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ZYRA E RREGULLATORIT PËR ENERGJI
REGULATORNI URED ZA ENERGIJU
ENERGY REGULATORY OFFICE

Statement of Security of Supply for Kosovo 2021-2022

(Electricity, Natural Gas, and Oil)

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Abbreviations

APEX	Albanian Power Exchange
BDS	Basic demand scenario for electricity
EU	European Union
GDP	Gross Domestic Product
RES	Renewable Energy Sources
CEFTA	Central European Free Trade Agreement
EC	Energy Community
EMS	Serbian Electricity Transmission System Operator
LPG	Liquefied petroleum gas
HPP	Hydropower Plant
ITC	Inter TSO Compensation
KEDS	Kosovo Energy Distribution Company
SEEEC	South East Europe Energy Community
KEK	Kosovo Energy Corporation
KESCO	Kosovo Energy Supply Company
KCC	Kosovo Competition Commission
KOSTT	Kosovo Transmission and Market System Operator
ICMM	The Independent Commission for Mines and Minerals
LFC	Load Frequency Control
PPA	Power Purchase Agreement
MTI	Ministry of Trade and Industry
MED	Ministry of Economic Development
NKEC	New Kosovo Electricity Company
DSO	Distribution System Operator
TSO	Transmission System Operator
EEC	Electro-energetic Consent
ECS	Energy Community Secretariat
SoSSoK	Security of Supply Statement of Kosovo
TPP	Thermal Power Plant
ERO	Energy Regulatory Office

1. LEGAL FRAMEWORK

In July 2016 Kosovo's Parliament adopted new laws on the energy sector, in accordance with the third package of the European Union energy legislation. The adoption of these laws aims at the creation and efficient and competitive operation of the energy market. The following energy laws were adopted:

- Law no. 05/L-081 on Energy,
- Law no. 05/L-085 on Electricity,
- Law no. 05/L-084 on the Energy Regulator,
- Law no. 05/L-082 on Natural Gas.

Security of Supply Statement of Kosovo (SoSSoK) is based on the energy sector laws. The Law on the Energy Regulator obliges ERO to prepare and publish a report on the monitoring of security of supply every two years and to send it to the ECS. The statement contains the structure proposed by ECS for the scope of the electricity, natural gas and oil sectors, and is in accordance with the relevant and respective directives on Electricity 2009/72 EC, Natural Gas 2009/73 EC and Oil 2009/28 EC.

The statement for monitoring the security of supply is drawn up based on Article 29 of the Energy Community Treaty, which requires it to be prepared one year after the entry into force of the Treaty. This statement should contain the following areas: diversity of supply, technological security, and geographic origin of imported fuels. In addition, the statement on monitoring the security of supply in the electricity and natural gas markets will deal specifically with:

a) Balance between supply/demand in the national market,

b) The level of expected future demand and the corresponding available supply,

c) Planned capacities for construction in the future,

d) The level and quality of network maintenance,

e) Measures to cover the peak demand, and

f) Measures for handling the failure of one or more suppliers.

Based on the aforementioned directives, *"Member States must ensure the monitoring of the security of supply-related issues. In cases where the Member States consider it appropriate, they may delegate this task to regulatory authorities."*

According to Article 42 of the Law on the Energy Regulator, ERO is responsible for monitoring and undertaking all actions specified in this law for the promotion and enhancement of security of supply on a short-term and long-term basis. Every two years ERO prepares and publishes a report where it describes the findings from the monitoring of security of supply related issues, and details of the measures undertaken or expected to be undertaken to address them. The document summarizes data for the previous years, with a special emphasis on the last two years, which have not been covered by the similar preliminary document, as well as makes forecasts for the coming years.

The European Commission has given indications that the obligations under the Energy Community Treaty should not be broader than those stipulated in the EU *acquis*. Therefore, it is sufficient to ensure compliance with the terms of security of supply as set out in the EU *acquis* on energy.

1.1 The main players in the energy sector and their role

Energy Regulatory Office (ERO); is an independent agency, established by the Parliament of the Republic of Kosovo in accordance with Articles 119.5 and 142 of the Constitution of the Republic of Kosovo. The ERO is responsible for the economic regulation of the energy sector.

Duties and functions of the Energy Regulatory Office are set forth in Law No. 05/L-084 on the Energy Regulator among which are the following: creating and operating an efficient, transparent, and non-discriminatory energy market; determining criteria and conditions for issuing licenses for the conduct of energy activities; determining criteria and requirements for granting authorizations for the construction of new generating capacity; monitoring and enhancing security of electricity supply; setting reasonable criteria and conditions for energy activities pursuant to tariff methodology:

Ministry of Economic Development (MED); is among others, responsible for energy sector strategy and policy (preparation and implementation), development of secondary legislation, renewable energy sources and rational use of energy, coordination of donors and attraction of investments;

The Independent Commission for Mines and Minerals (ICMM); is an independent agency established on the basis of Article 119, paragraph 5, and Article 142 of the Constitution of the Republic of Kosovo. ICMM regulates mining activities in Kosovo in accordance with the Law on Mines and Minerals, the sub-normative acts issued pursuant to the same law, and the Mining Strategy.

Kosovo Competition Commission (KCC); was established by the Parliament of Kosovo based on Competition Law No. 2004/36. Kosovo Competition Commission is an independent body and has responsibility for promoting competition among undertakers and for the protection of consumers in Kosovo.

Transmission System Operator (TSO) and Market Operator (MO); was established on 1 July 2006, as a result of the restructuring of the energy sector and is responsible for planning, development, maintenance and operation of the electricity transmission system in Kosovo; ensuring an open and non-discriminatory access for third parties; functioning of the new electricity market; providing conditions that encourage competition in Kosovo; and cooperating with neighbouring Transmission System Operators (TSOs).

KOSTT operates as the Transmission System Operator (TSO) and Market Operator (MO).

Kosovo Electricity Distribution Company (KEDS); is a private company of the Consortium Limak-Çalik that performs activities of electricity distribution, and maintenance of medium and low voltage network, including metering devices.

Kosovo Electricity Supply Company (KESCO) J.S.C; Is a company that in 2014 was created as a result of legal unbundling between distribution operator and supplier, which entered into force on 01.01.2015. This company is responsible for supply including the activity of universal service of supply.

Kosovo Energy Corporation (KEK); Is an electricity utility of Kosovo that carries out coal mining and power generation that includes about 89.9 % of electricity produced in the country.

1.2 The role of the regulatory authority

Law No. 05/L-084 on the Energy Regulator defines the powers, duties and functions of the Energy Regulator Office, including the conditions for issuing licenses for carrying out activities in the energy field, certification of activities of transmission operators in the energy sector, procedures for issuing authorizations for the construction of new production capacities, creation and efficient operation of competitive energy markets, consumer protection, as well as the criteria for adjusting tariffs and conditions for energy supply.

The Energy Regulator is an independent agency, autonomous from any government department in its exercise of economic regulation of the energy sector (electricity, thermal energy and natural gas). The Law on the Energy Regulator defines the tasks, functions and executive authorizations of the ERO such as:

- *Issuing, amending, suspending, transferring and terminating licenses to carry out energy activities;*
- *Supervision, monitoring and ensuring compliance with licenses;*
- *Monitoring the operation of the energy markets in Kosovo, including the access conditions for the parties;*
- *Granting authorizations for construction of new generation capacities and gas pipeline systems, including direct electricity lines and direct pipelines;*
- *Development and approval of tariff methodologies, and determination and approval of tariffs for regulated services;*
- *Description of overall criteria of energy supply;*
- *Monitoring and taking actions, as stipulated by the law, to promote and enhance security of energy supply;*
- *Monitoring the effective unbundling and development of competition in the energy sector; and*
- *Review and approve customer protection measures and resolving disputes in energy sector.*

1.3 Strategic documents for this document

1.3.1 Energy Strategy

The Energy Strategy of the Republic of Kosovo is a ten-year base document for the development of the energy sector. In time intervals of no more than three (3) years, the Strategy is reviewed and the Strategy is prepared for the next ten (10) year period. Based on the Strategy, the Strategy Implementation Program for the period of three (3) years is prepared and approved.

The role, importance, content and procedures for the preparation of the Energy Strategy document are based on the Law No. 05/L-081 on Energy. The Energy Strategy is based on the existing policies and strategic documents of the Government of Kosovo, on the results of the analyzes made and on the studies carried out for the energy sector.

The Energy Strategy has the fundamental objective of creating the conditions for reliable and secure energy supply, by developing the production, transmission and distribution capacities, and taking into consideration the diversification of resources, the efficient use of energy, decarbonization and promotion of maximum use of renewable resources of energy, the creation of a competitive market, the development of the natural gas system, and the protection of the environment.

1.3.2 Energy Balances

Forecasting the demand for electricity, natural gas and thermal energy, and the manner and measures to meet that demand, is stipulated in the Annual Energy Balance and in the Long-Term Energy Balance that are approved and published by the Regulator.

Mandatory components of annual energy balances are:

- Forecasting demand for each month of the following year;
- Forecasting supply to meet the demand;
- Forecasting the consumption of energy raw materials, levels and reserve capacities;
- annual reserve capacity level (reserve limit) of power plants and equipment;
- appropriate levels of operating reserves each year and energy efficiency criteria for each year

Mandatory components of long-term energy balances are:

- demand forecasting;
- Forecasting supply to meet the demand;
- the way to fulfill the demand;
- a list of the necessary levels of storage and reserve capacity needed to ensure the planned degree of sustainability (stability) of supply.

The annual energy balance will be approved at the end of the current year, for the next year.

The long-term energy balance is approved for a period of ten (10) years. Long-term energy balance updates are approved every two (2) years.

1.3.3 Network Development Plans

Based on the legislation, every year the Electricity Transmission System Operator, the Electricity Distribution System Operator, the Thermal Energy Distribution System Operator and the Natural Gas Transmission System Operator must submit to the Energy Regulatory Office a ten (10) year plan for network development based on current and projected demand and supply. The network development plan contains efficient measures in order to guarantee the adequacy of the system and security of supply.

The ten (10) year network development plan in particular must:

- notify the main market participants about the infrastructure that needs to be built or improved during the next ten (10) years;
- contain all the investments that are underway and identify the new investments that will be executed during the next three (3) years; and
- provides a time frame for all investment projects.

The Regulator approves development plans, as well as monitors and evaluates the implementation of network development plans.

1.3.4 Adequacy (Sufficiency) of Generation

The Transmission System Operator prepares the document "Generation Adequacy Plan" in accordance with Article 9 of the Grid Code - Planning Code. The purpose of this document is to notify the participants of the electricity market and the Energy Regulatory Office regarding the assessment of the adequacy of the generation of the electricity system of the Republic of Kosovo for load coverage and system regulation for the 10-year period.

The Generation Adequacy Plan contains:

- Generation Adequacy assessment methodology;
- Load forecasting;
- Prediction of generating capacities;
- Adequacy of generation; and
- Adequacy of the system.

1.4 Incentives for construction of RES capacities

Regarding the promotion of electricity generation from renewable energy sources, Article 14 of Law No. 05/L-081 on Energy requires all participants in the energy sector to perform the following tasks:

a. *When dispatching the generated electricity, the Transmission System Operator, or the Distribution System Operator, shall give priority to electricity generated from renewable energy sources and from co-generation, subject to the restrictions specified for purposes of system security by the Grid Code and other rules and codes.*

b. *Transmission System Operator and Distribution System Operator shall establish and publish standard rules on who bears the costs of technical determinations, such as grid*

connections and their grid reinforcements, necessary to integrate new electricity producers supplying electricity produced from renewable energy sources into the interconnected system. Such rules shall be submitted for approval to the Regulator and should be consistent with the Strategy, based on objective, transparent and nondiscriminatory criteria, taking particular account of all the costs and benefits associated with the connection of these producers to the system.

c. *Transmission System Operator and Distribution System Operator shall provide any new electricity producer using renewable energy sources or co-generation wishing to be connected to the system with a comprehensive and detailed estimate of the costs associated with the connection, for which estimate the system operator may levy a charge that reflects its reasonable costs.*

d. *Transmission System Operator and Distribution System Operator shall establish and publish standard rules relating to the sharing of costs of system installations, such as grid connections and reinforcements, between all electricity producers benefiting from them. Such rules shall be submitted for approval to the Regulator, and shall be consistent with the Strategy as well as other sub-legal acts.*

e. *The Regulator shall ensure that transmission and distribution fees for connection and for use of the transmission and distribution systems do not discriminate against the operator of electricity from renewable energy sources, including in particular the operator of the electricity from renewable energy sources produced in peripheral regions and of low population density.*

According to the requirements in Article 16, paragraph 1.16 of the Law on Electricity, KOSTT has developed and ERO has approved the Connection Charging Methodology on the transmission network. This document was developed under fully transparent and non-discriminatory criteria that define obligations for each party. Whereas the Connection Charging Methodology of the distribution network was finalized and approved in 2022. These documents also contain the charges for the connection of generators from RES to respective networks.

Regarding the promotion of renewable resources, the respective ministry has approved the mandatory annual and long-term targets until 2020, for which ERO has approved the feed-in tariffs for wind, small HPP, biomass and solar photovoltaic. RES will have Power Purchase Agreements (PPAs) for 10 years for small HPP and Biomass, while generators from solar/photovoltaic panels and Wind Turbines will have a 12-year PPA.

ERO has come to the conclusion that supporting investments in renewable energy through feed-in tariffs is no longer necessary compared to a few years ago, given the developments in many European countries and the region, where the feed-in tariffs as a dominant measure, is now excluded from the support schemes, being replaced by new models that align energy prices from RES with those of the market, so by the end of 2020 ERO has decided to discontinue the application

of the Support Scheme with feed-in tariffs for supporting the construction of new generating capacities for the production of electricity from Renewable Energy Sources (RES) for the targets 2021-2030. Pursuant to its legal obligations and in cooperation with the Institutions of the Republic of Kosovo, ERO will undertake actions for the development of projects from Renewable Energy Sources for long-term targets through various forms of auctions, in the selection of beneficiaries from other forms through Premium Tariffs or similar, in accordance with the best practices in favor of the public interest.

During the year 2022, as a necessity for the construction of energy projects, ERO has reviewed the Rule on Authorization Procedure for Construction of New Capacities from RES. The purpose of the review was to include the procedures for issuing the Authorization for other energy projects, for the development of a competitive energy market and that encourage investments to guarantee the security and stability of the energy sector in the Republic of Kosovo.

During the year 2023, ERO also approved the Rule on Prosumers of Renewable Sources, where the principles and regulated mechanisms are defined for the support of electricity customers who wish to generate electricity in their premises based on renewable technology for their own consumption. Through this rule, the possibilities have been created for the final customer who operates within his premises located within narrow borders, to produce renewable energy for his own consumption, as well as who can store or sell renewable energy produced by himself, provided that, for a non-household prosumer of renewables, these activities do not constitute his main commercial or professional activity.

In order to promote the production of electricity from renewable sources based on competitive mechanisms, ERO has approved the Methodology on Determination of Maximum Fixed Premium, Maximum Strike Price and Maximum Feed-in Tariff, which enables the determination of the maximum price that can be used in auctions that may be announced in the future.

ERO has also considered the conclusions of the 15th meeting of the Ministerial Council that encouraged the contracting parties, where Republic of Kosovo is also part of, to work closely with the Energy Community Secretariat (ECS) and the European Bank for Reconstruction and Development (EBRD) in designing and implementing a competitive, efficient and transparent process for awarding support schemes for renewable energy sources.

ERO has also taken into account the beginning of the implementation of the Project for the development of the RES Auction funded by the EBRD, which has the task of drafting the procedures for the implementation of the RES Auction which is in the implementation phase

1.5 Emergency Measures in Energy Supply

Since Kosovo's energy system is modelled for basic energy production, balancing the system remains one of the key issues. Energy required for the peak period, in addition to domestic production, is accomplished through imports, and in the case of the generating unit’s failure is realized through emergency imports, or sometimes with the application of load shedding (reductions) as the last measure to keep the system in balance.

Based on the Law on Energy, Article 25, *the Government may, as an emergency measure, impose restrictions on energy supply for customers or impose specific obligations on energy enterprises in following cases:*

- *...*
- *any unexpected long-term shortage of energy generation capacity or energy transmission or distribution capacity;*
- *…*

Within this, the Government can:

- *impose constraints on commercial activities in respect of specific energy resources;*
- *prescribe special commercial conditions;*
- *limit energy trade or prescribe special conditions for energy trading;*
- *compel (force) energy generation to take place at specified generation facilities, and*
- *impose an obligation to supply energy to selected customers only in accordance with predefined and objective criteria developed by the Transmission System Operator and the Distribution System Operator, and approved by the Regulator.*

After more than a decade of a long process, on 14 December 2020 the Interconnection Agreement between KOSTT and transmission system operators (TSOs) from Continental Europe entered into force, marking the first day of KOSTT operation as a zone of ENTSO-E's control. Kosovo fulfilled all technical and formal requirements to become an independent control area in ENTSO-E. At the same time in December 2020, a joint control block was established between the control zone of Albania and the control zone of Kosovo. Additionally, the 400 kV line between Kosovo and Albania built in 2016 was finally put into normal operation, contributing to greater cross-border exchanges, including possible cross-border exchange of reserves. The energy systems of Kosovo and Albania are complementary thermal-hydric systems, where Kosovo does not yet have flexible and fast internal generating units to serve as a reserve capacity of the system, whereas Albania has such units. Therefore, it is mutually beneficial - as an element of the unification of these two markets - to use the available cross-border transmission capacities for the exchange of reserve capacities of the energy system.

For the event of a failure of the incumbent supplier, based on the legislation in force, ERO has designated Supplier of the Last Resort which will take responsibility for the supply of customers who have remained without supplier.

According to Law on Electricity, Article 41, the Supplier of Last Resort shall:

- *supply final customers as per Article 39 of this Law until customers select a supplier of choice, but not for longer than sixty (60) days;*
- *bill final customers as per Article 39 of this Law for electricity delivered, in accordance with guaranteed supply prices approved by the Regulator in compliance with the methodology drafted and approved by the Regulator;*

- *inform final customers on conditions of guaranteed supply, termination of the contract on guaranteed supply, and their right to free selection of electricity suppliers;*
- *submit to final customers the contracts on guaranteed supply, no later than eight (8) days upon commencement of such supply.*

2. ELECTRICITY SECTOR

The electricity sector consists of generation, transmission, distribution and supply of costumers.

Generation; is mainly based on lignite power plants (TPP A and TPP B), and HPP Ujmani which are owned by the Government of the Republic of Kosovo 100%, whereas other HPP and other RES are privately owned.

Transmission (KOSTT); is the only transmission and market operator and is 100% owned by the Kosovo Parliament. It operates with two separate licenses, a license for operation of the transmission system and a license for market operation.

Distribution (KEDS); is the only distribution operator and is privately owned.

Supplier (KESCO); is a supplier that has a license to supply customers including customers entitled to a universal service under a Public Service Obligation as determined by the Regulator. Also KESCO is defined by ERO as the Supplier of the Last Resort.

Other Suppliers; until the end of 2022, 14 economic operators have been licensed, but they have not started with commercial operation yet.

2.1 Electricity Market

The electricity market in Kosovo includes bilateral electricity trading and trading for balancing the electricity system. Based on the legislation in force, electricity generators are obliged to provide their capacity in a transparent, non-discriminatory and market-based manner to all consumers in wholesale and retail markets, including those with Public Service Obligations.

Due to the low flexibility of the generation to meet demand, especially at peak time, and low demand during the off-peak period, there is a need for imports respectively exports. From the total electricity demand at country level (including transmission and distribution losses), most part of the demand is covered by local generation (generators), while the rest is covered by electricity imports.

The table below presents the basic data of the system, which shows that our country during 2021 has been a net importer, whereas during 2022 it has been a net exporter.

Tab. 2.1 Basic data of the power system

	Balancing of the power system GWh	2021	2022
1	Production from transmission generators	6,067	6,147
2	Production from distribution generators	140	168
3	Import	1,311	761
4	Total available energy	7,518	7,076
5	Export	835	787
6	Net import/export	-477	26
7	System deviations (offtake from the system)	-132	-186
8	Transit	2,056	2,475
9	National demand	6,885	6,547
10	Transmission losses	120	118
11	Consumption of customers in transmission network	396	132
12	LLOMAG Consumption	111	101
13	Load in distribution network	6,258	6,196
14	Distribution losses	1,538	1,403
15	Net consumption in distribution	4,721	4,794

It should be emphasized that since 14 December 2020, KOSTT has started operating as a regulatory area within the Kosovo-Albania Regulatory Block and is now recognized as a commercial area, where balancing the system will be the full responsibility of KOSTT, which also means covering all deviations of the system is responsible for the safe operation of the interconnection system, as well as the allocation of cross-border capacities and the management of congestions, which means the collection of revenues from cross-border trades, in addition to the allocation of cross-border capacities with Serbia.

Market liberalization is a process that has intensified upon the adoption of new energy laws by the Assembly of Kosovo. Based on the legal requirements and the requirements of the Energy Community Secretariat (ECS), this process is expanded with the formation of PX markets (power exchange APEX) and market coupling between Kosovo and Albania. The Kosovo-Albania joint market will improve the security of electricity supply for our two countries, taking into consideration the fact that our two countries have complementary electricity production systems.

In order to continue with the integration of the markets between our countries, the Energy Regulatory Office and the Energy Regulatory Entity together with the transmission system operators of both countries, KOSTT and TSO, on 21 October 2021 in Tirana signed the agreement on the coupling of electricity markets. Through the agreement, the signatory parties recognize the Albanian Electricity Exchange ALPEX as the only electricity exchange for day-ahead and intra-day trade for the trading areas of both countries. On 27 December 2022, the Energy Regulatory Office (ERO) of Kosovo and the Energy Regulatory Entity (ERE) of Albania held a joint meeting in Pristina to approve trading rules and procedures for ALPEX. The development of the ALPEX electricity

exchange creates a joint electricity market in Kosovo and Albania where participants in the sector can buy and sell energy easily.

Market coupling between Albania and Kosovo is the most efficient way to help maximize the use of cross-border electricity and transmission capacity at the lowest possible price. ALPEX will provide a transparent platform for energy trading, increase competition at the retail price level and create price signals that will encourage new private sector investments. The size of the combined integrated market also offers easier entry of new suppliers and better absorptive capacity of generation from renewable energy sources (RES). This trading platform is a big step forward in creating the regional energy market of the Western Balkans. Its efficiency will ultimately benefit the customers of Kosovo and Albania, but ultimately the entire region.

The REMIT Regulation, which is a transposition of Regulation No. 1227/2011 of the European Parliament and Council, was approved by ERO in June 2020. According to the obligations arising from the REMIT rules, market participants must be registered in the national register which was created by ERO.

ERO has transposed from the ECRB format the template of questionnaires for collecting data from licensees, which has been sent to market participants. Based on the data sent by market participants, ERO has created the national register of market participants, according to the legal requirements arising from the REMIT rules. Rules, forms and the national register are published on ERO's website.

2.2 Monitoring of the Security of Supply

The Regulator is responsible for monitoring the operation of electricity markets in order to ensure their efficient operation and to identify the corrective actions that may be required to provide a secure supply to customers.

Energy traded from domestic sources and imports was used to cover the demand including consumption, losses and system balancing. It should be emphasized that electricity trading is done in compliance with the Electricity Trading Procedure, which sets out the general principles for purchase and sale of electricity.

ERO in continuity undertakes activities for monitoring energy supply enterprises, related to the security of supply, but also to check whether the enterprises are operating in compliance with the terms of the license, the implementation of rules, individual acts and decisions issued by the Regulator or other applicable legislation.

2.3 Electricity System

2.3.1 Transmission System

Electricity transmission is of particular importance for the security of supply and the functioning of the entire power system. The transmission network in Kosovo is operated by the Transmission System Operator and Market Operator - KOSTT, which is responsible for the safety and reliability

of the operation of the electricity system. The transmission network has enough capacity to handle local demand and electricity flows in the system.

The power transmission network of Kosovo is well connected to the regional and European system through interconnection lines with:

- Albania, Macedonia, Montenegro and Serbia –400 kV lines;
- Albania and Serbia –220 kV lines; and
- Serbia - two lines 110 kV.

Kosovo's power transmission network meets the domestic transmission needs as well as the N-1 criterion for all levels of high voltage.

The following tables show the transformation capacities and transmission network lines according to the voltage level:

Tab. Tab. 2.2 Transmission Network Lines

Voltage (kV)	Owner	Length(km)
40(	KOSTT	279.5
22(	KOSTT	238.5
11(	KOSTT	912.1
Total		1,430.1

Tab. Tab. 2.3 Substations in the transmission network

Transformation	Owner	No. of SS	No. of TR	Power
400/220	KOSTT	1	3	1280
400/110	KOSTT	2	4	1200
220/110	KOSTT	3	9	1350
220/35	Feronikel	1	2	320
220/35/10(20) (Besiana)	KOSTT	1	1	40
220/10(20) (Besiana)	KOSTT	-	1	40
220/10(20)	KOSTT	1	2	80
110/35/10(20)	KOSTT	6	7	277.5
110/35/6.3	Trepça	1	2	126
110/6.3	Trepça	-	1	31.5
110/35	Ujmani	1	1	20
110/6.3	Sharri	1	2	40
110/10(20)	KOSTT	14	26	913.5
110/35	KOSTT	7	19	641
110/10	KOSTT	2	8	252
35/110 (Deçan)	Kelkos	-	1	40
Total		41	89	6,608

The scheme below presents basic information on the number of substations (SS), transformers (TR) and transforming power (VA), line length, and the connected power plants at the relevant voltage level.

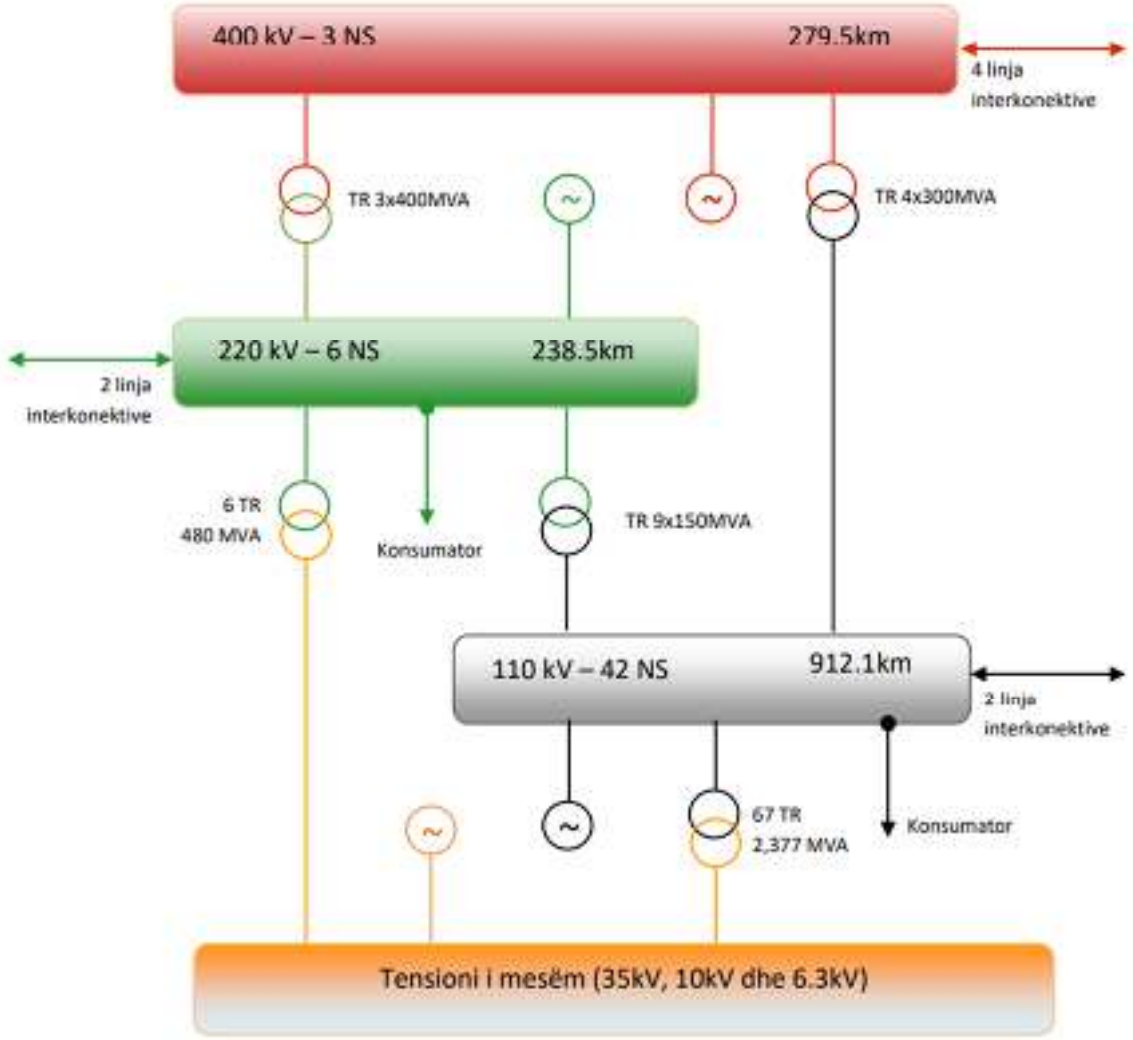


Fig. Fig. 2.1 Basic data of transmission system

Electricity Flows

Kosovo is in a favorable position as a regional node, and considerable electricity flows through its transmission network. These flows are represented on the figure 2.2 below for every interconnection line of Kosovo. Similarly to the recent years, the electricity supply situation in the region is generally characterized with lack of sufficient electricity supply; mainly in the southern part, therefore electricity flows from north to south.

Kosovo is a country with a high transit of electricity, where a ratio between the energy at the entry of transmission and transit is up to 26.04%. This strengthens the position of the transmission system, but also increases transmission losses and leads to network congestion. In order to manage the regional transit, a mechanism for calculating the transit compensation between TSOs (ITC mechanism) has been used. Kosovo participates in the ITC Mechanism for calculation of compensation for transit costs and obligations for imports and exports.

After the start of operation as an independent Regulatory Zone within Continental Europe, Kosovo has begun the allocation of cross-border capacities and the management of congestions, which means the collection of revenues from cross-border trades.

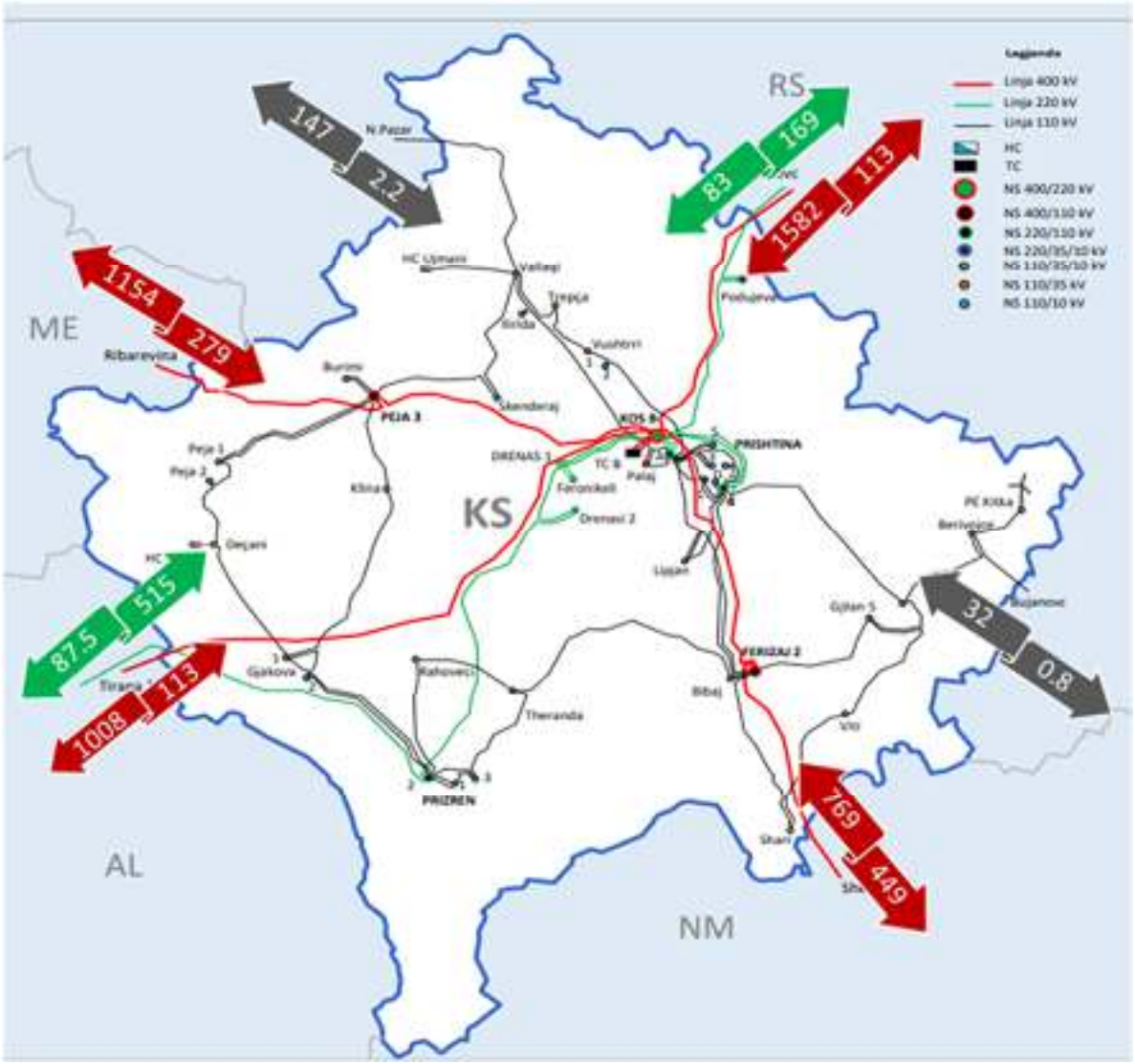


Fig. 2.2. Electricity flows through cross-border lines 2020

Electricity transmission Losses

In recent years can be noted certain stabilization of the curve of electricity losses in transmission. During the year 2021, transmission losses were 120 GWh, or in percentage 1.75% of the overall consumption, while in 2022 these losses were 118 GWh, or 1.81% of gross consumption in Kosovo. Transmission losses also include losses caused by transit. Losses as a percentage of overall energy entered into the transmission network in 2022 are 1.25%.

The figure below shows the transmission losses curve during recent years.

Fig. 2.3. Transmission losses 2010-2020

Realized and forecasted investments in transmission network

In recent years, investments have been made in order to upgrade the system. Such investments provided a safer and qualitative supply to customers. T Additionally, they have increased the security of supply and have resulted in considerable decrease of losses.

The projects that have been completed in 2021, 2022 and are under the one-year guarantee period

Management of the group of projects financed by the EBRD which have been completed in 2021:

- The double 110 kV line and the cable line, SS Fushë Kosova;
- SS Prishtina 4- Rehabilitation of personal consumption, Cabinets AC/DC, Cables; and
- Supply and Installation of UPS in the Central Building of KOSTT,

The projects financed by KOSTT, which started in 2021, 2022 and are in the implementation phase

Project in Kastriot (2021) including:

- Construction of SS 110/35/10(20) kV Kastrioti with 40MVA transformer, and
- Construction of the 110kV line/cable to connect the new 110/35/10(20) kV Kastrioti substation.

Project in Fushë Kosovë (2022) which included:

- Construction of SS. 110/35/10(20) kV Fushë Kosova

Phase VI and VII projects – Financing from the German Development Bank KfW for project implementation

According to the Investment Plan, this group of projects is planned to be co-financed by KfW/KOSTT. The borrowing between the Government of the Republic of Kosovo, KfW (Kreditanstalt

für Wiederaufbau) and KOSTT within the framework of interstate cooperation between the Republic of Kosovo and the Federal Republic of Germany. The planned projects are as follows:

a) Consulting services for the preparation of the tender file and supervision of the realization of the projects;

b) LOT 1 - NS 110/10(20) kV Dragashi with 2x40MVA transformers and transmission lines;

c) LOT 2 - Rehabilitation of NS and supply of 40MVA power transformers;

d) LOT 3: Design, supply and installation of power transformers;

e) LOT 4: Transmission lines.

During 2022, an application was made for the IPA 2023 fund (Instrument for Pre-Accession Assistance) in the EU for a donation for the project:

• Re-vitalization and strengthening of the 110 kV line segment SS Kosova A - SS Bardhi - SS Ilirida - SS Vallaq

Also, during 2022, the implementation of the projects signed for the projects continued as follows:

• Adaptation of SCADA hardware and software in NS Rahoveci 110/35/10kV and NS Palaj110/35/10kV;

• Adaptation of Hardware and Software for SCS in NS Gjakova 2;

• Supply of instruments and tools for maintenance of telecommunications equipment;

• ADSS optical cable supply;

• Air conditioning supply in KOSTT Substations;

• Supply of Hardware.

For the first two projects, the contracts were signed at the end of 2021.

2.3.2 Distribution Network

In recent years there have been investments in distribution network, which were however insufficient to ensure quality and reliable supply of electricity to customers.

The distribution network includes voltage level lines of 35 kV, 20 kV, 10 kV, 6 kV and 0.4 kV, and relevant substations of 35/xx kV/kV level and lower.

There have been continuous investments intended to reinforce and expand transformation capacities and respective lines of the distribution system due to the increase of consumption year by year. Basic data of substations and lines by voltage level, and length in the respective distribution system are given in the table below.

Tab. 2.4 Number of substations at DSO based on the voltage level

Tab.2.5 Basic data for DSO lines

Voltage (kV)	Owner	Arial network (km)	Cable network (km)	Total (km)
35 kV	KEDS	484	138	622
10(20) kV	KEDS	1 632	546	2 178
10 kV	KEDS	4 165	904	5 069
6 kV	KEDS	42	8	50
3 kV	KEDS	4	1	5
0.4 kV	KEDS	17 915	2 659	20 574
Total		24 243	4 256	28 499

Distribution Losses

Overall distribution losses are very high. These losses are divided into technical losses and commercial losses which occur as a result of unauthorized use of electricity.

The figure below shows the trend of changes of technical and commercial losses, as well as overall losses in distribution network during the years 2011 – 2022.

Fig.2.4. Distribution Losses 2011-2022

Realized and planned investments in distribution system

Over the past few years, there have been investments in distribution network, which have been mainly emergency investments focused on the low voltage network and overloaded transformers, without neglecting other required investments. These investments include the following:

- Investments on increase of capacities at medium voltage substations (MV);
- Investments in Medium Voltage Lines (MV OHL);
- Investments in improving the low voltage grid (LV);
- Investments in switching from medium voltage 35 and/or 10 kV to 20 kV;
- Investments in maintenance;
- Investments in the metering point; and
- Investments in SCADA.

<u>Forthcoming investments in new distribution capacities</u>

The main investment objectives of the Distribution System Operator are focused on reducing technical and commercial losses, ensuring the sustainability of the qualitative electricity supply, as well as supporting the increase of load, and the rehabilitation and modernization of the electricity network.

The distribution network will continue to invest in capacity building at medium voltage substations (MV); medium and low voltage lines (OHL); improving the low voltage grid; maintenance; metering point; and SCADA system.

ERO has analysed the ten-year DSO Development Plan for the period 2023-2032, whereby the investment projects in the distribution network will grow over the coming years.

2.3.3 Quality of Supply

Quality of supply and electricity service standards are important elements of energy sector regulation. To this end, the Regulator has developed and approved the Rule on Electricity Service Quality Standards, which was approved in 2019.

The standards of supply quality and electricity service are defined and monitored by the following areas:

- Quality of supply;
- Voltage quality; and
- Commercial quality.

The continuity of supply is related to the availability of the power system, namely the number and duration of the outages for each customer within a year, as well as the energy not supplied. The continuity of supply is measured by indexes:

- *SAIDI - System average interruption duration index;*
- *SAIFI - System average interruption frequency index; and*
- *ENS - Energy Not-Supplied.*
- *AIT - Average Interruption Time.*

The figure below shows the indicators AIT (in hours) and ENS (GWh) for 2020 and ENS (GWh) for the years 2015 - 2022 for the transmission network, and the indicators SAIDI (in hours), SAIFI (number of interruptions) and ENS (GWh) for the years 2015 - 2022 in the distribution network.

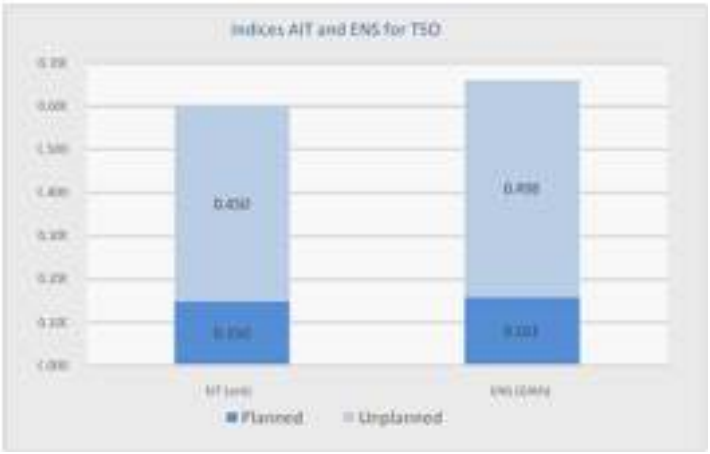


Fig. 2.5 Indicators AIT and ENS for TSO for the year 2022

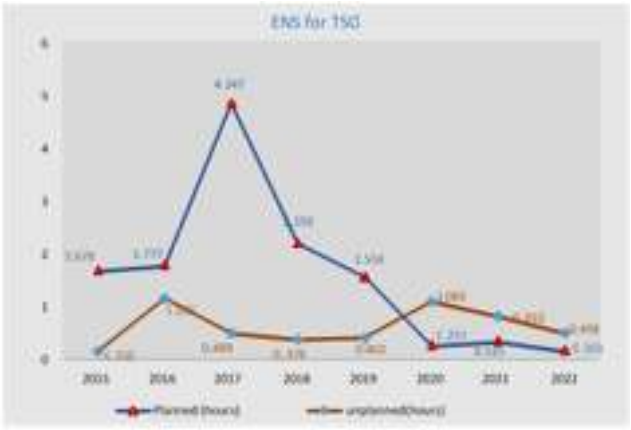


Fig. 2.6 ENS measuring index for TSO for the period 2015 - 2022

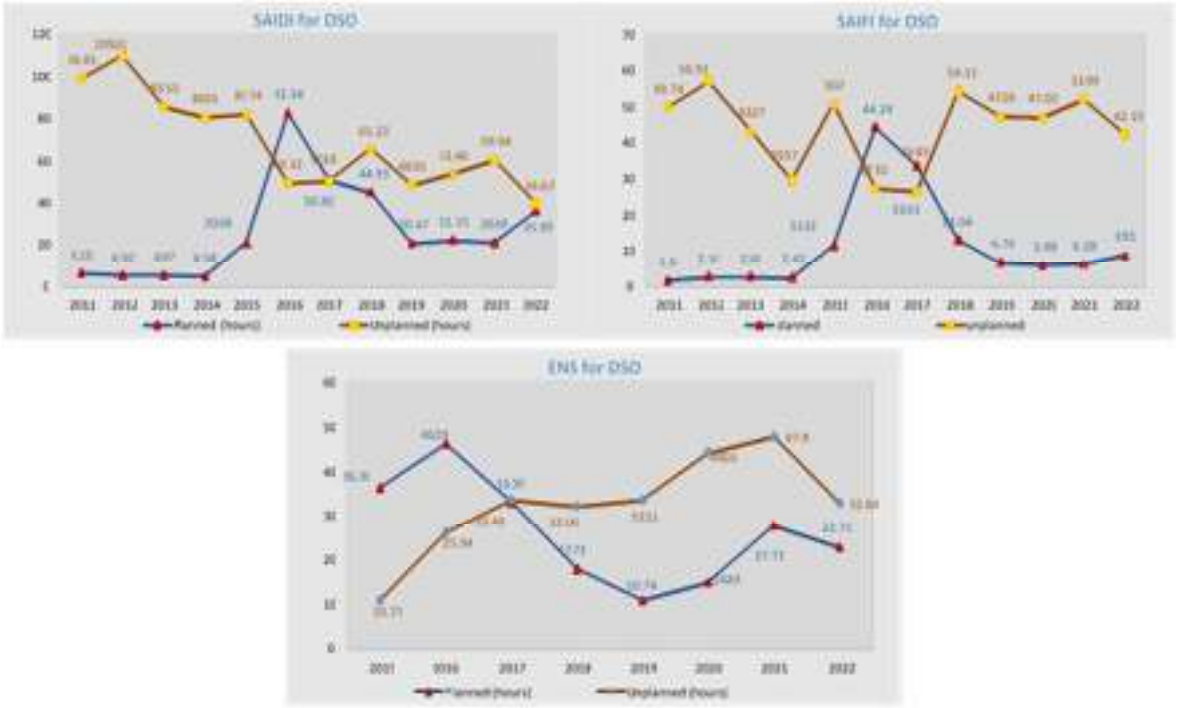


Fig. 2.7 Indicators SAIDI, SAIFI and ENS for DSO for the period 2011-2022

The voltage quality is related to the technical aspect of the power system and is compared to the nominal voltage, which, during this period, was mainly monitored by registering customer complaints on the voltage quality. Voltage quality standards are defined in the Rule on General Conditions of Energy Supply, the Distribution Code and the Distribution Metering Code.

Commercial quality determines the efficiency and accuracy on resolution of customer complaints and requests. Data on the identification of commercial quality are divided into three following categories:

- New Connections;
- Electro-energetic Consents; and
- Customer complaints

2.4 Electricity Generation

Kosovo possesses the prerequisites for generation of electricity not only to meet the demand but for export as well. Kosovo's electricity system is mainly designed to generate basic electricity from conventional lignite sources, therefore maximum load coverage and system balancing remain a major challenge for all stakeholders in this sector.

Although lignite-generating units that are in operation are very old, over the last few years there has been an increase in generation, however domestic generation is not sufficient to cover the continuous increase of consumption, hence, part of the electricity consumption in Kosovo is covered by imports over different time periods, especially at peak times. Despite this, at certain times, especially during the night (at the low tariff), there are surpluses of electricity that are exported.

2.4.1 Generation capacities and electricity generation in previous years

Electricity generation capacities in Kosovo are dominated by Lignite Power Plants Kosovo A and Kosovo B. These two power plants together have an installed total capacity of 1,478 MW. Due to the aging and non-operation of two Kosovo A units, the available capacity of the two TPPs is much lower than the installed capacity. Together, the total available capacity of the units of these power plants is about 960 MW.

Currently, generation of electricity from power plants covers about 90% of total generation in Kosovo. In addition, TPP-s, generation is also supported by hydro power plants: HPP Ujmani with an installed capacity of 35 MW, the cascade of Lumbardhi River with a capacity of about 32 MW, Wind Turbines Plant WIND PARK - KITKA with a capacity of 32.4 MW, and WIND PARK SELAC 1, 2 and 3 with a capacity of roughly 105 MW as well as some small hydro power plants connected to the distribution system with the overall installed capacity of 71.23 MW.

Tab.2.6 Electricity Generation Capacities

Generating units	Capacity of units (MW)			Entry in operation
	Installed	Net	Min/max	
TC Kosova A1	65	Nuk operon		1962
TC Kosova A2	125	Nuk operon		1964
TC Kosova A3	200	144	100-130	1970
TC Kosova A4	200	144	100-130	1974
TC Kosova A5	210	144	100-135	1975
TC Kosova A	610	432		
TC Kosova B1	339	264	180-260	1983
TC Kosova B2	339	264	180-260	1984
TC Kosova B	678	528		
HC Ujmani	35.00	32.00		1981
HC Lumbardhi I	8.08	8.00		(1957) 2006
HC Dikanci	4.02	3.34		(1957) 2013
HC Radavci	1.00	0.90		(1934) 2010
HC Burimi	0.95	0.85		(1948) 2011
Lumbardhi II	6.20	6.20		2020
Total HPP(outside Support Scheme)	55.25	51.29		
EGU Belaja	8.06	8.06		2016
EGU Deçani	9.81	9.81		2016
HC Hydroline-Albaniku III	4.27	4.27		2016
HC Brod II	4.80	4.80		2015
HC Restelica 1&2	2.28	2.28		2016
HC Brodi III	4.70	4.70		2016
HC Brezovica	2.10	2.10		2017
HC Orqusha	4.00	4.00		2021
HC Lepenci 3	10.00	10.00		2019
HC Dilli com	0.31	0.31		2020
HC Hidroline-Albaniku II	3.55	3.55		2020
HC ECO Energji	1.00	1.00		2020
HC Hidroline-Albaniku IV	1.12	1.12		2021
HC Restelica 3	2.35	2.35		2021
HC Brod I	2.48	2.48		2021
HC Sharri	6.45	6.45		2021
HC Vica	4.60	4.60		2021
HC Shterpca	5.30	5.30		2021
Wind Power	1.35	1.35		2010
Air Energy-Kitka	32.40	32.40		2018
SOWI Kosova	103.41	103.41		2021
PV LedLight Technology	0.10	0.10		2015
PV ONIX SPA	0.50	0.50		2016
PV Birra Peja	3.00	3.00		2018
PV Frigo Food Kosova	3.00	3.00		2018
PV Eling	0.40	0.40		2019
PV SGE	3.00	3.00		2019
Total RES (in Support Scheme)	224.34	224.34		
Total	1,567.59	1,235.63		

The thermal power plant Kosovo A has five units that were built during the 60s and 70s of the 20th century Currently, the units A3, A4 and A5 are in operation. Units A1 and A2 have not been in operation for several years. The availability of Kosovo A units is about 50-60%.

The thermal power plant Kosovo B consists of two lignite powered units with an installed generation capacity of 2x339 MVA. Between 2000 and 2002 various projects were implemented for the rehabilitation of these units. The purpose of certain rehabilitation projects was to increase the performance level of TPP Kosovo B in order to increase the availability and control characteristics. Power plant Kosovo B today operates with the lower efficiency than projected - with a capacity of about 310 MW per unit (net 265 MW). Kosovo B power plant units will soon reach the end of their forecast lifespan, so investments and significant rehabilitation measures are planned to be implemented during 2023/2024 in order to adjust these two units to the standards required for operation, thereby achieving the required level of environmental standards and extending their lifespan beyond 2039.

Due to the proper maintenance of generating capacities, large investments in the repair of generating units and sufficient amounts of coal, electricity generation has increased over the years.

The following diagram shows the overall generation in Kosovo during 2010-2020, where it is noticed a continuous increase until 2020.

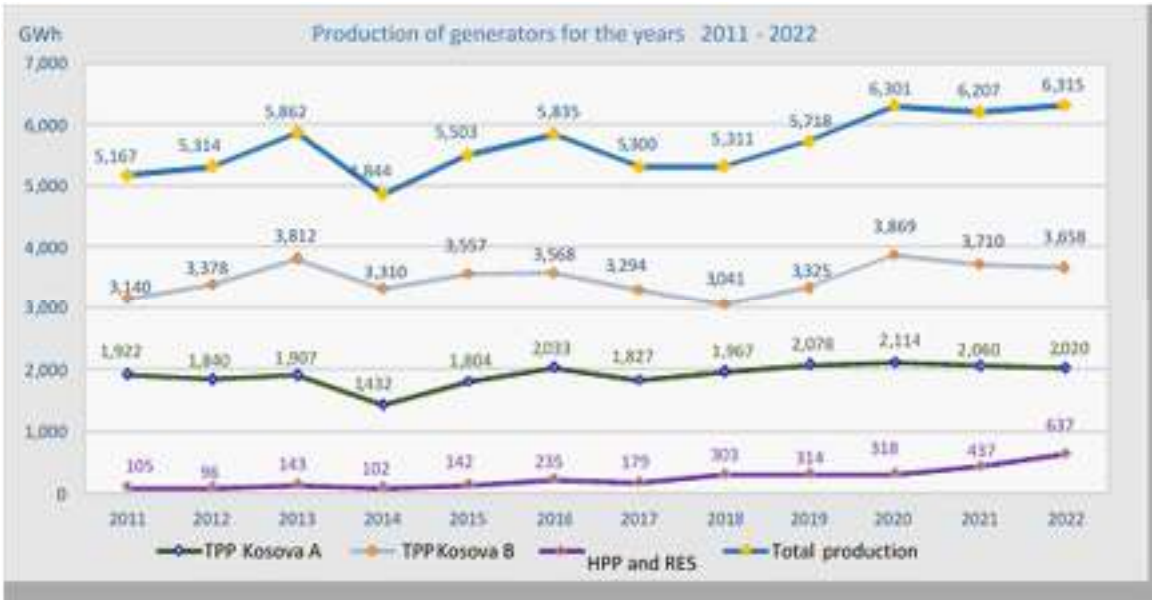


Fig.2.8. Overall generation 2010-2022

2.4.2 Operation of generating units

The planned repairs for TPP Kosova A and TPP Kosova B in 2021 have been postponed due to technical reasons that resulted from the pandemic restrictions, which has influenced the operation of these units to be higher than that foreseen in the energy balance , which also performed with higher production.

Compared to the previous year, the number of declines from the operation of generating units with lignite was almost the same.

The following table shows the types of power plant shutdowns for 2021.

Tab.2.7 Interruptions of generating units in 2021

2021	TPP Kosova A			TPP Kosova B	
	A3	A4	A5	B1	B2
Planned interruptions	2	4	3	2	2
Unplanned interruptions	7	0	2	8	2
Outages	3	0	1	7	6
Total outages	12	4	6	17	10
Working hours	6,614	2,726	7,202	7,411	7,374

The table below shows the types of interruptions of power plants for 2022.

Tab. 2.8 Interruptions of generating units in 2022

2022	TPP Kosova A			TPP Kosova B	
	A3	A4	A5	B1	B2
Planned interruptions	5	4	5	3	3
Unplanned interruptions	4	2	1	7	5
Outages	2	2	0	9	4
Total outages	11	8	6	19	12
Working hours	5,956	6,961	3,602	7,778	7,277

It is worth mentioning that units B1 and B2 have operated about 86% of the hours of the year, while in 2021 they have operated 84% of the year.

2.4.3 Renewable Energy Sources

With the Law on Energy No. 05/L-081 in force, the RES development policy is defined, which aims to promote the economic and sustainable use of local RES potentials, in order to meet energy demand, increase security of supply and environmental protection, which is an integral part of the Energy Strategy of the Republic of Kosovo.

The relevant ministry for the implementation of RES policies according to the legislation in force, has determined with a separate by-law the legal framework for the promotion of RES, in line with the requirements of the relevant Directive of the European Union for RES.

With the Law on the Energy Regulator No. 05/L-084, it is determined that the construction of new generating capacities (RES), new systems for transport and distributing natural gas, including interconnectors, as well as direct electric lines and direct gas pipelines for transporting natural gas will be done in accordance with the authorization procedures according to this law, which will be undertaken by the Energy Regulatory Office, in accordance with objective, transparent and non-discriminatory criteria.

The Energy Strategy of the Republic of Kosovo for the period 2022-2031 has been approved and the Draft Law on Renewable Resources is in the process of approval, which also comprises

obligations for ERO, for the implementation of renewable sources policies and the drafting of the legal framework for achieving the energy objectives.

During the year 2022, due to the necessity for construction of energy projects, ERO has approved: "Rule no. 03/2022 for the authorization procedure for the construction of new generation capacities, new gas transmission and distribution systems, including interconnectors, direct pipelines for thermal energy and direct electricity lines and direct pipelines for natural gas transmission".

During 2022, ERO also drafted the Draft/Regulation on Prosumers Renewable Sources, where the principles and regulated mechanisms are defined for the support of electricity customers who want to generate electricity in their premises based on renewable technology for personal use.

Through this draft/Rule, the possibilities have been established for the final customer operating within his premises located within narrow borders, to produce renewable energy for his own consumption, as well as storing or selling the renewable energy produced by himself, provided that, for a non-household prosumer of renewable sources, these activities do not constitute his main commercial or professional activity.

ERO completed the public consultation procedures regarding this draft/rule and during the beginning of 2023 approved the Rule No. 03/2023.

ERO, within the framework of fulfilling the obligations set by the legislation in force, has issued authorizations for construction of generation capacities, where each applicant in order to obtain the authorization was subjected to the analysis of regularity and the proper completion of the legal, administrative, technical, financial and environmental requirements as well as submission of relevant permits, issued by the relevant institutions in accordance with the activity that the subjects have requested the authorization for constructing new generating capacities based on RES.

During 2022, ERO received 2 applications from various legal entities for obtaining authorization for construction of new generating capacities from RES with a total capacity of 6.75 MW.

ERO, during 2021 and 2022, following the finalization of the projects according to the authorizations issued by the ERO Board, as well as technical admission, licensed three (3) projects from wind turbines, the WIND PARK SELAC project 1, 2 and 3 with total installed capacity of 104 MW which entered into operation.

ERO has also handled the requests/applications for generators to obtain the status of prosumer for self-consumption, which after fulfilling the legal requirements in accordance with the Rule on Authorization and the Support Scheme, were allowed to continue with the construction of generating capacities for self-consumption. Regarding the requests handled by the end of 2022,

there are about 248 applications with a total capacity of 8,701 kW.

Also in the process of completion are several projects for obtaining authorization for the construction of new generating capacities, which are in different stages of review, seven (7) solar projects with a capacity of 172 MW, two (2) projects of wind with a capacity of 70 MW, and three (3) hydro power plant projects DRINI PSHP - REVERSIBLE with a capacity of 250 MW, which is dedicated to energy reserves, a project from biomass with a capacity of 5.2 MW in the Municipality of Ferizaj and a hydro project (re-application) with a capacity of 9.98 MW. Also in the process of review and evaluation are the applications for self-consumption for obtaining the authorization, where following the completion and review, it will be decided on the issuance of authorizations.

2.5 Electricity demand and maximum load

The electricity demand has steadily increased until 2010, whereas there has been a balance of consumption since 2010.

Below is presented the overall demand during the period 2011-2022.

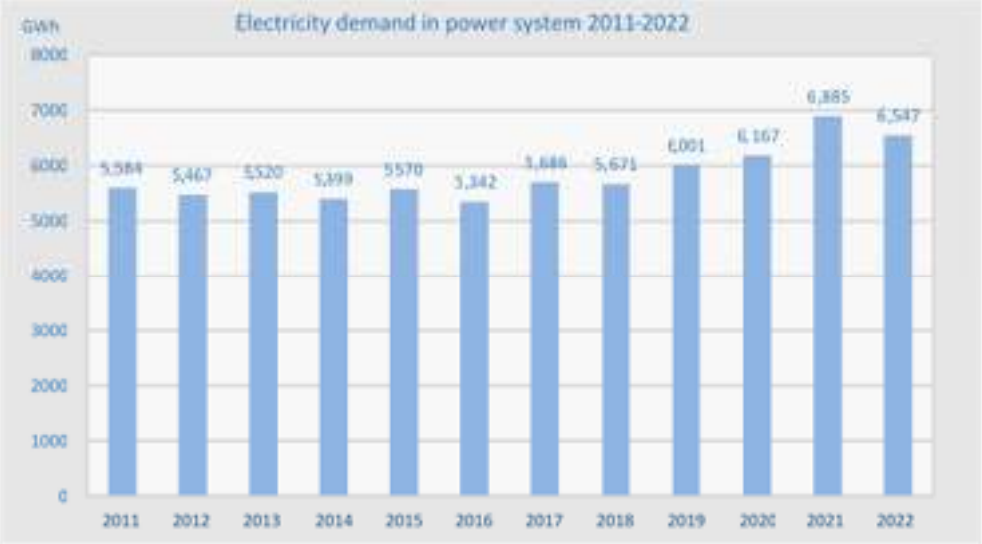


Fig. 2.9 Overall demand 2011- 2022

The overall energy demand for 2021 was 6,885 GWh, whereas the peak load during winter was 1,398 MW, while in 2022 the overall demand was 6,547 GWh, while the peak load during winter was 1,429 MW.

In order to evaluate the transmission network load, a network flow analysis and maximum consumption values should be performed. For this purpose, five (5) peak values (maximum load) that appeared during 2021 and 2022 were used.

The following tables represent the top five values of load for 2021, respectively 2022.

Tab. 2.9 Five peak values in 2021

Maximal charge Pmax (MW)	Data	Hour
1 398	21.12.2021	23
1 361	20.12.2021	18
1 325	15.02.2021	23
1 324	18.01.2021	23
1 317	17.01.2021	23

Tab.2.10 Five peak values in 2022

Maximum load Pmax (MW)	Date	Time
1 429	24.01.2022	23
1 389	26.01.2022	23
1 375	13.01.2022	18
1 349	22.01.2022	24
1 341	12.01.2022	19

The charts derived as an average throughout 2021 and 2022 show that the daily production by hours has had minor changes, while consumption has changed more in peak and off-peak intervals. The shaping of daily charts has been partly affected by the interruption of power supply. The difference between consumption during the day and at night is quite high.

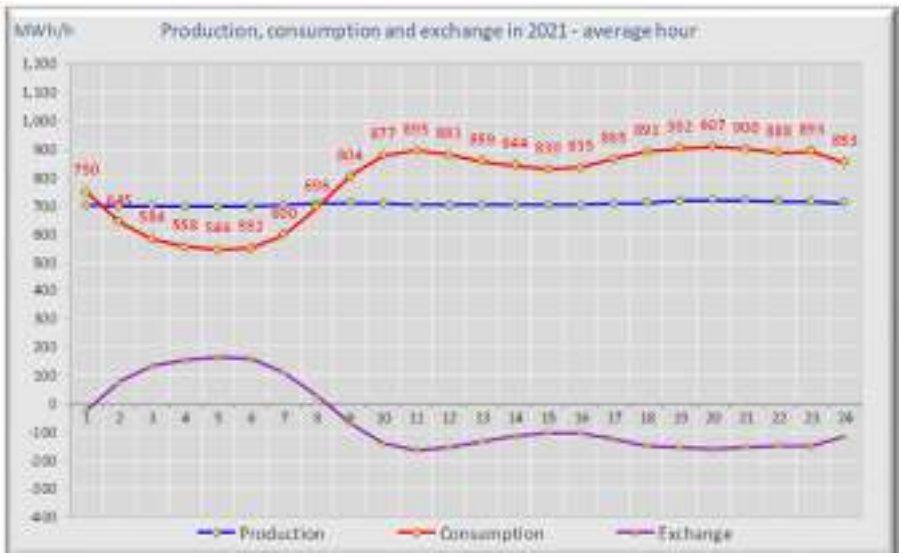


Fig. 2.10 The chart of the annual hourly average for hours for 2021

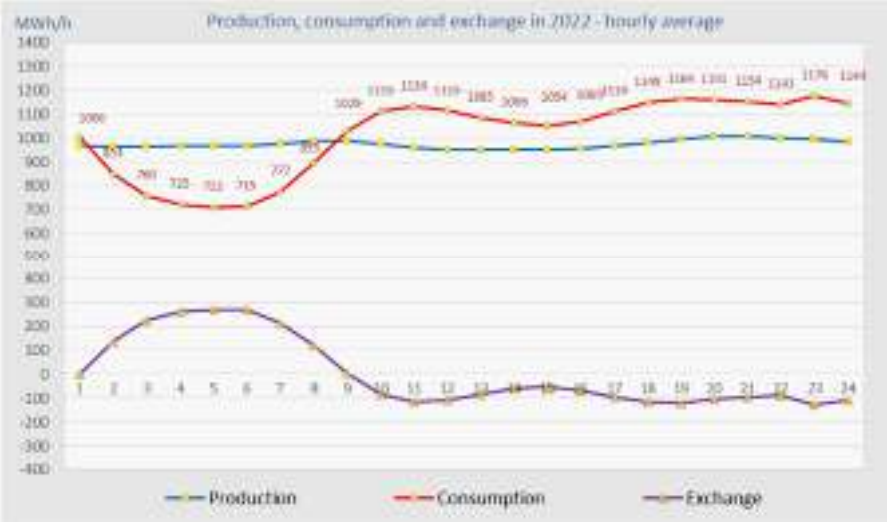


Fig. 2.11 The chart of the annual hourly average for hours for 2022

The difference between the maximum and minimum consumption values by months is quite large, and the following diagrams show the differences between the average of maximum and minimum consumption values by months for 2021 and 2022.

Fig. 2.12 Monthly average of maximum and minimum load for 2021

Fig. 2.13 Monthly average of maximum and minimum load for 2022

It is important to analyze and present the share of costumer categories in the overall consumption in order to identify the consumption structure. Electricity consumption by customer categories for 2021 and 2022 is presented in Table 2.11. It should be noted that the following customers: Ferronikel, Trepça and Sharrcemi are connected to the transmission network.

Tab.2.11 Consumption by category and losses

Consumption categories	2021		2022	
	GWh	Share in consumption	GWh	Share in consumption
Household consumption	3,131	45.47%	3,121	47.67%
Commercial consumption	1,145	16.62%	1,194	18.24%
Industrial consumption	842	12.22%	610	9.31%
Commercial losses	758	11.01%	646	9.86%
Technical losses	780	11.33%	757	11.56%
Transmission losses	120	1.75%	118	1.81%
KEK internal consumption	110	1.59%	101	1.55%
Total	6,885	100.00%	6,547	100.00%

The figures 2.13 and 2.14 present the share in percentage of each consumption category (with and without losses).

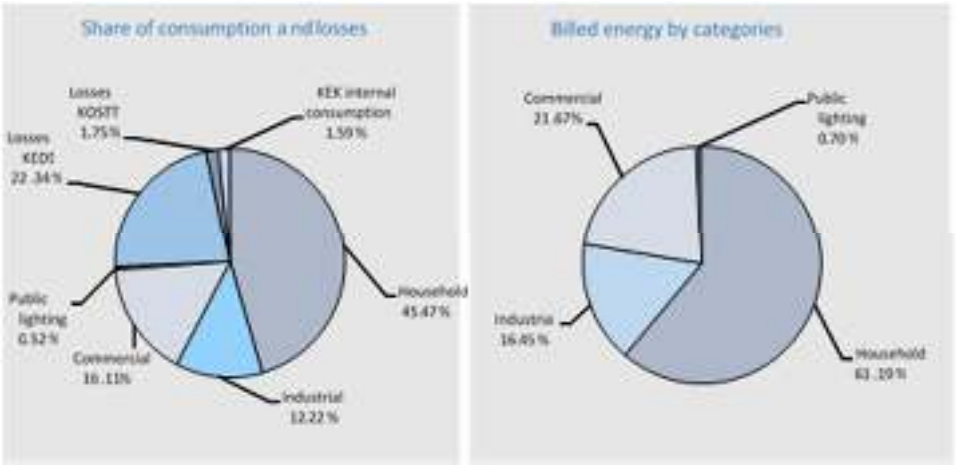


Fig. 2.14 Consumption by categories 2021

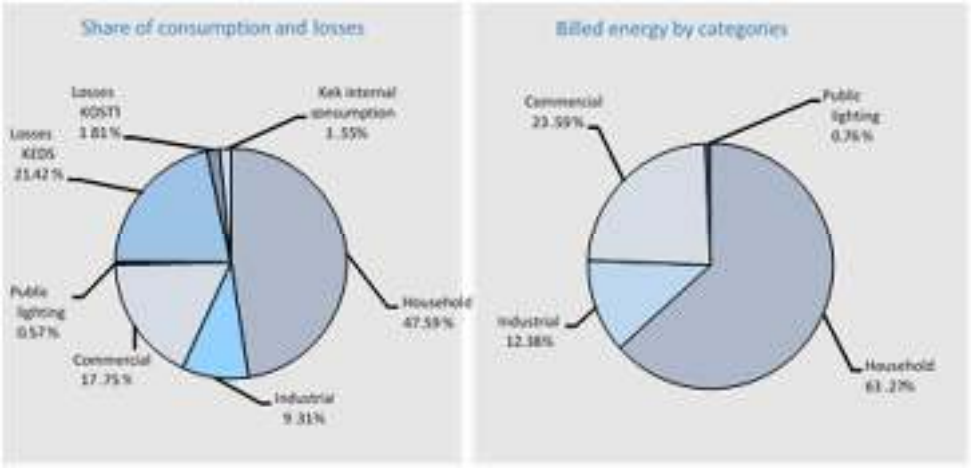


Fig. 2.15 Consumption by categories 2022

2.6 Balancing of the production and demand in previous years

As stated above, electricity production in most of the years has been lower than the overall demand, but generation has increased almost same as demand. Figure 2.15 presents the balance between electricity generation and demand for the period 2000-2022.

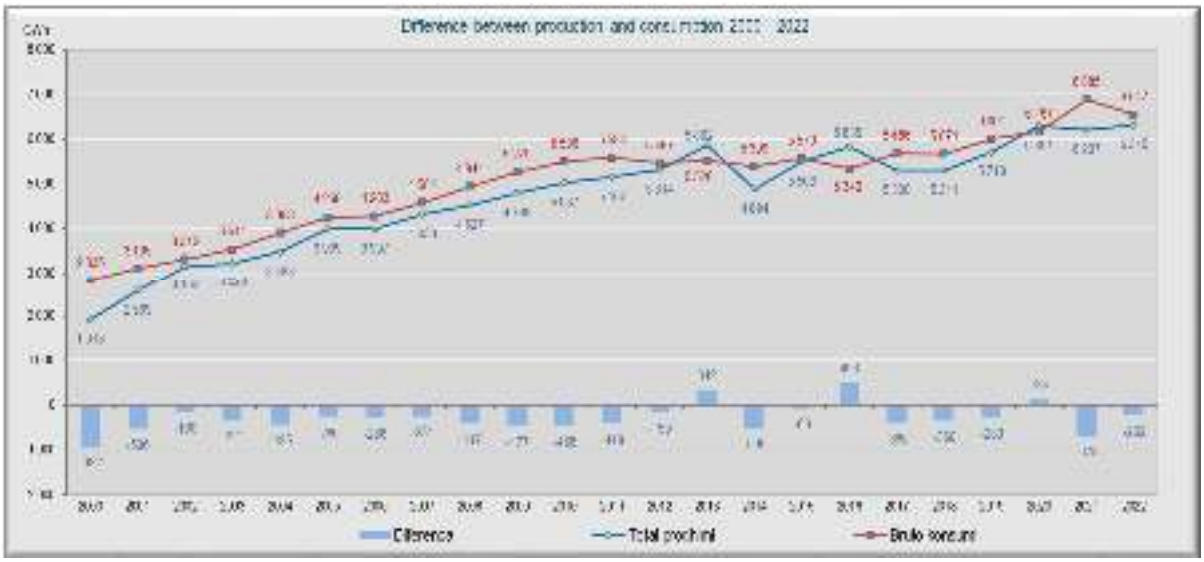


Fig.2.16. Balance between electricity generation and demand during previous years (2000-2022)

During the period 2000-2022 the overall demand has increased by an average of about 3.98% per year. Since the end of the war until 2020, the generation units did not cover the electricity demand, which was offset by the import of electricity, except in the years 2013, 2016 and 2020 when the generation exceeded the demand and Kosovo was a net exporter of electricity.

For the period 2021-2022, the situation regarding electricity can be summarized as follows:

- Electricity generation in the years 2021-2022 has been lower than the demand.
- Technical and commercial losses continue to be at a high level with a slight reduction; especially commercial losses that still remain high, and are a challenge for the energy sector;
- The collection rate was 90.85% in 2021 and 94.64% in 2022;
- Electricity imports continue to cover part of the overall consumption; and
- Further balancing of the electricity system, in some cases has been achieved through interruption of supply.

2.7 Forecast of demand and generation for the period 2023 - 2032

In order to provide secure customer supply, adequate forecasting of demand and electricity generation needs to be planned, including problems that may arise during implementation. The important issues related to customer's energy supply are as follows:

- Continued increase in electricity consumption that cannot be covered by domestic generation;
- Overall electricity losses that continue to be at high a level;
- Non-technical losses (unauthorized use of electricity) remain at high a level;
- The lack of alternative energy sources for balancing the system;
- Low electricity prices compared to regional market prices;

- Relatively high prices of other energy sources (e.g. oil, wood, natural gas etc.) that influence the customers to use electricity for heating.
- The increased consumption of liquid fuels that results in the increase of total energy imports in Kosovo.

2.7.1 Forecast of demand for different scenarios of economic growth

Based on the long-term energy balance for 2023-2032 approved by ERO, the following are the projections of GDP growth over the next 10 years that is in line with the Energy Strategy, which were used to forecast the energy demand electricity.

Tab.2.12 Three scenarios of GDP growth rate [%] for the period 2023-2032

Annual growth [%]	2023-2032
GDP Low scenario	2.2%
GDP Base scenario	4.3%
GDP High scenario	5.4%

(The basic scenario is considered most acceptable with regard to the forecast of demand)

The basic demand scenario for electricity (BDS) foresees a slight increase in demand in the household sector, meanwhile a high increase in the services sector and the industrial sector. Energy demand (base scenario) in 2023 is expected to be 7,021 GWh; whereas in 2032 the demand is expected to reach 8,226 GWh; whereas the respective peak loads for the same years are expected to be around 1,449 MW and 1,529 MW.

The electricity demands and peak loads for the three scenarios are presented in Table 2.13.

Tab. 2.13 Electricity demand and peak loads for the period 2019-2028

Gross demand [GWh]	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Base scenario	6,685	7,021	7,378	7,432	7,499	7,601	7,678	7,780	7,908	8,073	8,226
Low scenario	6,685	6,880	7,267	7,283	7,312	7,373	7,409	7,468	7,552	7,670	7,773
High scenario	6,685	7,056	7,489	7,580	7,687	7,829	7,947	8,091	8,264	8,477	8,678

Maximum load [MW]	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Base peak	1,429	1,449	1,455	1,472	1,491	1,486	1,493	1,502	1,514	1,524	1,529
Low peak	1,429	1,395	1,396	1,413	1,424	1,425	1,419	1,427	1,438	1,442	1,453
High peak	1,429	1,480	1,505	1,531	1,558	1,561	1,554	1,575	1,583	190	1,597

The forecast of demand growth according to the high demand scenario implies insufficient or precocious investment for the construction of new generation capacities as well as investments to expand the capacity of transmission and distribution networks.

Figure 2.16 presents a base scenario for increasing demand for electricity for all categories of customers, including technical losses in transmission and distribution networks and commercial losses in the DSO (Distribution System Operator) distributed in the categories of customers with a certain share (0.85% household, 0.1% commercial and 0.05% industrial) for the period 2018-2028

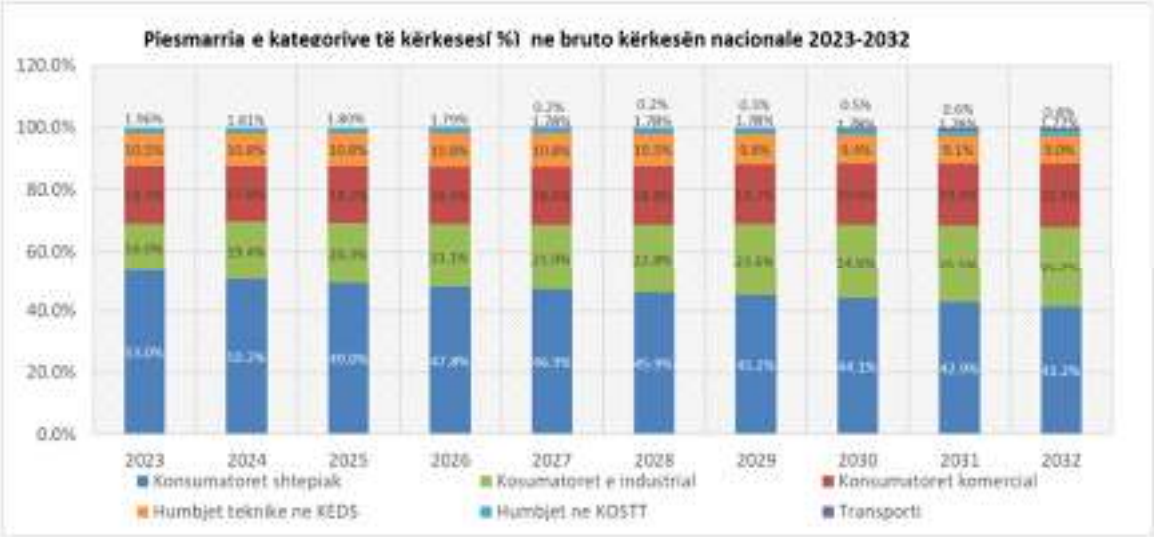


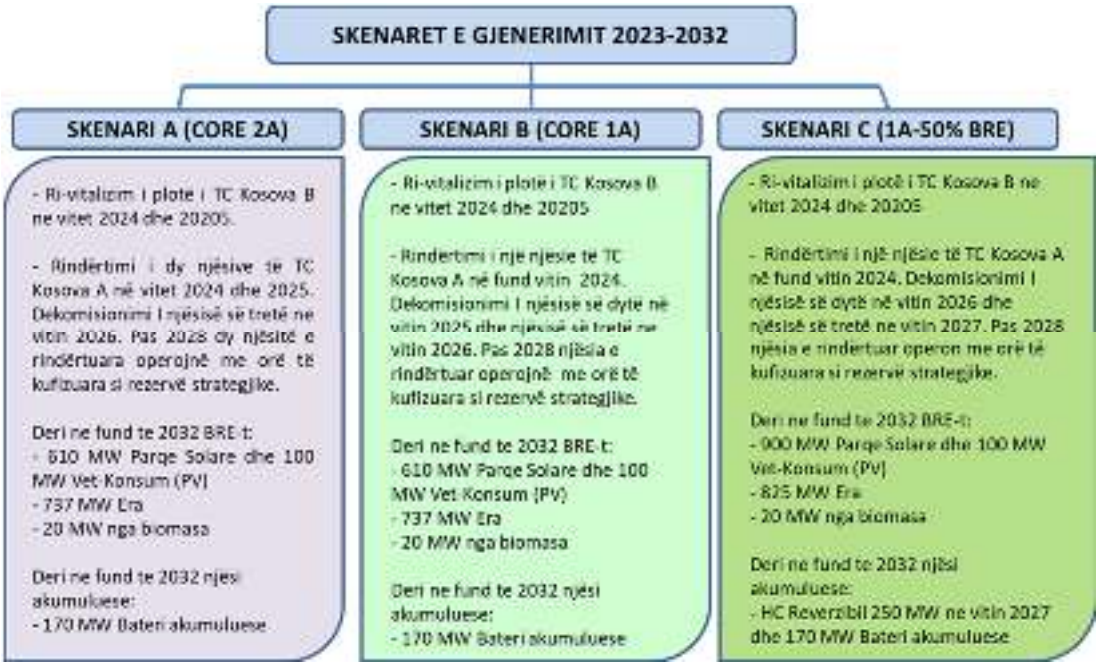
Fig. 2.17. The base scenario for electricity demand for the period 2023-2032, divided by customer categories

It should be noted that the data on forecast of industrial consumption is provided by Trepça and SharrCem (through KOSTT questionnaires) as well as based on the forecast of demand from Ferronikeli. The development of the remaining industrial consumption, such as food industry, light industry, industrial parks (manufacturing businesses), etc. are mainly based on GDP projections as the main factor for the development of this sector, respectively to increase the consumption of electricity for industrial purposes.

2.7.2 Forecast of electricity generation

The forecast of electricity generation for the period 2023-2032 is based on the two scenarios of COR-2A and COR-1A of the Energy Strategy 2022-2031 and the third scenario determined by TSO (KOSTT).
The scenarios for the development of new generating capacities (thermal power plants, renewable sources and flexible) are presented in Table 2.14.

Tab.2.14 The three scenarios of development of generation capacities in the period 2023-2032



a) **Scenario A**, moderate in terms of the intensity of de-carbonization, envisages the diversification of generation as follows:

- In 2024, the unit B1 of TPP Kosova B will undergo general revitalization from May and return to operation in January 2025. In 2025, the second unit B2 will also undergo general revitalization and return to operation in 2026. TPP Kosova B will have an increase in capacity and the level of emission of pollutants will be in compliance with the European directives on emission rates from generating units with fossil fuels.

- The unit A3 of TPP Kosova A will be re-constructed in 2024 and in 2025 it will return to work with a net capacity of 180 MW and the level of pollutant emission will be in compliance with the European directives on the norms of emission from generating units with fossil fuels.

- The unit A4 will be re-constructed in 2025 and in 2026 it will return to work with a net capacity of 180 MW.

- The unit A5 will be decommissioned in 2026.

- After 2028, the repaired unit(s) of the "Kosova A" thermal power plant will work as a strategic reserve from 2028, which means that this unit(s) will be (are) available in the season of heating when the demand for electricity is higher, or in exceptional cases such as the recent energy crisis. The third operating unit of this power plant will be closed permanently after the renovation of the other lignite units is completed.[1]

- As for RES, wind resources from the current capacity of 137 MW will reach 737 MW by 2032

[1] From the Draft-Energy Strategy 2022-2031, specific objective 1.3: Rehabilitation of existing capacities of electricity production, page 32

- As for solar (photovoltaic) sources from 10 MW that are now installed, they will reach the value of 610 MW in 2032. Self-consumption generating capacities (Prosumer-PV) from 10 MW as they are now in 2032 will reach the value of 100 MW.

- The small hydropower plants together with the existing capacities until 2032 will remain at the current value of 132 MW, mainly hydropower plants with river flow.

- The biomass generating sources are supposed to reach a capacity of around 20 MW in 2032.

- In order to increase the flexibility of the system as a result of the integration of RES, battery storage systems with a capacity of 170 MW will be built until 2032.

b) **Scenario B**, intensive in terms of the intensity of de-carbonization foresees the diversification of generation as follows:

- The TPP Kosovo B same as in Scenario A

- The unit A3 of TPP Kosova A will be re-constructed in 2024 and in 2025 it will return to work with a net capacity of 180 MW and the level of pollutant emission will be in compliance with the European directives on the norms of emission from generating units with fossil materials.

- The unit A4 will be decommissioned in 2025, while unit A5 in 2026.

- After 2028, the reconstructed A5 unit will operate as a strategic reserve with reduced operating hours and will mainly be activated in the heating season when the demand for electricity is higher.

- As for RES and the battery storage, the same applies as in Scenario A.

c) **Scenario C** is characterized by high intensity of decarbonization and integration of significant wind and solar capacities.

- The revitalization of TPP Kosova B is the same as in scenario 1.

- The unit A3 of TPP Kosova A will be re-constructed in 2024 and will return to work in 2025 with a net capacity of 180 MW. After 2028, the reconstructed A5 unit will operate as a strategic reserve with reduced operating hours and will mainly be activated in the heating season when the demand for electricity is higher.

- The unit A4 will be decommissioned in 2026, while the unit A5 in 2027.

- Regarding RES, wind resources will reach the value of 825 MW by 2032, while solar (photovoltaic) resources will reach the value of 1000 MW, of which 100 MW will be self-consumption generation. Hydropower plants and biomass remain with the same capacities as in scenarios A and B.

In order to increase the flexibility of the system as a result of the integration of RES systems, the 250 MW Reversible Hydropower Plant will be built in 2027, as well as the Accumulator Battery with a capacity of 170 MW in the 2026-2028 time period.

In figures 2.18, 2.19 and 2.20, you can see the share of thermal power plants, hydro power plants, renewable sources and accumulators (Battery, reversible HPP) in energy production, according to the three generation scenarios A, B and C.

For the three scenarios A-B-C, the wind capacity factor is taken to be 27%, while the solar park capacity factor is 15.7%, based on the historical data of the average production over the years of existing wind and solar power plants.

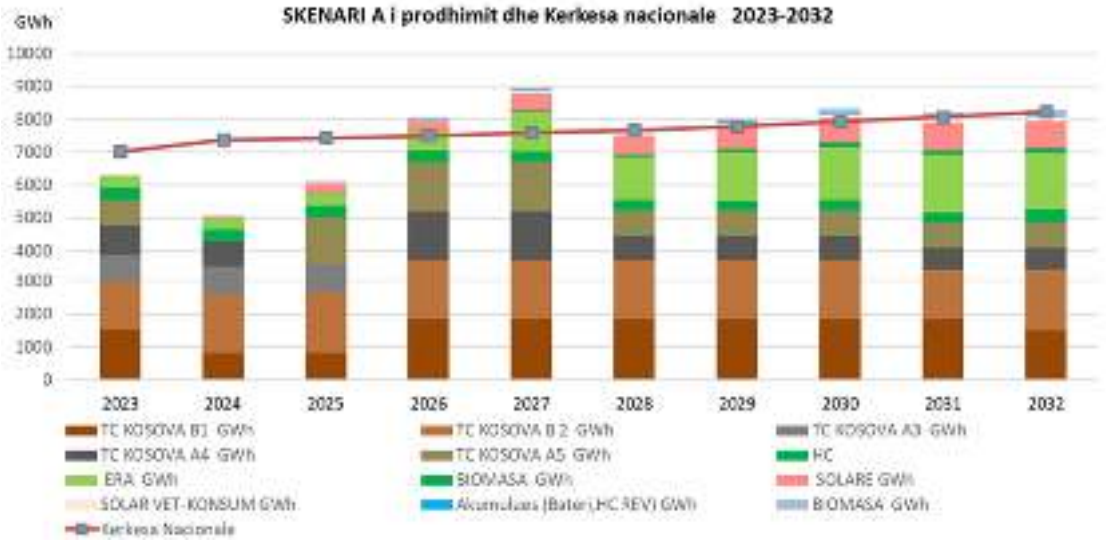


Fig. 2.18 Share in production of electricity according to scenario A of generation and national demand according to base scenario

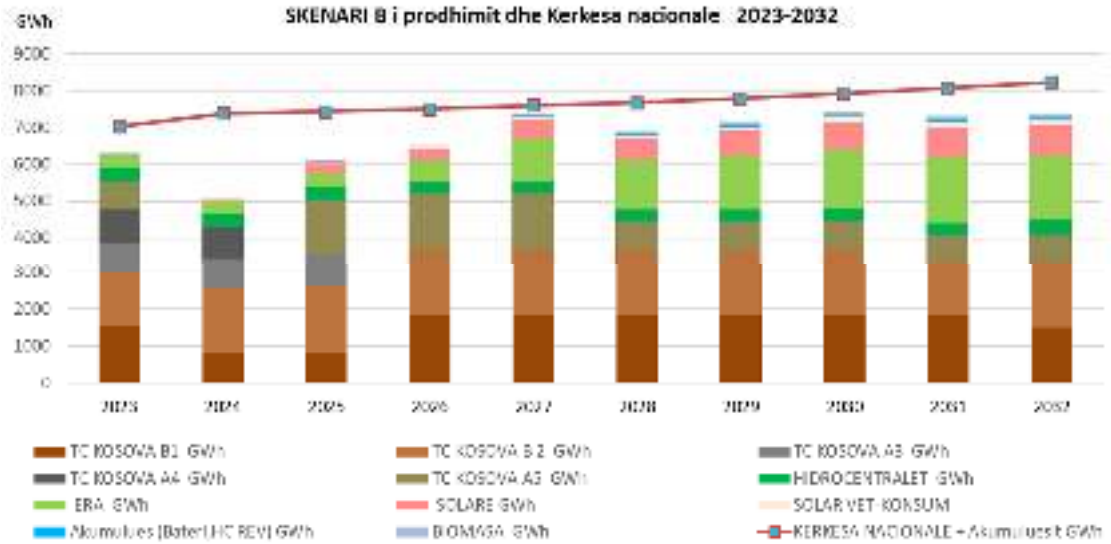


Fig. 2.19 Share in production of electricity according to Scenario B of generation

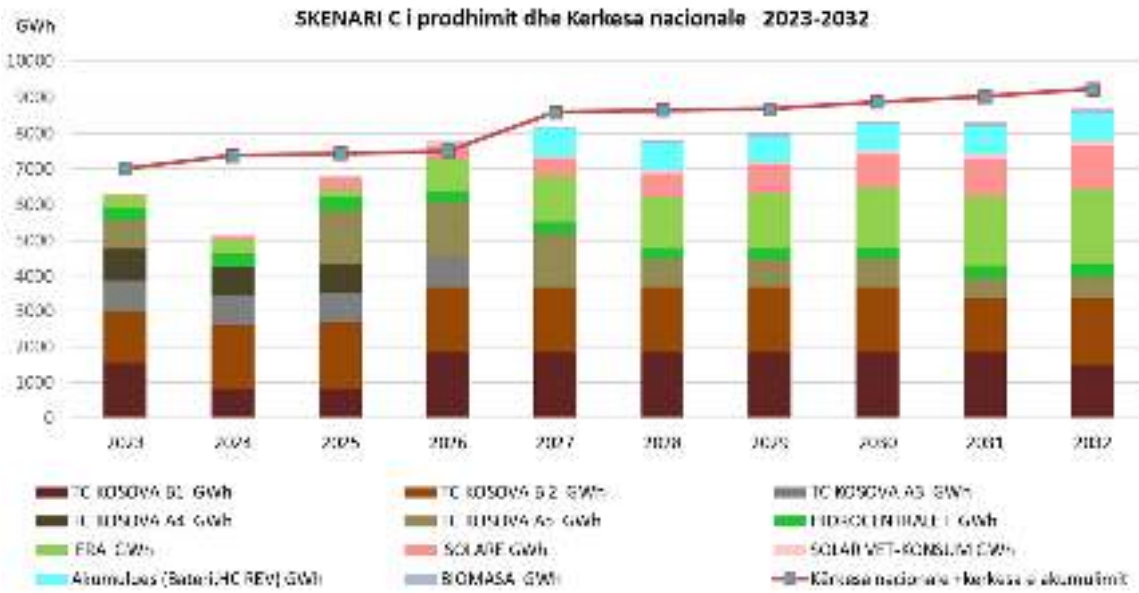


Fig. 2.20 Share in production of electricity according to scenario C of generation

2.7.3 The balance between production and consumption

The balance of electricity in the next ten years considers the forecasted demand and development of generating capacities and needs for electricity import or export. The realization of imports and exports of electricity depends on the demand and on the development of local and regional electricity markets. Figure 2.18 shows the balance of electricity for the period 2023-2032 defined by the difference between production (scenario A, B and C) and demand (base scenario).

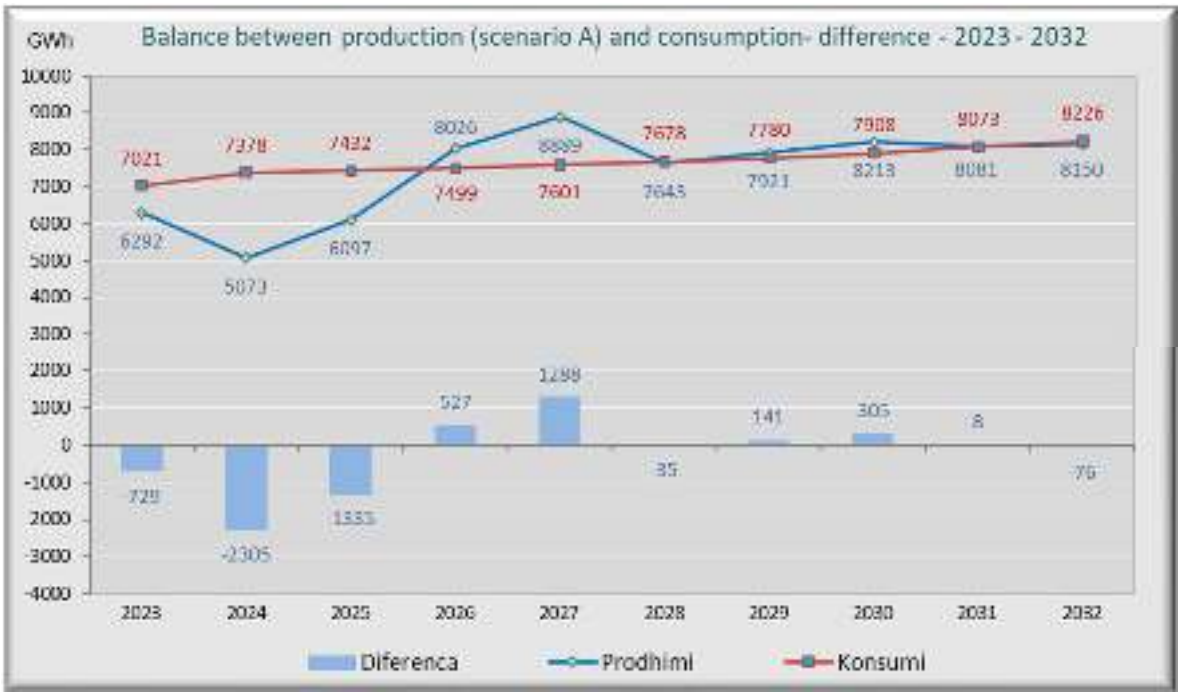


Fig. 2.21 The balance of electricity production (scenario A) and demand in the future (2023-2032)

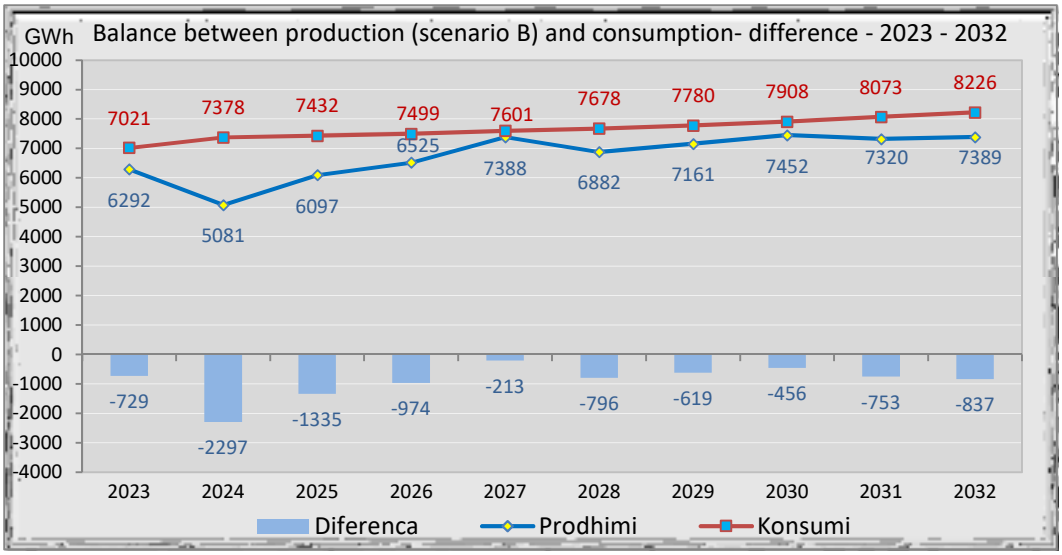


Fig. 2.21 The balance of electricity production (scenario B) and demand in the future (2023-2032)

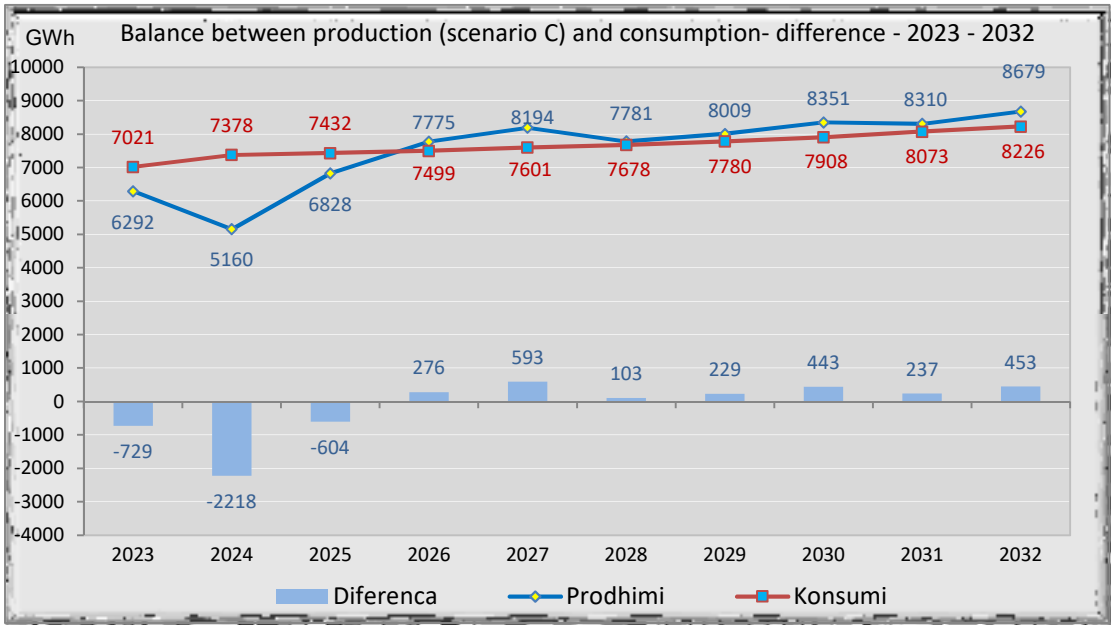


Fig. 2.21 The balance of electricity production (scenario C) and demand in the future (2023-2032)

The figure above shows the difference between planned net production, according to scenarios A, B and C and planned demand without taking into account the energy needed for ancillary services (primary, secondary and tertiary reserves) as well as the unused capacities of generating units. The negative values of the difference according to the figure represent the electricity deficit (need for imports), while the positive values represent the electricity surplus (possibility of export).

Given that electricity generation by RES is unpredictable, and the demand for electricity varies widely between peak loads and minimum load (off-peak), significant shortages of energy occur in different periods that should be covered by imports and energy surpluses that need to be exported, and this implies the need for additional generation capacities.

3. NATURAL GAS SECTOR

3.1 General description

Kosovo has no domestic production of natural gas and it is not linked to any operational natural gas supply networks. A connection to natural gas supply would be an important option for introduction of natural gas in Kosovo, which would have impacted diversification of fuel supply in the country and to increase security of supply.

Gas supply and consumption in Kosovo is therefore limited to bottled LPG (liquefied petroleum gas).

3.2 Legal and Institutional framework

In order to create the perspective for development of natural gas sector and fulfillment of the obligations that Kosovo has as a full member in Energy Community Treaty, the Kosovo Assembly in June 2016, adopted the Law no. 05/L-082 on Natural Gas, as part of the package of energy laws.

By adoption of this Law, the European third package legislation relevant for natural gas was transposed; mainly:

- Directive No. 2009/73/EC concerning common rules for the internal market in natural gas; and
- Regulation No. 715/2009/EC on conditions for access to the natural gas transmission networks.

Law on natural gas lays the foundations of legal and regulatory framework for the transmission, distribution, storage and supply of natural gas and the operation of gas transmission and distribution systems. Consequently, this law determines the organization and functioning of the natural gas sector and access to networks and gas market.

3.3 Description of the role of regulatory authority and/or other authorities

Law 05/L-084 on Energy Regulator established a strong, fully-independent Regulator (Energy Regulatory Office - ERO), completely autonomous from any governmental department to exercise economic regulation in the energy sector (Electricity, District Heating and Natural Gas) and defined its executive powers, duties and functions, primarily amongst which are:

- Issuing, amending, suspending, transferring and terminating licenses to carry out energy activities;
- Supervision, monitoring and ensuring compliance with licenses;
- Monitoring functioning of energy markets in Kosovo, including access conditions for parties;
- granting authorizations for construction of new generation capacities and gas pipeline systems, including direct electricity lines and direct pipelines;
- development and issuing tariff methodologies, and determining and approving tariffs for regulated services;
- to prescribe general conditions of energy supply;

- monitoring and taking actions, as stipulated by the law, to promote and enhance security of energy supply;
- monitoring the effective unbundling and development of competition in the energy sector, and
- review and approve customer protection measures and resolving disputes in energy sector.

The establishment of ERO falls within the wider framework of energy policy harmonization in South Eastern Europe, where Kosovo is the 'Contracting party' of the Energy Community of South East Europe (ECSEE).

3.4 Currently available production and import capacity

There is no production of gas in Kosovo, nor import capacity by pipelines.

3.5 Forthcoming production and import investment for the next three years

Authorized - There are actually no authorized investment projects.

Actually in process of construction - There are no projects under construction.

Requirements relating to supplier of last resort -There are no special requirements.

Incentives to increase production/import capacity or any type - There are no specific incentives in place.

3.6 Progress in major infrastructure projects

Important interconnection projects between or within Member States –

Besides the project ALKOGAP – Albania-Kosovo Gas Pipeline, for which the Prefeasibility Study was completed 2018, and the MCC study in 2020 for development of the gas sector in Kosovo, during this reporting period there have been other initiatives for development of the natural gas sector in Kosovo.

In 2023, the drafting of the National Gas Sector Development Plan and the Review and Assistance for the Regulatory Framework, financed through the WBIF platform, where the leading financial institution is the EBRD, was completed. This plan addressed the development of a comprehensive medium-term plan and the identification of the main gas projects, with the main objective of developing the relevant gas infrastructure within the country. There is also the review of the regulatory framework, the organizational and institutional evaluation and the Environmental Impact Assessment (EIA).

This plan included the main components as follows:

- Gas demand projections for the long-term period that have included: residential and service sectors, industry, district heating sector and generation of electricity.
- Assessment of the most favourable options for the supply of natural gas through regional interconnectors and respective evaluations for development of the internal grid of natural gas.

- Determination of the technical parameters of the pipeline and related stations and equipment, as well as the hydraulic analysis of the pipeline as well as the configuration and optimization of the system.
- Economic and financial analysis including assessment of investment costs and operation and maintenance costs, as well as cost benefit analysis.

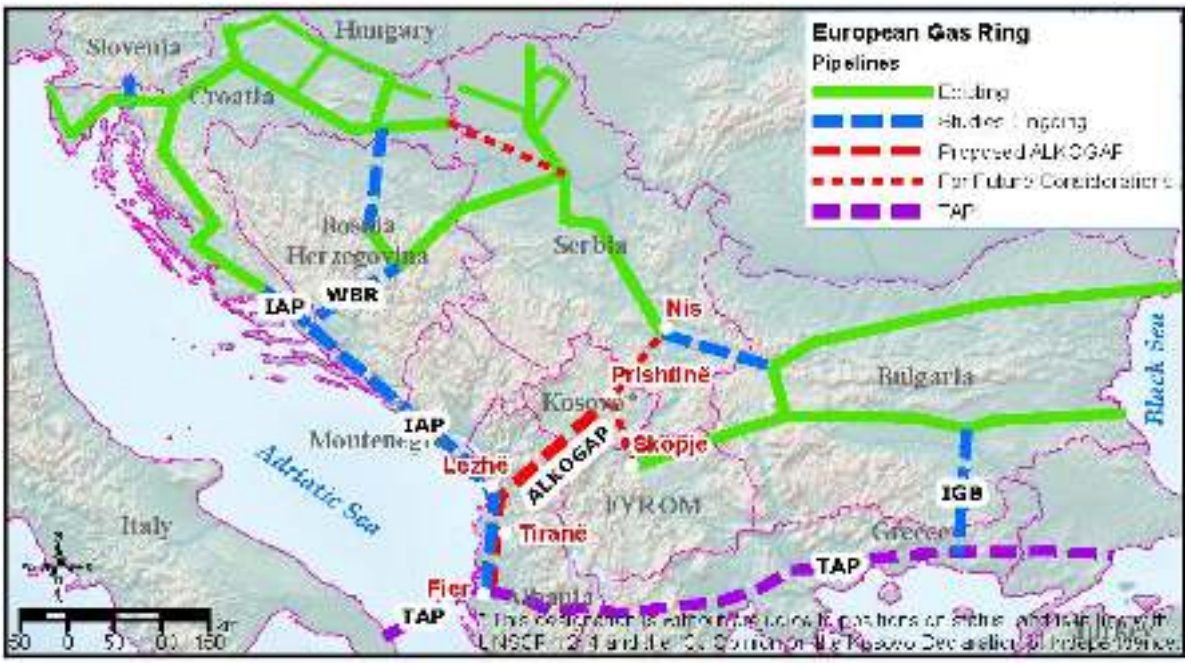


Fig. 3.1: Projects of regional gas infrastructure and options for connection of Kosovo

4. OIL SECTOR

4.1 Legal and Institutional framework

The main law that regulates the oil sector in Kosovo is Law No. 08/L-018 on Trade in Petroleum Products and Renewable Fuels, which was approved in February 2022. This law applies to entities that conduct activities with petroleum products and renewable fuels, including import, production, processing, storage, wholesale and retail.

The Department for Oil Market Regulation is a body within the Ministry of Industry, Enterprise and Trade (MINT) responsible for market regulation and the administration of permits for activities with oil products and renewable fuels. Licensing procedures for commercial entities operating in the oil sector are defined by Administrative Instruction no. 15/2022 on determining the procedure for obtaining a permit for entities operating in the oil and renewable fuel sector, approved in December 2022.

The control of the quality of oil products in the customs terminals is done by the Kosovo Customs, which also has an accredited laboratory. Monitoring and supervision of the market of oil products, including quality, is carried out by the Market Inspectorate, which is part of the MINT. For quality inspection, the Market Inspectorate cooperates with inspection bodies and testing laboratories accredited and appointed by MINT.

The quality of petroleum fuels is regulated by Administrative Instruction no. 01/2017on the quality of liquid petroleum fuels. We are currently in the final stage of drafting a new administrative instruction on the quality of fuels according to the law in force no. 08/L-018.

The drafting of the administrative instruction for biofuels in transport is foreseen in the legislative plan for 2024. Currently, the first draft of the administrative instruction for biofuels in transport has been prepared.

4.2 Domestic supply of crude oil and petroleum products

Kosovo has no oil resources and no capacity for oil refining, therefore it does not import crude oil. Kosovo is a net importer of oil products. Until the beginning of 2022, four licensed factories for the production of heavy fuel oil from imported raw materials have operated. They covered about 30% of the heavy fuel oil market in Kosovo until their licenses were revoked by MINT following the findings by the Market Inspectorate. Consequently, there is now no company licensed to produce heavy fuel oil.

4.3 Import and consumption of crude oil and petroleum products

Kosovo is a net importer of oil products, and the country's entire consumption is covered by imports. The following tables present the data on the net import of oil products during the years 2021 and 2022, based on the data provided by the Kosovo Customs.

The tables below show the data on import and export for the years 2021 and 2022.

Table 4.1: Data for petroleum products in 2021 (in 1,000 tons)

Petroleum products - 2021 [in tons]			
Fuel type as final product	Import 2021	Export 2021	Net import 2021
Diesel	601.7	-	601.7
Biodiesel	-	-	-
Petrol	62.7	-	62.7
Gasoil	-	-	-
Jet fuel	2.4	-	2.4
LPG	22.9	-	22.9
Petrolcoke	84.5	1.4	83.1
Heavy fuel oil	22.1	-	22.1
Lubricants	5.8	0.0	5.8
Bitumen	42.9	0.0	42.9
Bottled natural gas	1.0	-	1.0
Total	**846.0**	**1.4**	**844.5**

Table 4.2: Data for petroleum products in 2022 (in 1,000 tons)

Petroleum products 2022 [in 1,000 tons]			
Fuel type as final product	Import 2022	Export 2022	Net import 2022
Diesel	562.8	-	562.8
Biodiesel	-	-	-
Petrol	58.2	-	58.2
Gasoil	-	-	-
Jet fuel	3.6	-	3.6
LPG	22.0	-	22.0
Petrolcoke	106.9	24.0	83.0
Heavy fuel oil	14.2	-	14.2
Lubricants	5.3	0.0	5.3
Bitumen	28.5	0.0	28.5
Bottled natural gas	0.8	-	0.8
Total	**802.1**	**24.0**	**778.1**

4.4 Imports dependency and origin of imported fuels

Kosovo is completely dependent on imports of oil products. Imports of oil products have mainly originated from Greece and Saudi Arabia and a smaller part from Italy, North Macedonia, Serbia, etc.

4.5 Domestic supply of crude oil and petroleum products

Law No. 08/L-018 on Trade in Petroleum Products and renewable fuels does not oblige the points of sale and storage of petroleum products to keep reserves.

Kosovo has an amount of oil product reserves based on Law no. 03/L-244 for State Reserve Goods. They are stored in contracted private warehouses. Their amount and location is not public information.

For several years now, Kosovo has finalized the draft law on mandatory oil reserves in accordance with directive 2009/119/EC. This draft law is scheduled to be sent to the government for approval according to the legislative plan at the end of 2024.

Kosovo currently does not have a national plan for fulfilling the obligations according to directive 2009/119/EC.

Current licensed landfills have a capacity of about 55,000 m3, while retail outlets have a capacity of about 50,000 m3. There are currently 14 landfills that are licensed for the storage of diesel, gasoline, NLG, jet fuel, heavy fuel oil).

4.6 Oil infrastructure

Kosovo does not possess a pipeline for crude oil nor for oil products. Oil products are almost completely imported by road transportation.

4.7 Import/Export Customs duty

The customs tax is regulated by the relevant legislation in force that fulfills the obligations of international agreements (CEFTA, Energy Community Treaty) in the oil sector; specifically, Law 04/L-163 and Administrative Instruction no. 05/2015 supplemented by Administrative Instruction no. 07/2016, 09/2016 and 05/2017 for goods exempted from customs tax specifies oil products exempted from customs tax.

In article 3, paragraphs 1 and 2 of Law no. 04/L-163 for goods exempted from customs tax and goods with zero customs tax rate (Official Gazette: 2/2014), the exemptions of goods from customs tax are regulated, as follows:

> *1. Subjects and goods exempted from customs tax or the reduction or suspension of customs tax at zero rate, is regulated by a sub-legal act issued by the Government of the Republic of Kosovo and the Assembly is notified of this. (ref. AI no. 05/2015 completed with AI No. 07/2016, No. 09/2016 and No. 05/2017)*
>
> *2. The initial exemptions are defined in Parts A, B, C and D of Annex 1 (one), attached to this law*

Part B.

List of goods with zero customs tax

1. Products listed as follows:

Tariff code	Description
2710193100 to 2710194800 2710201100 to 2710201900	Petroleum

4.8 Price Regulation, role of the regulatory authority

According to Law No. 08/L-018 on Trade in Oil Products and renewable fuels, the authority responsible for the regulation of the oil sector in Kosovo is the Department for Oil Market Regulation within MINT.

Product prices are determined by the free market. However, the law provides that the Government, by a sub-legal act proposed by the Minister, determines the regulation of prices in the event of a sudden and continuous shortage of oil products and renewable fuels, natural disaster, non-adjustment of local prices to large price movements in the world market, the unjustifiable difference of local prices with the prices of the countries of the region. In June 2022, Administrative Instruction (QRK) no. 03/2022 on the regulation of the prices of petroleum products and renewable fuels and other protective measures was approved and the amendment of this administrative instruction was made in June 2022. The measures of regulation of the maximum margin and the maximum price for diesel and gasoline have been implemented for several months in a row during 2022 and 2023.

5. CONCLUSIONS

Kosovo's energy sector is partly based on domestic sources and partly on imports. Electricity fulfills over 90% of demand from domestic generation, while as far as natural gas is concerned, it should be noted that there is no network developed, whereas all oil and oil products comes from imports.

With respect to electricity, the sector is advancing regarding its generation capacities, transmission, distribution and supply of customers in general.

- There have been investments in new network equipment as well as maintenance, but also in electricity generation, particularly regarding Renewable Energy Sources.
- The transmission network is in good condition, following the investments in the infrastructure. The transmission capacities fulfill the required criteria, especially with the construction and operationalization of a 400kV line Kosovo - Albania.
- The blocking by Serbia of the allocation of cross-border transmission capacities for commercial use remains a very important issue with an impact on security of supply in the country and in the region.
- The distribution network still remains in unsatisfactory conditions and investments are required to ensure quality and sustainable supply for consumers.
- Due to the emergent power situation and financial liquidity of the licensees, there have been reductions of energy to customers during this reporting period.
- The situation of electricity supply of consumers for the period 2021-2022 can be considered acceptable, but in order to have better quality of electricity supply to customers, continuous investments are required, especially in the distribution network as well as in production.
- The issue of balancing the system remains problematic as there is insufficient generation capacity, especially flexible ones, which could be activated in cases of power shortages or failure of a larger unit. Thus, in order to cover consumption during peak hours, electricity imports are required, whereas for off-peak hours, especially at night, there are electricity surpluses which could be exported.

According to the Energy Strategy 2022 - 2031, in order to cover the local demand for electricity, which is growing, and potentially to export electricity, the construction of new production capacities is envisaged that will result in increased security of electricity supply.

With respect to natural gas, Kosovo does not have domestic natural gas production and is not connected to any natural gas supply operational network.

The important issue remains:

- A connection to any of the regional networks to enable the supply of natural gas. This would be an important option for the introduction of natural gas in Kosovo;
- Some studies and plans for the connection with the regional gas networks which were under development, were actualized after the completion of the TAP project.

Kosovo does not have sources of unrefined oil or capacities to carry out its processing, therefore Kosovo is a full importer of oil products.

- Currently there are storage facilities which are licensed for wholesale (diesel, gasoline, LPG).
- Wholesale and retail prices are freely set from the market and there is a considerable competition.

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