating sector, by improving the wellbeing, quality of life, and health of citizens and by diversifying its energy sources.

In special cases, the existing project of central heating will also assess the opportunities for the expansion of heating system network and the improvement of existing heating capacities.

#### Expected results

Result 1: Improvement of energy security of supply

Result 2: Diversification of energy

Result 3: Reduction of consumption and costs of electricity for heating purposes

Result 4: Reduction of CO2 emissions

The estimated cost of the project is 150 million EUR.

There should be a feasibility study beforehand however as modalities of financing have not been determined yet.

## ANNEX 6 NATURAL GAS SYSTEM DEVELOPMENT

Information from application of the Albania-Kosovo Gas-Supply Project (ALKOGAP).

The Albania-Kosovo Gas-Supply Project (ALKOGAP) is about interconnecting the existing and planned gas transmission systems of the Republic of Albania (including the TAP and IAP projects) with the future gas transmission system of the Republic of Kosovo, and the interconnectors of transmission, which are a part of the eastern branch of the Energy Community Gas Ring (ECGR).

This project aims to create new pipelines for supply with natural gas from the Middle East and Caspian Region, through transportation from the Trans-Atlantic Gas Pipeline, in the north-east of the West Balkans zone towards Serbia.

The pathway/possible pipeline of gas supply will be assessed in two scenarios: 1. Lezhe- Prishtinë: This scenario assumes that IAP will move on to implementation stage 2. 2. Fier-Lezhë-Prishtinë: This scenario will be considered if a lack of progress is noticed in the implementation of IAP. Possible links of Pristina in the direction of Nis (Serbia) and Pristina in the Direction of Skopje (FYROM) will be assessed.

### Sustainability

Benefits from this project include:

- Presentation of a more ecologically acceptable source of energy in the region (replacement for wood logs, coal, and oil; supplements for renewable energy; and the potential for increasing cogeneration and coproduction)
- Facilitation of the gasification of a considerable part of the east of Albania and the entire territory of Kosovo
- Increase energy security in Albania and Kosovo, by ensuring a diverse supply of gas in the region, by ensuring access in the capacities of Albania and ensuring important transit capacity and income for Albania and Kosovo.
- Create preconditions for supporting the regional concept South East European Gas Ring.
- Reduction of CO<sub>2</sub> emission in the region and facilitation of economic development.

Competition – Construction of this gas supplier will enable the gasification of Albania and Kosovo, and will ensure a diverse and credible supply with natural gas. It was emphasised that Albania, Kosovo, and Montenegro are the only isolated countries in Europe when it comes to gas supply. This project, around 260 km long, would create preconditions for the further development of a natural gas market in Albania and create and develop markets of natural gas in Kosovo in the projected annual level of 2 bcm (1- 1.3 bcm for Albania and 0.5- 0.7 bcm for Kosovo). It would be possible to increase the capacity (double or triple) in case



ALKOGAP is used to supply Serbia and other countries with gas from the Middle East and the Caspian, by achieving a regional integration of the gas market.

*Cost* - 200 million EUR

*Current status* – The project was approved to be a part of the priority list with interest for the Energy Community from Groups within the ECS. At the end of 2016 it is expected to be approved by the Energy Community Council of Ministers.

300 thousand EUR have been allocated from the WBIF platform for preparation of the feasibility study.

## ANNEX 7 RES DEVELOPMENT PROJECTIONS

Production capacity of electricity from RES, under obligations to ECT are shown in Table 26. Table 27 presents a very high scenario of RES developments.

**Note:** Assessment of the development of RES-generating capacity of wind, sun, and biomass (Table 26) has been assessed by the RES Division/Ministry of Economic Development under obligations to ECT.

Table 26. The projection of the development plants for the production of electricity from RES by targets

RES	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Photovoltaic (MW)	2	6	8	10	11	12.5	15	18	22	26.5
Solid biomass (MW)	2	4	4	5	7	7	9	9	11	11
Energy from wind (MW)	1.5	35	62	70	110	110	120	120	130	130
Existing small HPP (MW)	74	74	74	74	74	74	74	74	74	74
New HPP-s (MW)	20	91	100	107	110	110	120	120	140	160
<b>Total</b>	<b>99.5</b>	<b>210</b>	<b>248</b>	<b>266</b>	<b>312</b>	<b>313.5</b>	<b>338</b>	<b>341</b>	<b>377</b>	<b>401.5</b>

Table 27. The high projection (aggressive) of the development station for producing electricity from RES

RES	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Photovoltaic (MW)	2	8	12	16	18	26	40	50	63	75
Solid biomass (MW)	2	4	4	5	7	7	9	9	11	11
Energy from wind (MW)	1.5	35	62.15	70	110	110	120	120	150	150
Existing small HPP (MW)	74	74	74	74	74	74	74	74	74	74
New HPP-s (MW)	20	91	100	107	110	110	120	120	140	160
<b>Total</b>	<b>99.5</b>	<b>212</b>	<b>252.2</b>	<b>272</b>	<b>319</b>	<b>327</b>	<b>363</b>	<b>373</b>	<b>438</b>	<b>470</b>





## ANNEX 8. SUPPORTING STUDIES TO BE DEVELOPED

Considering the following:

1. Time span of the Strategy (10 years), which is very short compared to the lifecycle of the energy projects and the long-run nature of the energy sector;
2. Very high cost of energy sector project;
3. The time needed for energy sector development projects;
4. Recent energy and climate policy developments in the EU and the Energy Community in defining new 2050 targets;
5. Additional activities need for the preparation of new long-term plans for RES and energy efficiency;
6. Lack of in-depth comprehensive studies much longer than the timeline of this Strategy.

Below listed and described additional studies and assessments will be developed with an objective to provide longer term projections of energy sector development.

### 1. BASELINE STUDY

As the starting point, a comprehensive analysis of the existing situation of the Kosovo energy sector will be additionally elaborated. This is called the “baseline study” and it would serve as a base for each of the specific studies that follow. The proposed timeline for all projections made under this work is 2050, in line with EU energy and climate policy horizons.

### 2. ENERGY DEMAND STUDY

As an essential component for energy planning, an energy demand projection will be made. It will result in several energy demand scenarios in line with the Strategy, wherein one of them is marked as a baseline/reference scenario. The most appropriate approach to energy demand forecasting in transitional countries is in applying the end-use model. Each scenario in the model is viewed as a consistent description of a possible long-term development pattern of a country, characterized mainly in terms of the long-term direction of governmental socio-economic policy. Therefore, the planner can make assumptions about the possible evolution of the social, economic, and technological development pattern of a country that can be anticipated over the long term from current trends and governmental objectives. Each scenario will include key assumptions such as the dynamics of the



distribution loss reduction, penetration of other energy sources replacing the usage of electricity for heating purposes, district heating network development, and so on. Following this approach, energy demand modelling will not be conducted only on the country level, but also on the district level (Kosovo is administratively subdivided into seven districts which are further subdivided into 38 municipalities). This work will result in the projection of useful and final energy demand scenarios.

### 3. ELECTRICITY AND GAS MARKET STUDY

The energy demand study will be followed by the study of the regional electricity and gas market, which would also encompass the energy supply model. For this purpose, the internationally recognized demand and supply model will be applied. There will be an option to model the whole energy sector on particular electricity. The modelling will be based on several criteria such as least cost or emission criteria.

### 4. ENERGY TRANSMISSION AND DISTRIBUTION DEVELOPMENT ASSESSMENT

A separate assessment covering electricity transmission and distribution in Kosovo is foreseen. It will be based on the existing transmission and distribution network development plans, but prolonged to the long term timeline to 2035. This assessment will be also complemented with a special elaboration considering technical and commercial losses that are currently playing a significant role in the Kosovo electricity system. Commercial losses of electricity are representing a distinctive specificity in Kosovo and they should be considered with special attention. Namely, in 2014 commercial losses approximately represented 22% of the total electricity consumption in households. Therefore, it will be considered which measures would most appropriately contribute to commercial loss reduction and which share of the current electricity consumption occurring as commercial losses would consequently be transferred into measured consumption.

### 5. SUB-SECTOR ASSESSMENTS ON:

- Ñ Coal sector development
- Ñ District heating development
- Ñ Natural gas sector development
- Ñ Oil sector development
- Ñ Renewable energy sources development and
- Ñ Energy efficiency development



This work will be followed by six assessments each including an elaboration on the institutional framework, legislative framework, open market organization, and implementation of renewable energy sources and energy efficiency. The assessments will cover these specific topics: coal, district heating, gas, oil products, renewable energy sources, and energy efficiency. The assessment on coal will identify risks associated with mining development and will comprehensively consider issues regarding the resettlement process for affected villages (elaboration of resettlement policy framework and resettlement action plans). The assessment on renewable energy sources will include an analysis of the biomass/fuelwood potential (according to the preliminary analysis the firewood reserves in Kosovo are very limited and greater harvesting is not sustainable while the import sources are not competitive in the market). The assessment will also deal with the key obstacles that are preventing RES projects from being implemented.

## 6. ENERGY SECTOR INVESTMENT ASSESMENT

The investment assessment will consider the allocation of investments in particular energy activities and define their dynamics and amounts. This will serve as a base for financing options and as a guideline for prices and tariffs.

## 7. ENERGY SECTOR AFFORDABILITY STUDY

The study on affordability will provide an analysis of market prices and social impact. It will identify which household would not be able to pay real market prices of energy, how many of them there are, and finally, which instruments/models could be implemented in order to overcome these challenges in a sustainable manner.

## 8. IMPACT OF GREENHOUSE EMISSIONS ON KOSOVO ENERGY SECTOR DEVELOPMENT

The study on emissions will consider Kosovo's compliance with European Union Acquis, as it has taken over these responsibilities through its membership to the Energy Community Treaty. Even if not yet a party to the UNFCCC convention, Kosovo supports and contributes to the global aspiration to stabilize the greenhouse gas concentrations in line with the 2°C temperature increase scenario. The study will take into account that Kosovo is preparing for the implementation of Large Combustion Plants (Directive 2001/80/EC) and the Industrial Emissions Directives (2010/75/EU), which require the fulfilment of defined emission limit values for thermal power plants and other large combustion plants by 31. December 2017. The study will propose the preparation of the air protection plan with identified mitigation measures to protect human health. Within the study, at least two greenhouse gas emission scenarios will be prepared (with and without emission reduction measures). The scenarios will be in line with the Climate Change Framework Strategy. The above listed studies



and assessments will serve as a set of supporting documents complementing the Energy Strategy of the Republic of Kosovo 2016 – 2025 and will also provide a solid and comprehensive basis for future energy sector development documents, such as Strategy related documents, Action plans, as well as new releases of the Energy Strategy which is by law prescribed to be updated every three years.

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