Republika e Kosovës
Republika Kosova - Republic of Kosovo

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

Statement of Security of Supply for Kosovo 2019 - 2020

(Electricity, Natural Gas, and Oil)

Pristina, December 2021

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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. 05L-081 On Energy,
- Law No. 05L-085 on Electricity,
- Law No. 05L-084 on the Energy Regulator,
- Law No. 05L-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 nondiscriminatory 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 neighboring 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 95% 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, the 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 is in the process of finalization and approval. These documents also contain the charges for the connection of generators from RES to respective networks.

Regarding the promotion of renewable resources, MED 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). 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.

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 and which is expected to start being implemented during 2021.

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 now 8 economic operators have been licensed, but they have not yet started with commercial operation.

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 2019 has been a net importer, whereas during 2020 it has been a net exporter.

Tab. 2.1 Basic data of the power system

	Të dhënat bazë të sistemit elektroenergjetik GWh	2019	2020
1	Prodhimi nga gjeneratorët në transmetim	5,650	6,187
2	Prodhimi nga gjeneratorët në shperndarje	68	114
3	Importi	928	839
4	Gjithsej energjia në disponim	6,646	7,140
5	Eksporti	905	1,283
6	Net import/eksport	-24	444
7	Devijimet e sistemit (marrje nga sistemi)	-260	-316
8	Transiti	1,696	1,918
9	Kërkesa nacionale	6,001	6,167
10	Humbjet në transmetim	105	107
11	Konsumi i konsumatorëve në rrjetin e transmetimit	464	396
12	Konsumi LLOMAG	110	114
13	Ngarkimi në rrjetin e shpërndarjes	5,322	5,549
14	Humbjet në shpërndarje	1,378	1,409
15	Neto konsumi në shpërndarje	3,944	4,140

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 market integration between our countries, it is necessary to continue the harmonization of legislation and secondary regulatory acts in order to eliminate the obstacles that may arise in this direction. In this context, with the USAID assistance, the working groups already established with the composition of Ministries, Regulators and System Operators are working in this direction. Additionally, the operation of both systems, as a single control zone, based on the agreement signed at the end of 2019 between the two system operators, with the approval of both regulators, is an important step towards market unification and optimization of interconnection capacities. The working groups already established between TSOs, Regulators and Electricity Exchanges are continuing their work for the revision of the primary and secondary legislation to enable the unification of these markets as well as on the steps that need to be taken for its operation.

ERO has approved the Rule on Wholesale Energy Market Integrity and Transparency (REMIT), which is a transposition of Regulation No. 1227/2011 of the European Parliament and the Council of Europe, which puts an emphasis on increasing transparency and maintaining the integrity of the wholesale energy market both domestically and in the region.

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.

The interconnection line 400 kV SS Kosovë B - SS Kashar (Tirana) which was finalized in 2016 was put into regular operation in December 2020 after the start of the implementation of the agreement on Secondary Frequency/Power Regulation between KOSTT and OST of Albania for operation as regulatory area/block within ENTSO-E.

During the period 2000 -2020 sufficient investments have been made in the transmission network in order to enhance the transmission network capacities. These investments have increased the security of supply and have resulted in a significant decrease of transmission losses. Due to these investments, Kosovo's power transmission network meets the domestic transmission needs as well as the N-1 criterion, except for the Therande - Rahovec line, which remains in radial supply.

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

Tab. Tab. 2.2 Transmission Network Lines

Tensioni (kV)	Pronari	Gjatësia (km)
400	KOSTT	279.5
220	KOSTT	238.5
110	KOSTT	892.5
Gjithsej		1,410.5

Tab. Tab. 2.3 Substations in the transmission network

Transformimi (kV/kV)	Pronari	Nr. i NS	Nr. i TR	Fuqia (MVA)
400/220	KOSTT	1	3	1200
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	16	26	949.5
110/35	KOSTT	11	19	641
110/10	KOSTT	6	8	252
35/110 (Deçan)	Kelkos	-	1	40
Gjithsej		51	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.

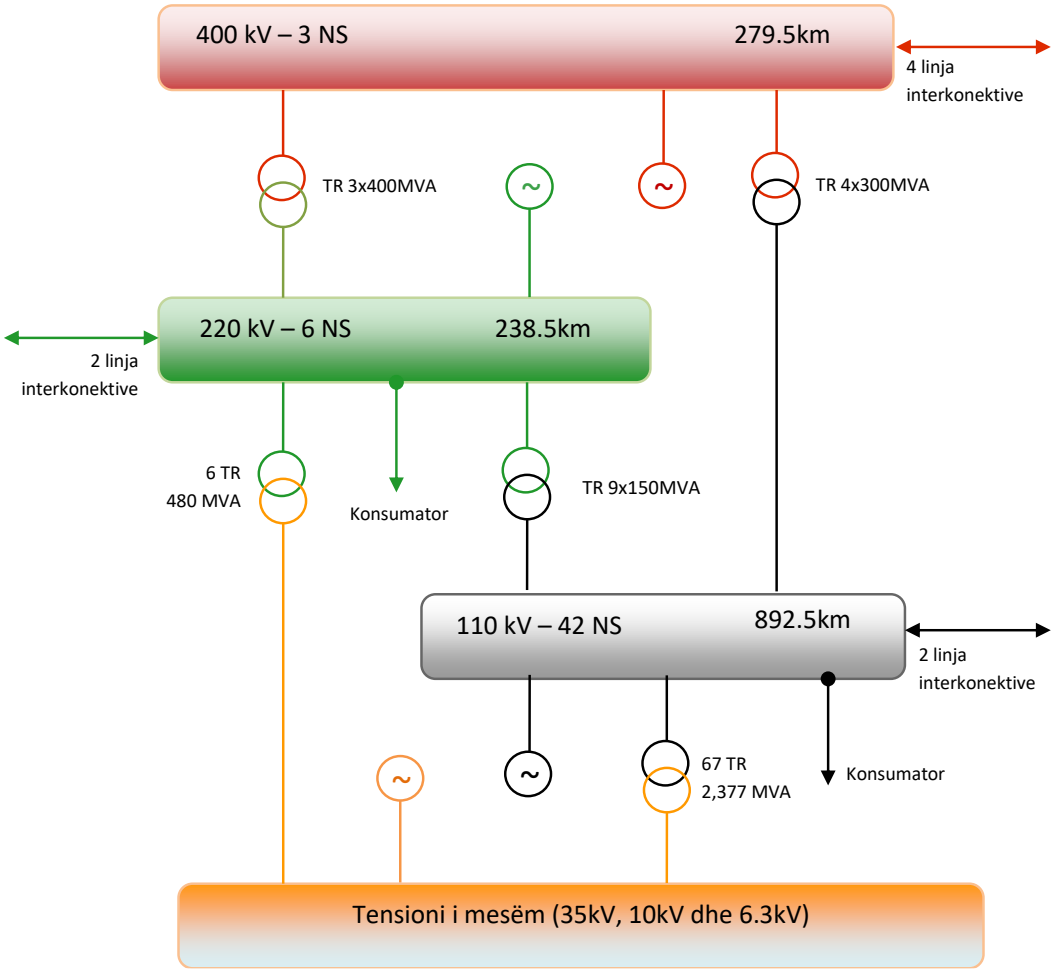


Fig. Fig. 2.1 Basic data of transmission system

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 transit and consumption is up to 31% (the transit ratio). 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.

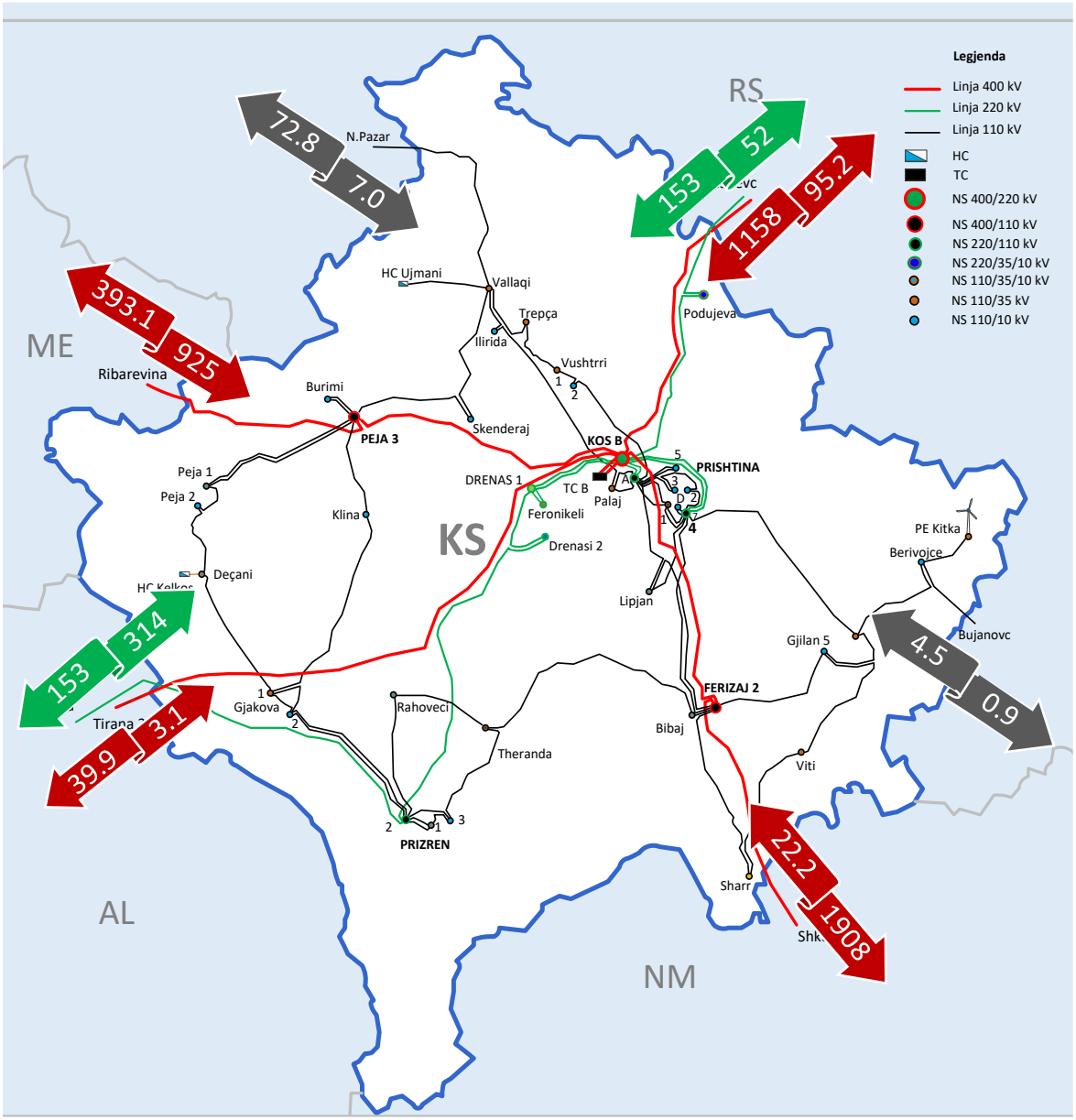


Fig. 2.2. Electricity flows through cross-border lines 2020

Transmission Losses

In recent years can be noted certain stabilization of the curve of electricity losses in transmission. During the year 2019, transmission losses were 105 GWh, or in percentage 1.76% of the overall consumption, while in 2020 these losses were 107 GWh, or 1.74% 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 2020 are 1.18%.

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

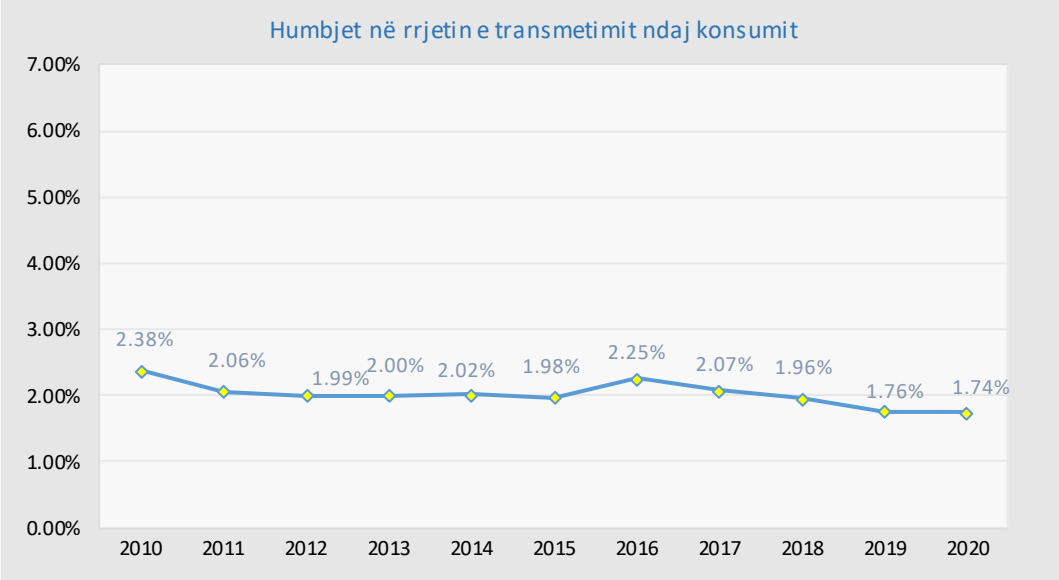


Fig. 2.3. Transmission losses 2010-2020

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.

Investments realized in transmission system 2019 and 2020

- *110/10(20) kV – SS Prishtina 6 (Dardania) and two 110 kV HIS fields in SS Prishtina 4;*
- *220/10(20) kV – SS Drenasi 2;*
- *110/10(20) kV – SS Mitrovica 2 (Ilirida);*
- *Single air line 110 kV SS Rahoveci - SS Theranda has been completed;*
- *Dual air 110 kV and cable line, SS Fushë Kosova is expected to be completed in Q2 2021;*
- *Refurbishment of Command buildings in: SS Deçani, SS Lipjani, SS Burim, SS Viti, SS Prishtina 3, SS Prizreni 3, SS Gjakova 2, SS Besiana and SS Vitia, SS Gjakova 1;*
- *SS Prishtina 4- Rehabilitation of own Consumption, AC/DC Cabinets and Cables;*
- *Rehabilitation of enclosures AC 400V;*
- *Inclusion of new substations in the SCADA/EMS system in QND and QEND.*

Some of these investments have not yet been completed, but are before completion.

Planned investments in new transmission capacities

The transmission network is in good condition following the investments in infrastructure, however, continuous investments are required, taking into account the security of supply that includes the increase of transmission capacity, strengthening the transmission network, network revitalization, load support, support of the transmission system operation etc.

Over the next few years, investments are expected in projects that will impact on the security of supply to customers:

Reinforcement of the transmission network

- *Variable reactor 100MVAr, 400 kV at SS Ferizaj 2;*
- *The second transformer 40MVA in SS 110/10(20) – Klinë;*
- *Re-vitalization of the 110 kV line: SS Prizreni 1 - SS Prizreni 3;*
- *New line 110 kV SS Prizren 1- SS Prizren 2;*
- *The second transformer 40 MVA in SS 110/10(20)kV Gjilani 5;*
- *Replacement of transformer in SS 110/10kV Deçani (40MVA);*
- *Replacement of transformer in SS 110/10kV Gjakova 1 (40MVA);*
- *Replacement of transformer in SS 110/10kV Therande (40MVA);*
- *Replacement of transformer in SS Ferizaj 1, (40MVA);*
- *Reconstruction of the 110 kV line: SS Palaj A- SS Ilirida - SS Vallaq (segment 150mm2);*
- *Replacement of transformer in SS Prizren 1 and Peja 1 (40MVA);*
- *New cable line 110 kV SS Prishtina 2 - SS Prishtina 4;*
- *Re-vitalization of the 110 kV line: L116 (155/2) Vallaq- Border;*
- *Replacement of transformer in SS Gjakova 1, Gjilani 1, and SS Vitia (40MVA);*
- *Re-vitalization of the 110 kV line: L127 SS Bibaj - SS Kastriot (new SS);*
- *Re-vitalization of the 110 kV line: L106 SS Ferizaj 2- SS Sharr;*
- *SS NASHEC, 400/220/110 kV with the connection line 400 kV;*

Load Support

- *SS 110/35/10(20) kV - Fushë Kosova;*
- *SS 110/10(20) kV Kastrioti (Ferizaj 3) with 110 kV transmission lines;*
- *SS 220/10(20) kV Malisheva with 220kV transmission lines;*
- *SS 110/10(20) kV Dragashi with 110kV transmission lines;*

Revitalization of the substations of transmission system

- *Revitalization of TL equipment in SS Klinë and SS Burim;*
- *Re-vitalization of TL equipment in SS Vallaqi;*

Support of Transmission System Operation

- *Air line signalization for aviation security;*
- *Upgrade of SCADA/EMS;*
- *Migration to advanced telecommunication systems;*

Support of Generation Connection

- *EEC "Selaci 1, 2 and 3", 105 MW, 30 turbines with a capacity of 3.45 MW;*

- *HPP "Lepenci", 9.92 MW;*
- *EEC "Koznica", 34.5 MW, 10 turbines with the capacity 3.45 MW;*
- *EEC Reversible Hydropower Plant 250 MW;*
- *EEC ÇIÇAVICA 116 MW;*
- *Installation of solar panels and energy efficiency at KOSTT substations*

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

Transformimi (kV/kV)	Pronari	Nr. i NS	Nr. i TR	Fuqia e instaluar (MVA)
35/10	KEDS	44	94	662
35/10	Privat	11	15	68
35/20	KEDS	2	5	41
35/6 kV	Privat	5	8	43
35/0.4kV	Privat	17	23	22
10(20)/0.4	KEDS	2,511	2,606	1,329
10(20)/0.4	Privat	2,582	2,592	1,254
10/20	KEDS	1	1	109
10/0.4	KEDS	2,865	2,865	868
10/0.4	Privat	1,247	1,253	606
6(3)/0.4	KEDS	66	66	13
6/0.4	Privat	1	1	1
Gjithsej		9,353	9,530	5,017

Tab.2.5 Basic data for DSO lines

Tensioni (kV)	Pronari	Rrjeti ajror (km)	Rrjeti kabllor (km)	Gjithsej (km)
35 kV	KEDS	482	137	619
10(20) kV	KEDS	1,536	521	2,057
10 kV	KEDS	4,165	904	5,069
6 kV	KEDS	42	8	50
3 kV	KEDS	4	1	5
0.4 kV	KEDS	17,484	2,561	20,045
Gjithsej		23,713	4,132	27,845

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 2010 – 2020.

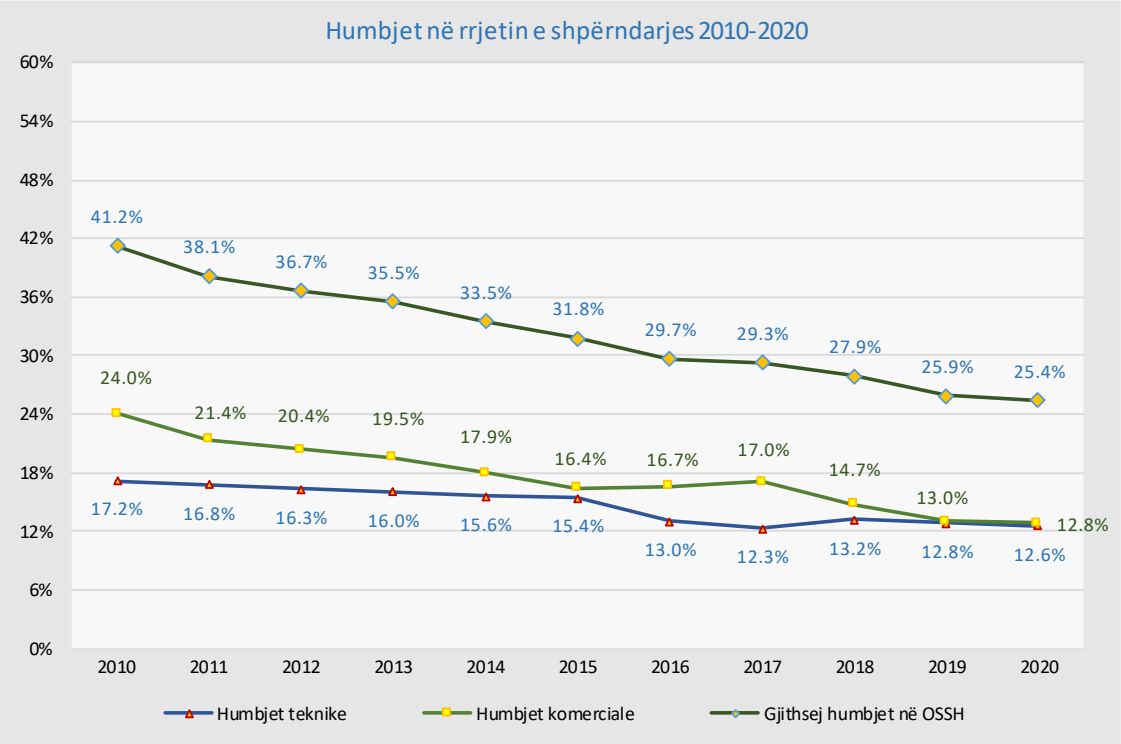


Fig.2.4. Distribution Losses 2010-2020

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. These investments consist of:

- ***Master Plan projects**, which shall have a great impact on sustainability and quality of supply. In total, they include 147 projects in all 7 districts in Kosovo.*
- ***Crossing projects at 20 kV level**, which shall have a major impact on reducing technical losses, and at the same time is a requirement to meet EU standards. In total, in this period (2018-2022), they include 35 projects in all 7 districts in Kosovo.*
- ***Network expansion projects**, which have emerged from the new demand for consumption and which will help reduce the decline in voltage, losses and improved supply quality. They comprise a total of 446 projects in all 7 districts in Kosovo.*
- ***Network Reinforcement projects** are mainly oriented to the low voltage network, and tend to improve the quality of supply and reduce losses. In total, they comprise 437 projects in all 7 districts in Kosovo.*
- ***Meters** include projects that are the result of legal requirements, ensuring the continuity of distribution services and which will have an impact on all customers.*
- ***Smart Grid projects** have an impact on the modernization of the system, in line with the transmission system network, and the reduction of SAIDI, SAIFI and/or Energy-Free (ENS). They include 63 projects in total.*
- ***Machinery**, are a necessity to ensure business continuity, and which over time should be changed due to their high maintenance cost and/or unrepairable damages.*
- ***Support services**, which represent services, such as IT (Information Technology), which are also needed to ensure business continuity but also projects under legal requirements.*

ERO is at the end of analyzing and approving the ten-year DSO Development Plan. Therefore after the approval of this development plan, 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 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 - 2020 for the transmission network, and the indicators SAIDI (in hours), SAIFI (number of interruptions) and ENS (GWh) for the years 2015 - 2020 in the distribution network.

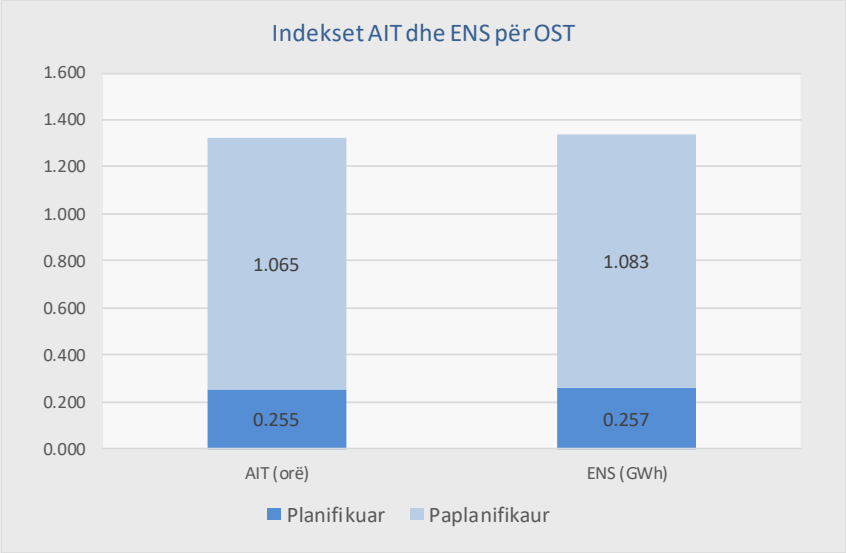


Fig. 2.5 Indicators AIT and ENS for TSO for the period 2015-2020

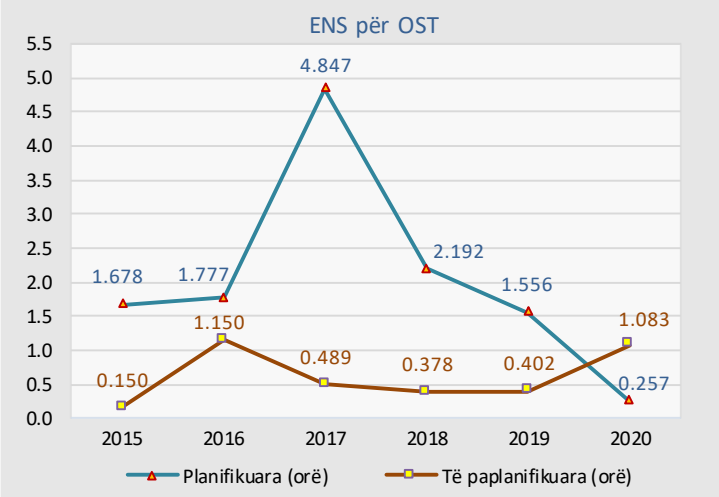


Fig. 2.6 ENS measuring index for TSO for the period 2015 - 2020

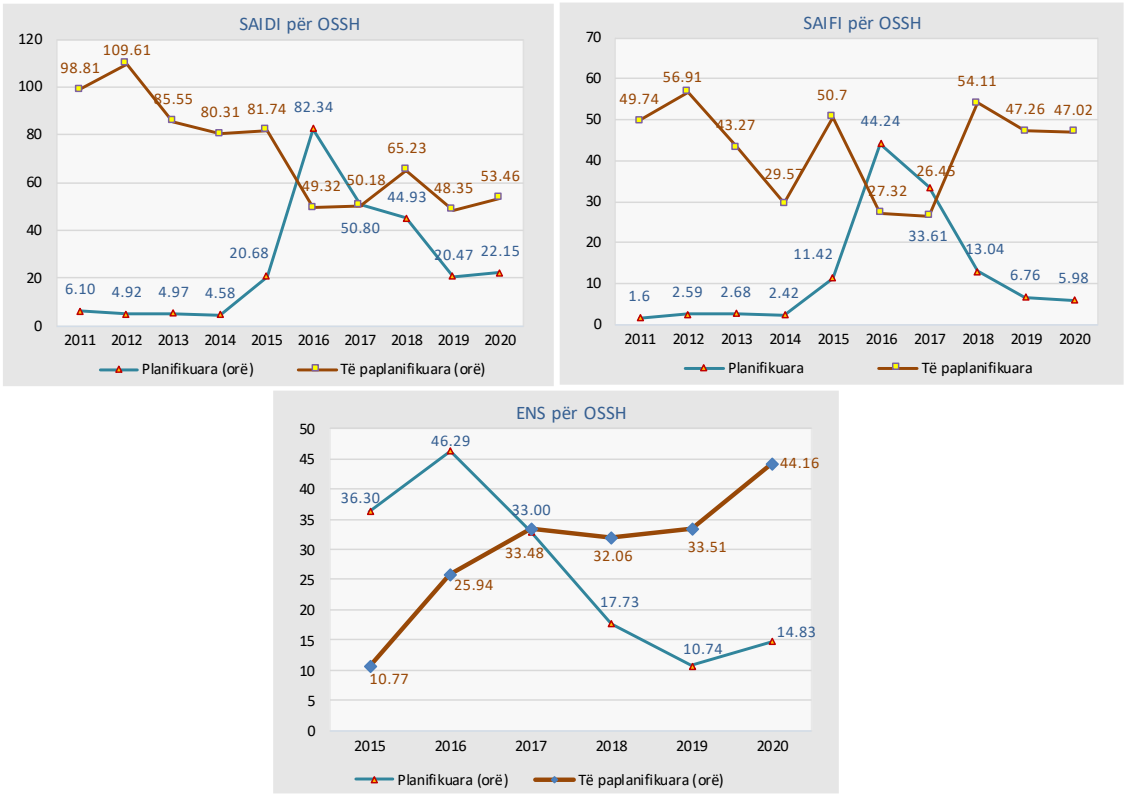


Fig. 2.7 Indicators SAIDI, SAIFI and ENS for DSO for the period 2011-2020

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 94% 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 68.45 MW.

Tab.2.6 Electricity Generation Capacities

Njësitë prodhuese	Kapaciteti i njësive (MW)			Futja në operim
	Instaluar	Neto	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		1983
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
Gjithsej HC (jasht skemës mbështetëse)	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		2019
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
Wind Power	1.35	1.35		2010
Air Energy-Kitka	32.40	32.40		2018
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
Gjithsej BRE (në skemën mbështetëse)	98.63	98.63		
Gjithsej	1,441.88	1,109.92		

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.

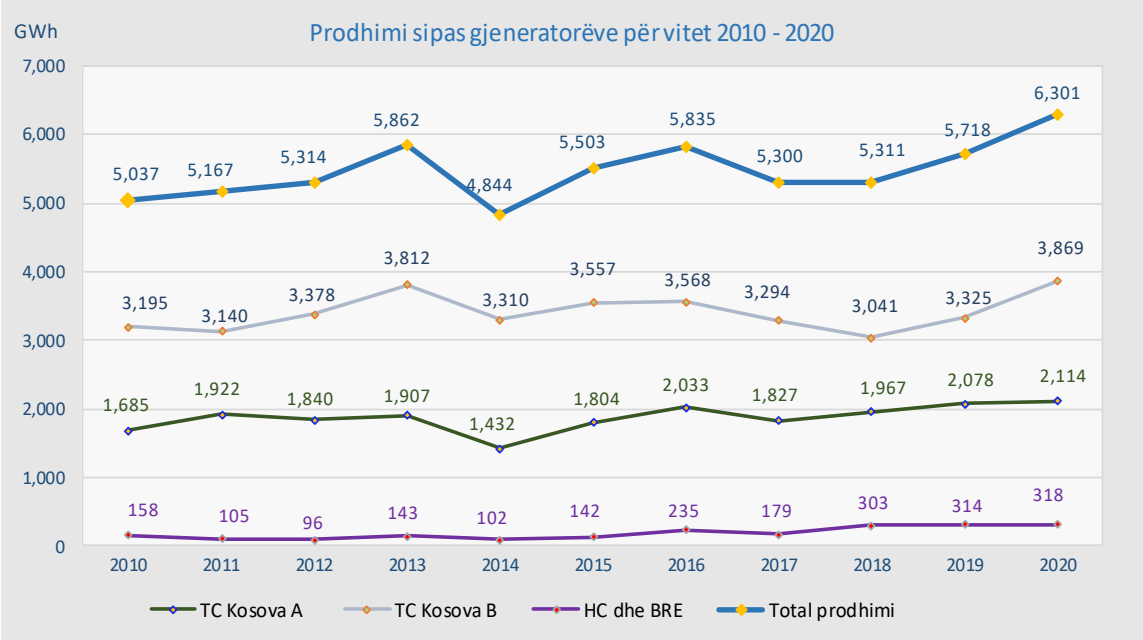


Fig.2.8. Overall generation 2010-2020

2.4.2 Operation of generating units

The operation of the generating units of TPP Kosova A and TPP Kosova B during 2017 and 2018 has been close to the forecasts in the energy balances, both for operating hours as well as for the energy provided in the system. The number of interruptions from the operation of lignite generation units in 2020 was the same compared to 2019.

The table below shows the types of interruptions of power plants for 2019.

Tab.2.7 Interruptions of generating units in 2019

2019	TC Kosova A			TC Kosova B	
	A3	A4	A5	B1	B2
Ndalesat e planifikuara	3	3	3	2	1
Ndalesat e paplanifikuara	4	5	1	8	7
Rëniet	0	0	2	2	7
Gjithsej ndalesa	7	8	6	12	15
Orë pune	3,271	6,262	6,802	7,652	5,275

The table below shows the types of interruptions of power plants for 2020.

Tab. 2.8 Interruptions of generating units in 2020

2020	TC Kosova A			TC Kosova B	
	A3	A4	A5	B1	B2
Ndalesat e planifikuara	1	3	2	2	1
Ndalesat e paplanifikuara	8	3	3	1	8
Rëniet	3	1	1	3	8
Gjithsej ndalesa	12	7	6	6	17
Orë pune	3,609	7,190	5,598	7,660	7,716

It is worth mentioning that during 2019 and 2020 the hours of operation of the generating units TPP Kosovo A and TPP Kosovo B were lower than the planning, but it is characteristic that in 2019 unit A3 worked only 37% of the year, and unit B1 in 2020 worked only 87% of the year, whereas unit B2 worked 88% of the year. The number of operating hours of unit B2 in 2018 is higher even comparing to the first years of operation of this unit.

2.4.3 Renewable Energy Sources

European Directives and obligations deriving from the ECT define the requirements related to RES. These resources take an important role in consumer supply with electricity and should be taken into account when forecasting investments in the energy sector. Laws in energy sector of Kosovo also support RES investments.

The criteria for investment in RES shall take into account the targets set by MED, the level of consumer affordability, system stability, and their impact on system balance. Based on the long-term targets of Kosovo Energy Strategy, government policies, i.e. Administrative Instruction no. 01/2013 and no. 05/2017 on "Renewable Energy Targets", Pre-feasibility Study for Identifying Water Resources for Small Hydropower Plants in Kosovo, as well as the obligations deriving from the Energy Community Treaty of South East Europe in the area of new generation capacities from renewable sources, ERO has completed the secondary legislation on renewable energy sources Among the important activities of ERO is the issuance of authorizations for construction of new energy capacities including generation from renewable energy sources, in accordance with Article

43 paragraph 1 of the Law on Energy Regulator, and the Rule on Authorization Procedure for Construction of New Capacities approved by ERO.

ERO has reviewed applications/requests received for authorization for the construction of new generation capacities, in accordance with the laws on the energy sector and relevant regulations, ensuring that such applications have been reviewed in an objective, transparent and nondiscriminatory manner. During the assessment of the applications, ERO has taken into account relevant criteria that had to be met by the applicant as required by the Rule on the Authorization Procedure for Construction of New Capacities.

During 2019 and 2020, ERO has issued 22 preliminary authorizations for construction of new generating capacities from solar sources, which have been considered as "pending" applications, with an installed capacity of 66 MW.

During the reporting period, ERO has issued 2 final authorizations for the construction of new generating capacities from Wind Turbines with an installed capacity of 11 MW and from Biomass with a capacity of 1.2 MW (Gjakova District Heating).

From the above-mentioned final authorizations, 9 projects have been put into commercial operation: solar power plants Solar Green Energy, Eling and hydropower plants HPP Orqusha, Lepenci 3, Lumbardhi II and HPP Brodi 3, HPP Bresana, HPP Albaniku II and HPP Binqa with a total installed capacity of 33.16 MW, while other power plants are under construction and in different stages of construction according to the terms of the authorizations.

Projects which are being constructed according to the dynamic plan of realization and according to legal deadlines, are four (4) projects, from Wind Turbines where 103.4 MW with a total of the twenty-seven (27) turbine, at the Wind Park in Bajgora, Municipality of Mitrovica, and the Wind Park Budakova project with a capacity of 11 MW with a total of three (3) turbines are being constructed in Budakove, Municipality of Suhareke. Additionally, under construction are a number of small projects, hydropower plants, where according to work dynamic plan it is expected that they are realized in 2021, as well as the project from Biomass with a capacity of 1.2 MW of electricity and 15 MW of thermal energy which will be implemented by the Public Central Heating Company of Gjakova, a project funded by the European Commission.

Furthermore, during the same period, several projects have been received for obtaining authorization for construction of new generating capacities, which are in different stages of review, among which three Hydropower plant projects, namely DRINI PSHP - REVERSIBLE with a capacity of 250 MW, which is dedicated to energy reserves, a project by Biomass with a capacity of 5.2 MW in the Municipality of Ferizaj, and Lepenci 1 with a capacity of 9.98 MW.

Additionally, the requests/applications on generators to obtain the status of producing consumer for self-consumption, which after fulfilling the legal requirements in accordance with the Authorization Rule and the Support Scheme, were allowed to continue with the construction of generation capacities for self-consumption, mainly through the roofs of buildings, where about 57 applications with an installed capacity of 1,736.4 kW were addressed.

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 2010-2020.

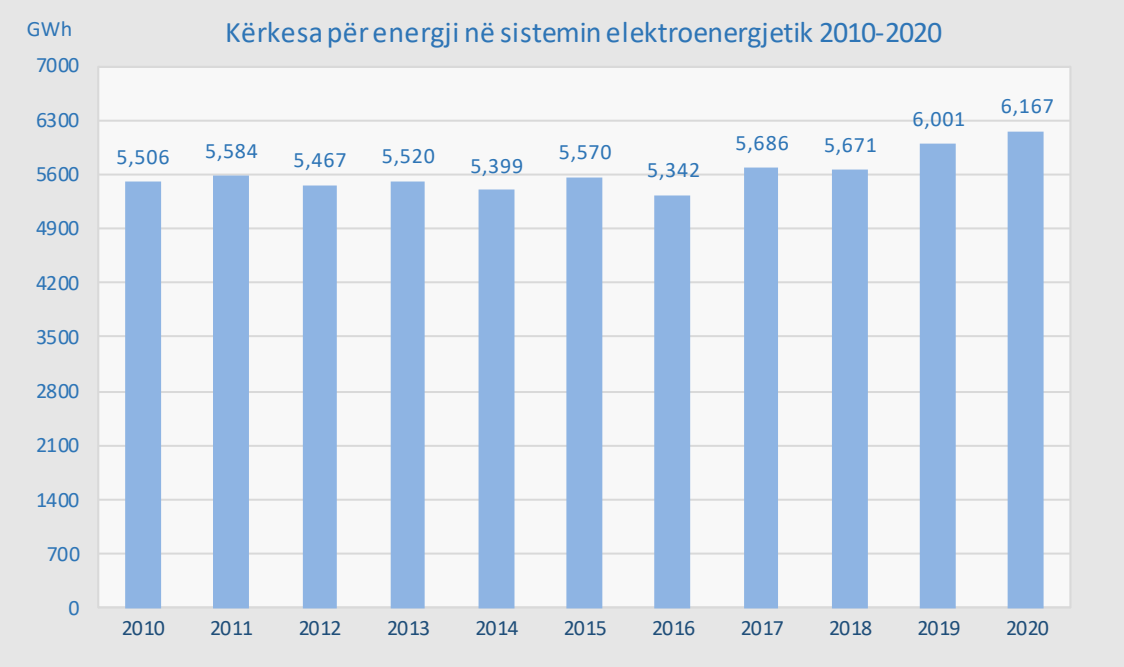


Fig. 2.9 Overall demand 2010- 2020

The overall energy demand for 2019 was 6,001 GWh, whereas the peak load during winter was 1,253 MW, while in 2020 the overall demand was 6,167 GWh, while the peak load during winter was 1,249 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 2019 and 2020 were used.

The following tables represent the top five values of load for 2019, respectively 2020.

Tab. 2.9 Five peak values in 2019

Ngarkesa maksimale Pmax (MW)	Data	Ora
1,253	12/31/2019	18:00
1,193	12/29/2019	18:00
1,178	1/8/2019	18:00
1,177	1/4/2019	18:00
1,138	1/14/2019	18:00

Tab.2.10 Five peak values in 2020

Ngarkesa maksimale Pmax (MW)	Data	Ora
1,249	21.12.2020	11
1,239	19.12.2020	18
1,231	31.12.2020	19
1,228	27.12.2020	23
1,207	24.12.2020	23

The charts derived as an average throughout 2019 and 2020 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.

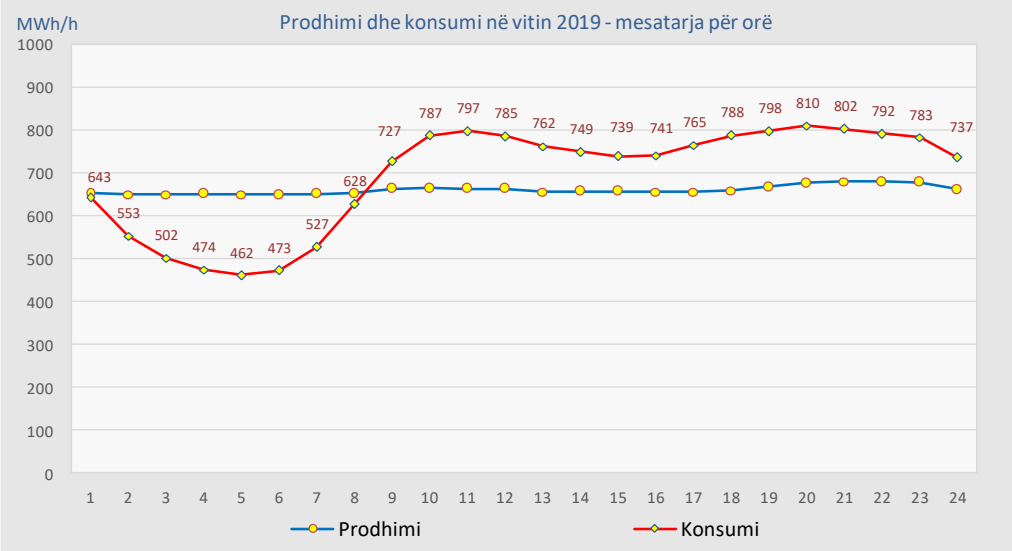


Fig. 2.10 The chart of the annual hourly average for hours for 2019

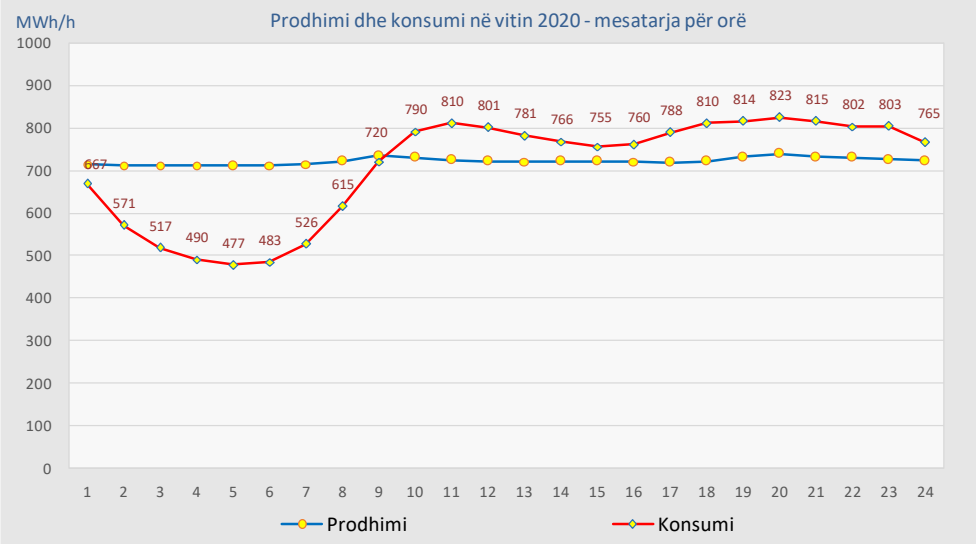


Fig. 2.11 The chart of the annual hourly average for hours for 2020

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 2019 and 2020.

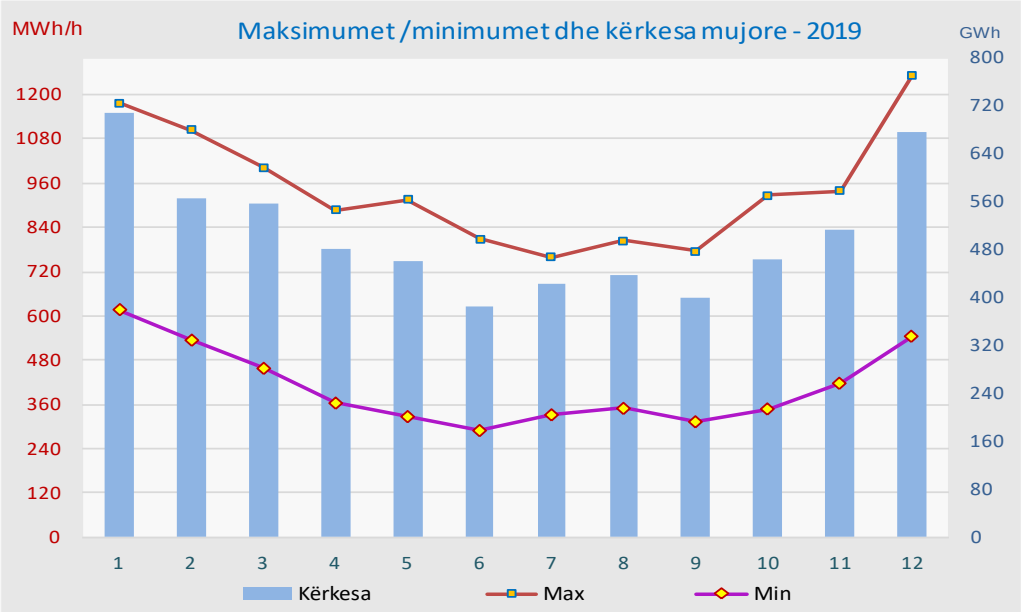


Fig. 2.12 Monthly average of maximum and minimum load for 2019

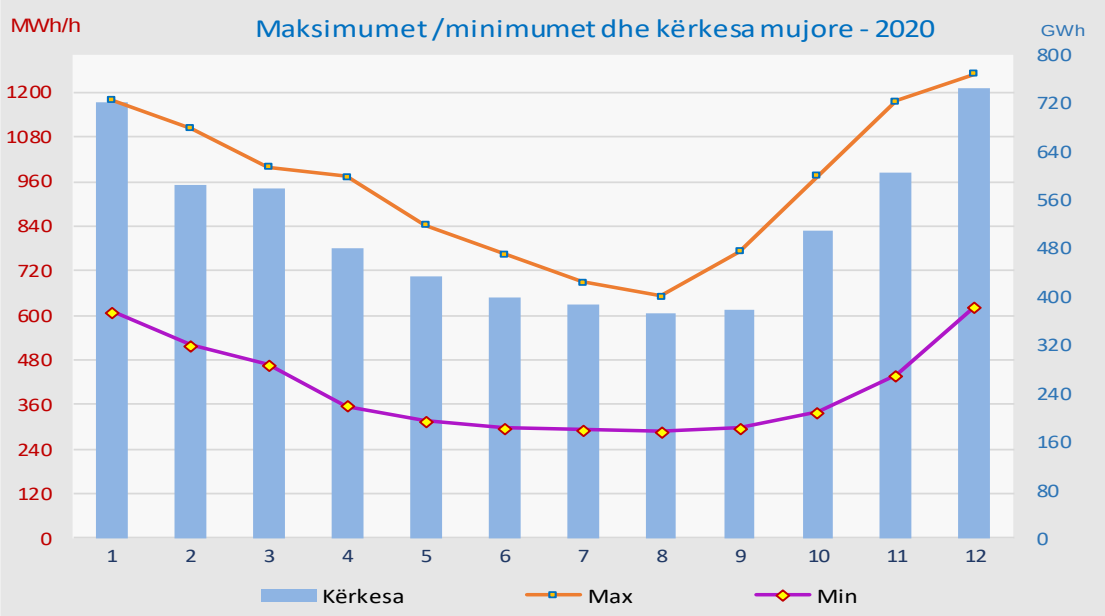


Fig. 2.13 Monthly average of maximum and minimum load for 2020

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 2019 and 2020 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

Kategorit e konsumit	2019		2020	
	GWh	Pjesemarrja ne konsum	GWh	Pjesemarrja ne konsum
Konsumi ne amviseri	2,515	41.91%	2,778	45.04%
Konsumi Komercial	1,020	16.99%	963	15.62%
Konsumi industrial	873	14.55%	796	12.90%
Humbjet Komerciale	694	11.57%	712	11.55%
Humbjet Teknike	684	11.39%	697	11.30%
Humbjet ne Transmision	105	1.76%	107	1.74%
Konsumi I mbrendshëm i KEK-ut	110	1.83%	114	1.85%
Total	6,001	100.00%	6,167	100.00%

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

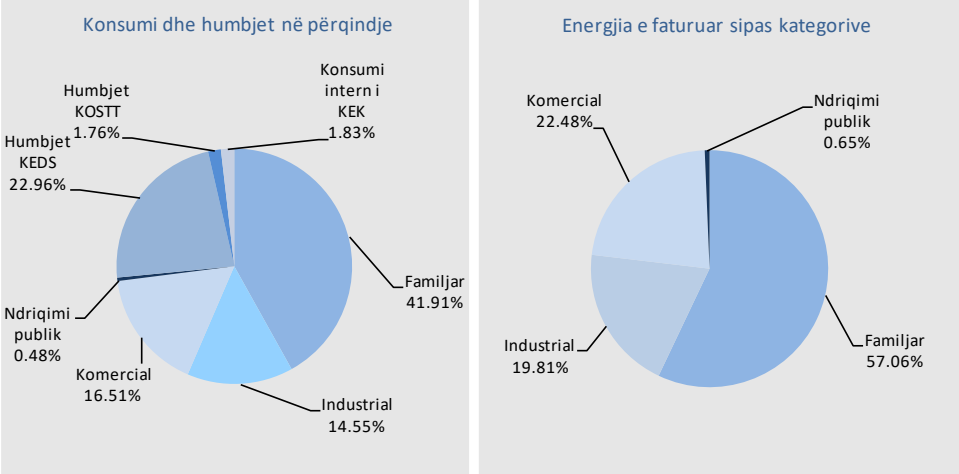


Fig. 2.14 Consumption by categories 2019

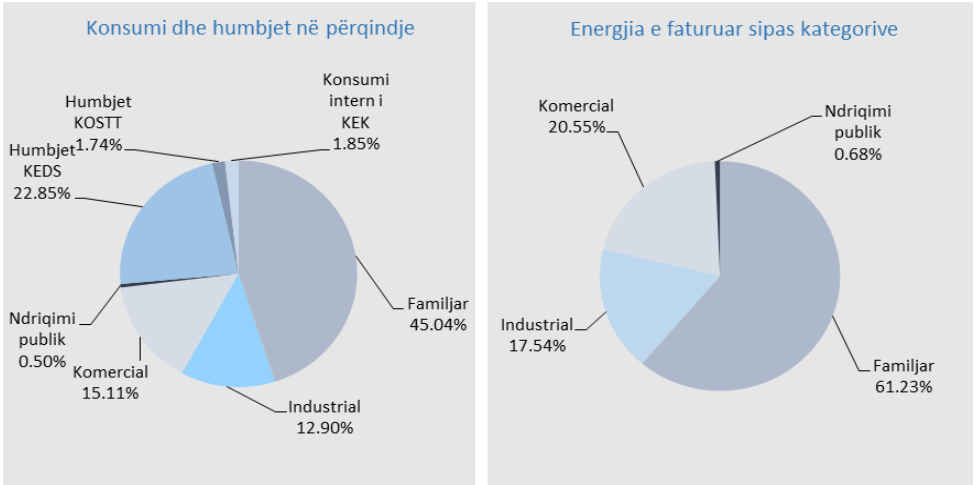


Fig. 2.15 Consumption by categories 2020

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 2000-2020.

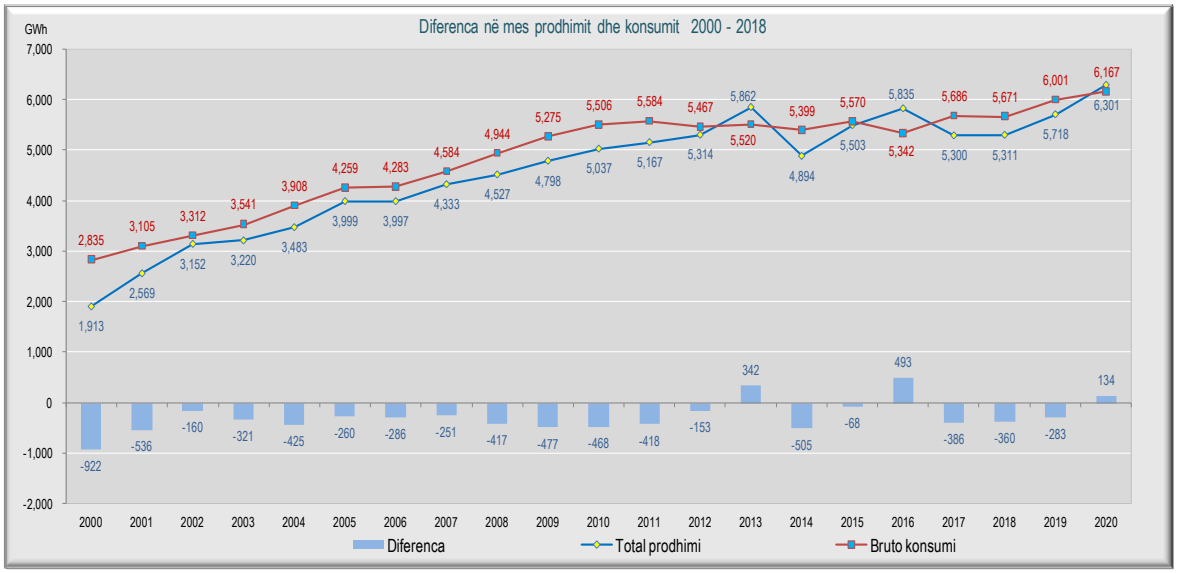


Fig.2.16. Balance between electricity generation and demand during previous years (2000-2020)

During the period 2000-2020 the overall demand has increased by an average of about 5.56% 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. The figure above shows the level of net imports, which are used to supply costumers with electricity. The import to the total demand in the period 2000-2018 was 13.84%, while the net import for the same period was 5.47% of the total demand in the Republic of Kosovo.

For the period 2019-2020, the situation regarding electricity can be summarized as follows:

- Electricity generation in 2019 has been lower than demand, whereas in 2020 it has been higher 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 99.51% in 2019 and 94.244% in 2020;
- 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 2019 - 2028

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 2019-2028 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 2019-2028

Rritja vjetore [%]	2018	2019	2020-2028
GDP Skenari ultë	2.2%	2.2%	2.2%
GDP Skenari bazë	4.3%	4.3%	4.3%
GDP Skenari lartë	5.4%	5.4%	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 2019 is expected to be 5,814 GWh; whereas in 2028 the demand is expected to reach 6,170 GWh; whereas the respective peak loads for the same years are expected to be around 1,177 MW and 1,270 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

Bruto kerkesa [GWh]	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Skenari bazë	5,814	5,835	5,898	5,943	5,991	6,039	6,070	6,102	6,156	6,170
Skenari ultë	5,526	5,532	5,580	5,565	5,616	5,627	5,644	5,644	5,670	5,683
Skenari lartë	6,101	6,150	6,245	6,322	6,400	6,482	6,543	6,607	6,695	6,740

Ngarkesa maksimale [MW]	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Piku bazë	1,177	1,210	1,221	1,231	1,237	1,246	1,251	1,257	1,267	1,270
Piku ultë	1,126	1,145	1,154	1,151	1,158	1,159	1,161	1,160	1,165	1,167
Piku lartë	1,276	1,276	1,294	1,311	1,324	1,340	1,351	1,364	1,381	1,390

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

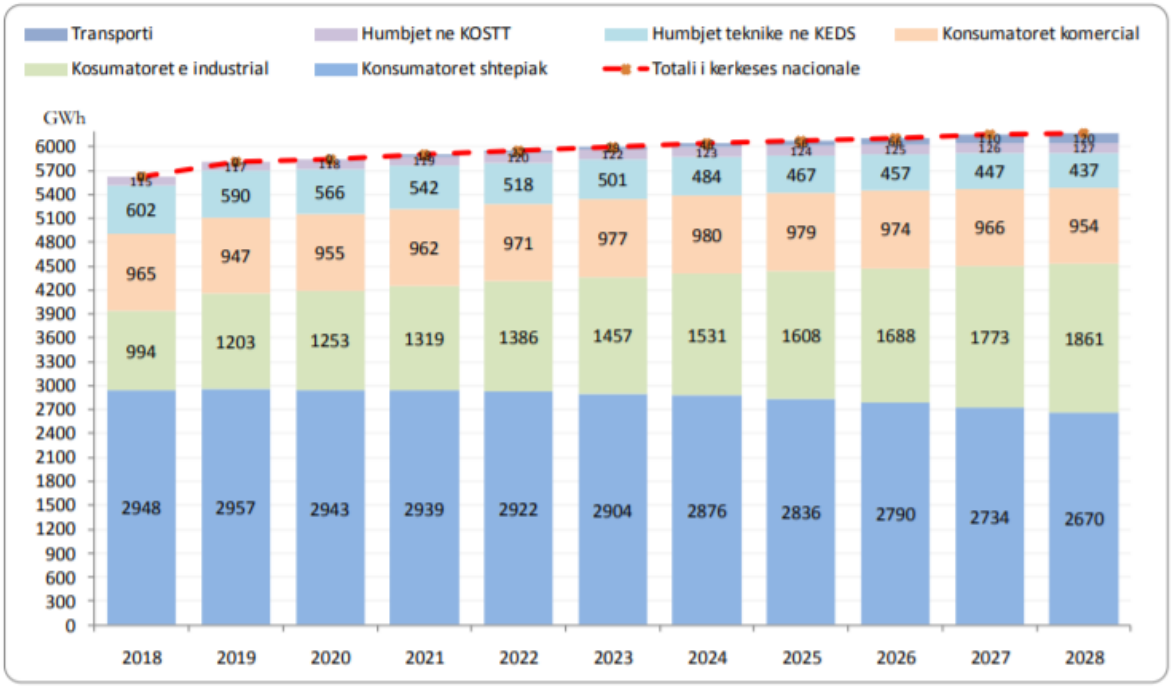


Fig. 2.17. The base scenario for electricity demand for the period 2018-2028, divided by customer categories

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 2019-2028 is based on electricity generation from TPP Kosovo A, TPP Kosova B, HPP Ujmani, HPPs in Lumbardhi, wind power plant KITKA, small existing hydropower plants, other renewable energy sources, and the thermal power plant Kosova e Re, as well as flexible HPP.

The basic scenario for the development of new generation capacities (TPP, HPP, and renewable sources) is presented in Table 2.14.

Tab. 2.14 Basic scenario for new generating capacities in the future

KAPACITETET E REJA GJENERUESE				
		Fuqia e instaluar	Në operim	Jetëgjatësia
Gjeneratorët e rinjë konvencional	TC Kosova e Re G1	P=450 MW	2023	>2050
	HC Fleksibile G1	P=200 MW	2023	>2050
Burimet e renovueshme	HC e vogla*	P_{2028}=101 MW	2019 - 2028	>2050
	Turbinat me erë	P_{2028}=180 MW	2019 - 2028	2035 - 2045
	Biomasa	P_{2028}=16 MW	2019 - 2028	>2050
	Solar	P_{2028}=85 MW	2019 - 2028	2035 - 2045

* Në zhvillimin e HC të vogla nuk janë përfshirë edhe ato eksiztuese(Dikanca, Radavci dhe Burimi)

From tables 2.6 and 2.14 we can conclude as follows:

(i) Generation of electricity from TPP Kosovo A, operating with the units A3, A4 and A5 (in accordance with the European Large Combustion Plants Directive) will continue until the end of 2023[1].

(ii) Power generation from TPP Kosova B, operating with B1 and B2 units – (It is anticipated that these two units will be rehabilitated during the period 2023 – 2024, including investments needed to meet emission standards required by EU Directive for Large Combustion Plants). These units would continue their commercial operation for up to 15 more years after revitalization, respectively until 2039.

(iii) Power generation from Ujmani and Lumbardhi Hydro Power Plants, and Wind Pharm Kitka, which under the precondition of proper maintenance and rehabilitation could continue its commercial operations for a long-term period.

(iv) Power generation from TPP Kosova e Re is expected to enter into commercial operation in 2023.

[1] The time of decommissioning of TPP Kosova A is related to the time of commissioning of TPP Kosova e Re.

(v) Power generation from the Flexible Hydro Power Plant, is expected to be in operation in 2023, however, there are still many uncertainties regarding the implementation of this project.

(vi) Some new HPPs are expected to be constructed during 2019-2028, with a total installed capacity of 101 MW. Participation of other renewable energy sources in electricity generation is expected to be realized mainly by wind power generators, where by the end of 2028 it is expected that such capacities will reach 180 MW, solar power plants with a capacity of up to 85 MW and power plants from biomass up to 16 MW.

(vii) Until the start of generation from TPP Kosova e Re and rehabilitation of TPP Kosova B, the uncovered demand from domestic generation shall continue to be covered by imports.

Based on the above assumptions, electricity generation from domestic power generation plants for the period 2019-2028 is shown in Table 2.15.

Tab. 2.15 Forecast of electricity generation [GWh]

PRODHIMI NETO I ENERGJISE SKENARI BAZË	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
TC KOSOVA A	1,858	1,792	1,792	1,830	0	0	0	0	0	0
TC KOSOVA B	3,224	3,224	3,224	3,224	2,000	1,600	3,628	3,628	3,628	3,628
TC KOSOVA E RE	0	0	0	0	3,370	3,370	3,370	3,370	3,371	3,372
GJITHSEJ NGA TERMOCENTRALET	5,082	5,016	5,016	5,054	5,370	4,970	6,998	6,998	6,999	7,000
HC UJMANI	93	93	93	93	93	93	93	93	93	93
HC (LUMBARDHI+DEQANI+BELAJA)	87	87	87	87	87	87	87	87	87	87
HC NE DISTRIBUCION	57	57	57	57	57	57	57	57	57	57
HC FLEKSIBILE	0	0	0	0	0	0	0	0	0	0
HC TE VOGLA	109	234	276	317	338	359	380	401	413	421
GJITHSEJ NGA HIDROCENTRALET	346	471	513	554	575	596	617	638	650	658
CENTRALET NGA BIOMASA	0	0	0	7	7	15	15	15	22	22
PE KITKA	96	96	96	96	96	96	96	96	96	96
CENTRALET NGA ERA	0	205	205	293	293	293	293	293	351	351
CENTRALET SOLARE	17	35	41	47	52	58	70	87	93	99
GJITHSEJ BIOMASA,ERA,SOLAR	113	336	341	443	448	461	473	490	562	568
GJITHSEJ RIPËRTËRISHME	366	714	761	904	930	964	997	1,035	1,119	1,133
GJITHSEJ NETO PRODHIMI	**5,541**	**5,822**	**5,870**	**6,051**	**6,394**	**6,028**	**8,088**	**8,126**	**8,212**	**8,227**

The forecast of electricity generation capacities is also presented graphically in Figure 2.17.

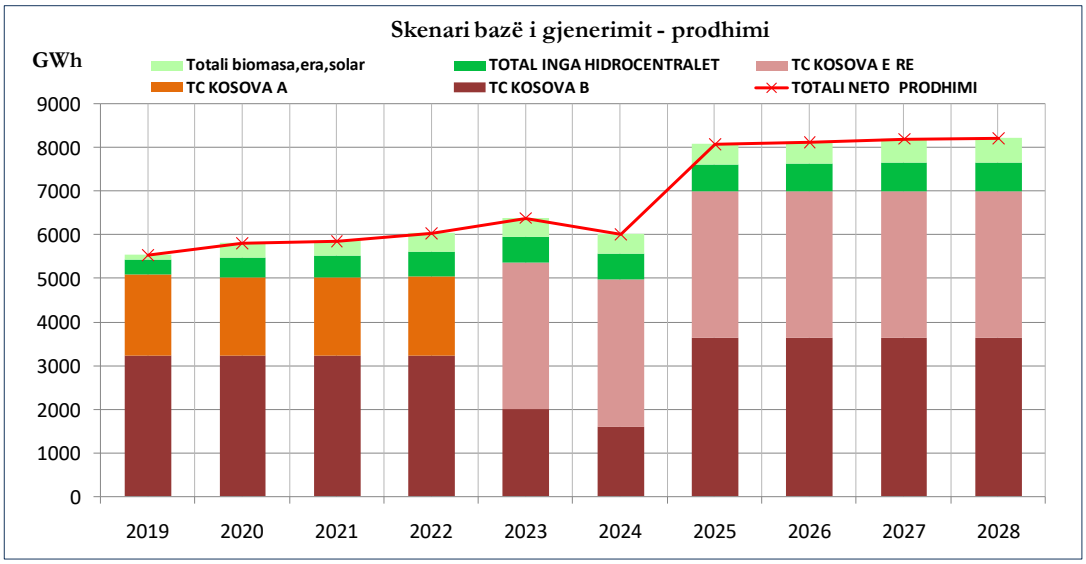


Fig. 2.18 Forecast of electricity generation capacities [GWh]

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 2019-2028 defined by the difference between production (base scenario) and demand (base scenario).

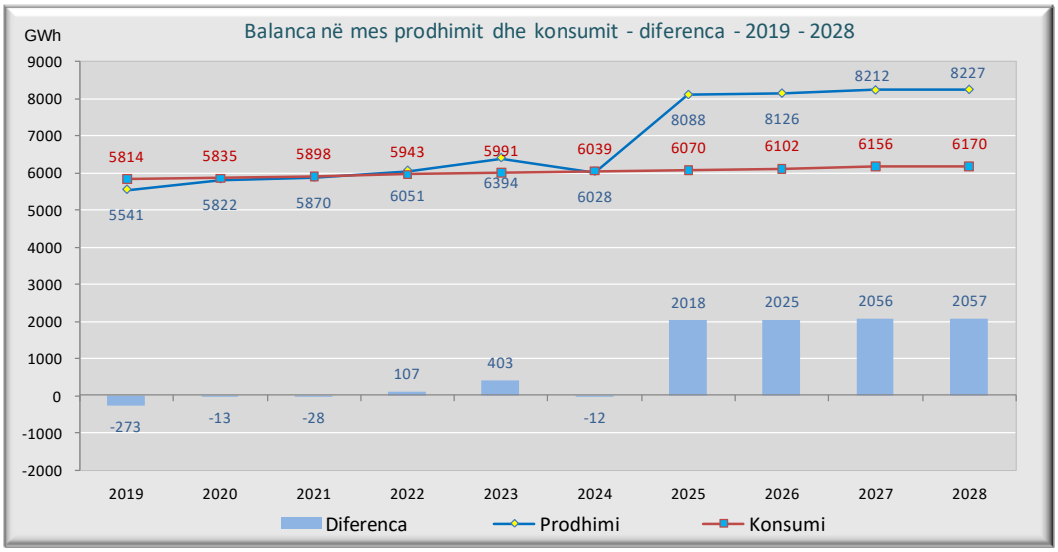


Fig. 2.19 Balance of electricity production and demand in the future (2019-2028)

The figure above shows the difference between planned net production 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, during the reporting period there were other initiatives for the development of natural gas sector in Kosovo.

In 2020, within the frame of the MCC Compact Program was prepared the study for Development of the Gas Sector in Kosovo, which has evaluated most favourable options for introduction of natural gas in Kosovo and developing relevant gas infrastructure with focus on interconnection with North Macedonia.

Also this year has started the Kosovo's Gas Development Plan and Regulatory Review and Assistance, which is financed through WBIF platform, with EBRD as Lead IFI. The plan will address development of comprehensive mid-term gas master plan and project identification with the main aim to develop gas and gas-related infrastructure within the country. In addition, it includes regulatory framework review, organizational and institutional assessment and Strategic Environmental Assessment (SEA).

Within these studies the following main components are being elaborated:

- 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 option for the supply of natural gas – assessing Gas interconnectors within the regional and most favourable options for development of internal gas network.
- Preliminary survey and determination of pipeline trench, as well as determination of the technical parameters of the pipeline and related stations and equipment.
- Financial analysis and Cost benefit analysis including estimation of the investment costs and O&M cost.

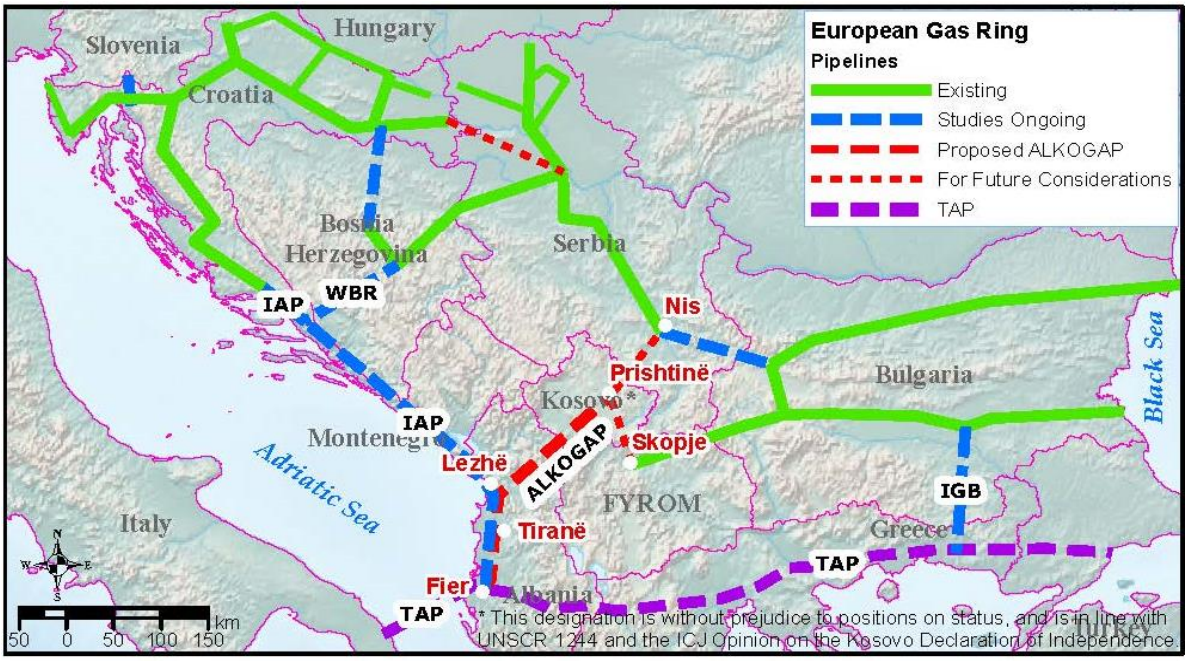


Fig. 3.1: Projects of regional gas infrastructure and options for connection of Kosovo

4.

4. OIL SECTOR

4.1 Legal and Institutional framework

The main law governing the oil sector in Kosovo is the Law no. 2004/5 on Trade with Petroleum and Petroleum Products enforced in 2004, amended by Law no. 03/L-138 enforced in 2009. The Law applies to the wholesale and retail supply, transport, and storage of petroleum and petroleum products.

The Department for petroleum market regulation operates in accordance with relevant provisions of above mentioned law and is responsible for regulation respectively licensing of the oil sector activities in Kosovo. While the monitoring and oversight of the petroleum market is performed by the Market Inspectorate, which also operates within the Ministry of Trade and Industry.

A draft Law on the Trade with Petroleum and Bio-fuels is in the process of re-drafting, in order to fully transpose the respective European Directive – namely the Directive 2009/28/EC for promotion of the use of bio-fuels and the Minimal Oil Stock Directive 2009/119 /EC. Actually this draft law is undergoing approval procedures by the Government and Parliament.

For the purpose of full transposition and implementation of the Directive 1999/32/EC on limitation of Sulphur content in certain fuels (heavy fuel oil and gasoil), on November 2020 the Administrative Instruction no. 09/2020 on the quality of petroleum products was approved, by which the Administrative Instruction 01/2017 was repealed. Compliant to this Instruction the quality of the petroleum products is controlled at the customs terminal by the customs officials. Also Administrative Instruction no. 07/2018 determines the licensing procedures for the commercial entities operating in the oil sector, namely for performing the following business activities:

- Import of petroleum and diesel for general consumption;
- Storage of petroleum and diesel products;
- Wholesale of petroleum and diesel;
- Retail of petroleum and diesel.

4.2 Domestic supply of crude oil and petroleum products

Kosovo has neither domestic reserves of crude oil nor capacities for refining of crude oil and therefore does not import crude oil. Kosovo is net importer of petroleum products, and produces only heavy fuel oil for heating from imported raw material amounting approximately 30% of the consumption of heavy fuel oil for heating. There are four licensed production plants, which currently produce heavy fuel oil with less than 1% of sulphur content; heavy fuel oil with less than 1% sulfur content is produced by mixing heavy fuel oil containing over 1% sulfur with light oils such as gasoline and kerosene.

4.3 Import and consumption of crude oil and petroleum products

Kosovo is net importer of oil products. Since there are negligible amounts of domestic production and exports, almost all consumption within the country is covered by imports. In recent years the total import of oil products did not have significant upward trend, but only slight variations.

In the table and the graph below are presented data for consumption, import and export (negligible amounts).

Table 4.1: Data for petroleum products in 2019 (in 1,000 tons)

Petroleum Products - 2019 [in tons]			
Type	**Imports**	**Exports**	**Consumption**
Benzine	58,954.2	0	58,954.2
Biodizel	0.0	0	0.0
Bitumen	54,715.9	67.1	54,648.8
Dizel	510,577.3	0	510,577.3
Bottled natural gas	604.4	2	602.4
Gazoilet	3,673.7	0	3,673.7
LPG	29,289.6	0	29,289.6
Jet fuel	2,409.9	0	2,409.9
Koks nafte	123,861.1	13,677.8	110,183.3
Mazut	22,247.6	0	22,247.6
Lubricants	5,615.0	149.2	5,465.8
Total	**811,948.7**	**13,896.1**	**798,052.6**

Source: Kosovo Agency of Statistics – www.ask.rks-gov.net

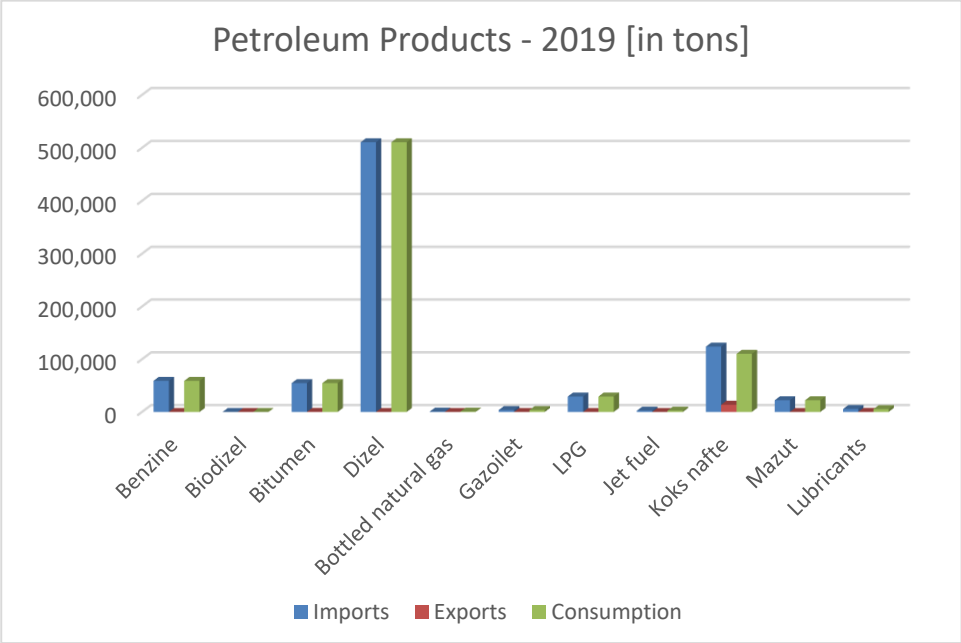


Figure 4.1 Graphical presentation of data for petroleum products in Kosovo in 2019

Table 4.2: Data for petroleum products in 2020 (in 1,000 tons)

Petroleum Products - 2020 [in tons]			
Type	**Imports**	**Exports**	**Consumption**
Benzine	50,144.3	0	50,144.3
Biodizel	0.0	0	0.0
Bitumen	50,260.8	5.2	50,255.6
Dizel	498,324.6	0	498,324.6
Bottled natural gas	671.5	2	669.5
Gazoilet	7,745.0	0	7,745.0
LPG	23,741.5	0	23,741.5
Jet fuel	2,067.1	0	2,067.1
Koks nafte	113,396.9	7,927.8	105,469.1
Mazut	252.8	0	252.8
Lubricants	6,196.4	278.2	5,918.2
Total	**752,800.9**	**8,213.2**	**744,587.7**

Source: Kosovo Agency of Statistics – www.ask.rks-gov.net

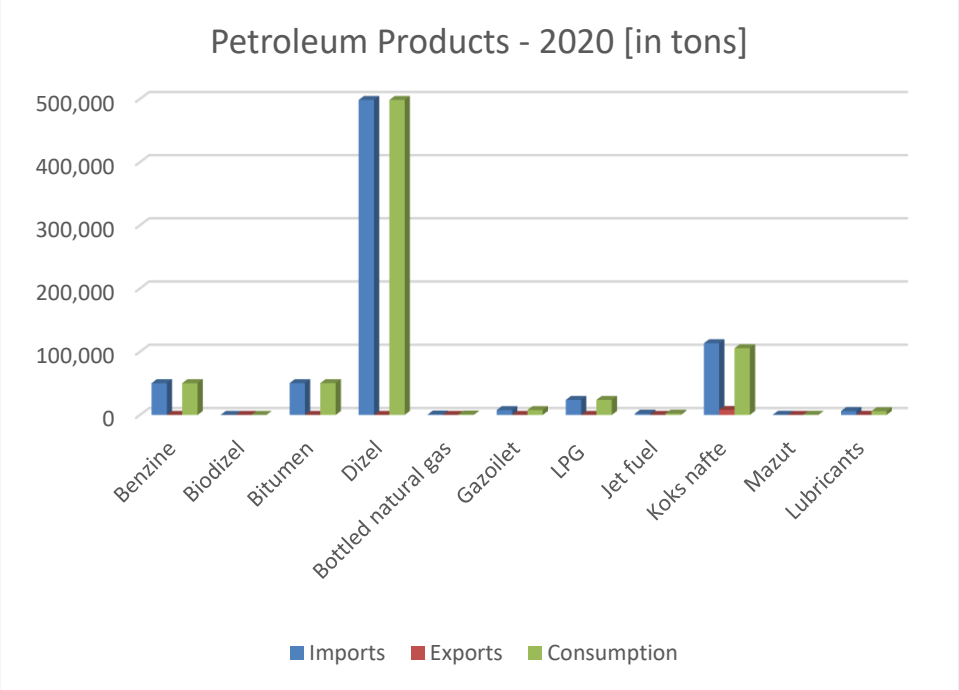


Figure 4.2 Graphical presentation of data for petroleum products in Kosovo in 2020

4.4 Imports dependency and origin of imported fuels

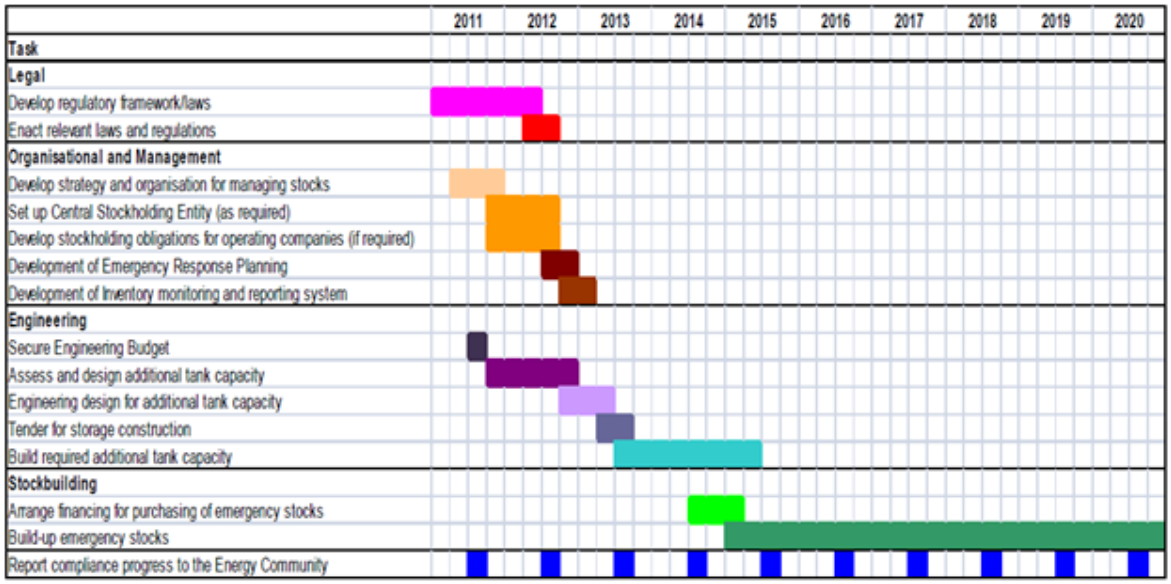
Kosovo is almost 100% dependent on imports of oil products and the imports of oil products mainly originate from regional countries.

4.5 Domestic supply of crude oil and petroleum products

Law on trade with petroleum and petroleum products obliges all petroleum and petroleum products storage facilities and sale points to maintain reserves of at least 5% of their storage capacity at any time for emergency purposes. Current licensed storage capacities have approximately 80,000 m3 and approximately 40,000 m3 for retail sale of fuels, therefore 5% of this capacity equals to 3-4 days of average daily net import. There are additional 50,000 m3 of storage capacities that are not being used and are not licensed for fuel storage. Currently there are 12 storage facilities that are licensed for fuel wholesale (diesel, petrol, LPG).

Table 4.3 shows the proposed roadmap from Energy Community for Kosovo to meet the obligations of Directive 2009/119/EC by the end of 2020.

Table 4.3: Kosovo's roadmap for achieving emergency oil stocks



4.6 Oil infrastructure

Kosovo does not possess a pipeline for crude oil nor for oil products. Oil products are imported 75% by road transportation and 25% by railroad.

4.7 Import/Export Customs duty

Kosovo has an open market for oil products including import and export, and prices are set freely by the market. In regards to a 10% customs duty, this issue is addressed by the respective legislation in force, which fulfils obligations arising from international agreements (CEFTA, Energy Community Treaty) for the oil sector; specifically, the Law 04/L-163 and the Administrative Instruction no.05/2015, amended by Administrative Instruction no.07.2016 for commodities for which the customs duty isn't charged specifies oil products that are released from customs duty such are: fuel oils, lubricants, bitumen, and calcinated and decalcinated petrol coke.

4.8 Price Regulation, role of the regulatory authority

According to Law on Trade with petroleum and petroleum products, the responsible authority for the Kosovo's Oil sector is the Department for regulation of the Oil Sector of the Ministry of Trade

and Industry. This department has the competences for licensing commercial entities for undertaking the activities in the oil sector. Price regulation isn't implemented since the market is very competitive with over 40 importers for transport fuels and many other importers of other petroleum products. The wholesale and retail prices are freely set by market forces.

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.
- There were no reductions of energy for consumers due to lack of energy.
- The situation of electricity supply of consumers for the period 2019-2020 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 2017 - 2026, 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 are under development, which after the completion of the TAP project have been actualized and are expected to be operationalized soon.

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 12 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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