



3rd Tirana Energy Forum

ALBANIAN POWER TRANSMISSION INFRASTRUCTURE

OST STATUS OVERVIEW
&
FUTURE DEVELOPMENT PLANS

May 2024



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OST POWER INFRASTRUCTURE ASSETS



3,431 km Transmission Line

- ▶ 400 kV, 445.7 km
- ▶ 220 kV, 1,297 km
- ▶ 154kV, 34.4 km
- ▶ 110kV, 1,701 km



6 Interconnection Lines

Greece

- ▶ 400 kV Zemblak–Kardia (GR)
- ▶ 150 kV Bistrice–Myrtos (GR)

Montenegro

- ▶ 400 kV Tirana2–Podgorica (ME)
- ▶ 220 kV Koplík–Podgorica (ME)

Kosovo

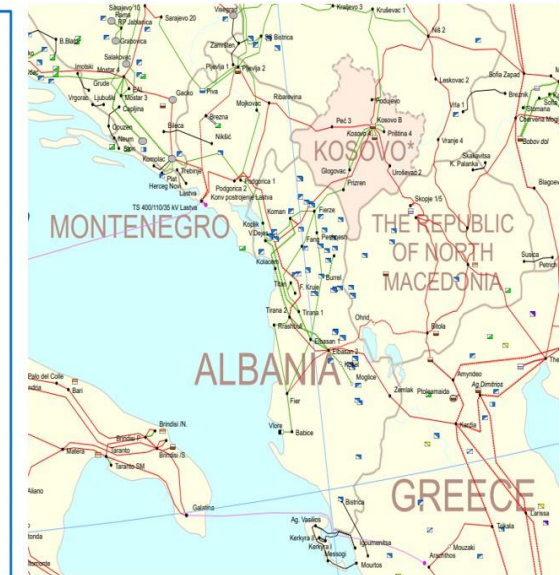
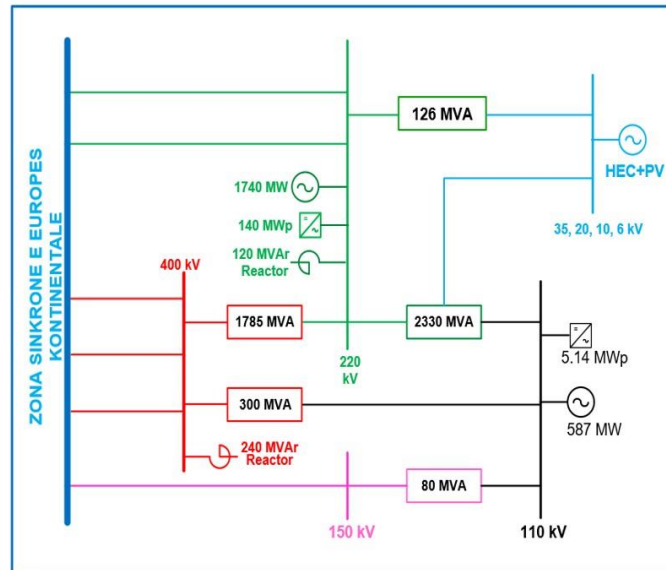
- ▶ 400 kV Koman–Kosova B (KS)
- ▶ 220 kV Fierza–Prizren (KS)



16 Electrical Substations (4621 MVA)

- ▶ 1 Ss 400/220 kV, 600 MVA, (Elbasan2)
- ▶ 1 Ss 400/220 kV, 345 MVA, (Koman)
- ▶ 1 Ss 400/220/110 kV, 840 MVA, (Tirana2)
- ▶ 1 Ss 400/110 kV, 300 MVA, (Zemblak)
- ▶ 1Ss 220/110/20 kV, 486 MVA, (Tirana1)
- ▶ 10 Ss 220/110/MV 1880 MVA, (Fierze, V.Dejes, Koplík, Burrel, Elbasan1, Fier, Babice, Sharra, Rrashbull, Shumbat)
- ▶ 1 Ss 150/110 kV, 40 MVA, (Bistrice)

- Based on Law 43/2015 "On the Electricity Sector", amended, OST owns the electricity transmission system, which includes
 - 400 kV, 220 kV, 110 kV and 150 kV lines,
 - power transformation substations with levels of high voltage transformation 400 kV, 220 kV and 110 kV busbars in all 110/MV kV substations, up to the energy measurement point on the 110 kV side of 110/MV kV transformers,
 - including the switching/disconnecting devices of 110 kV line .



POWER TRANSMISSION SYSTEM BALANCE

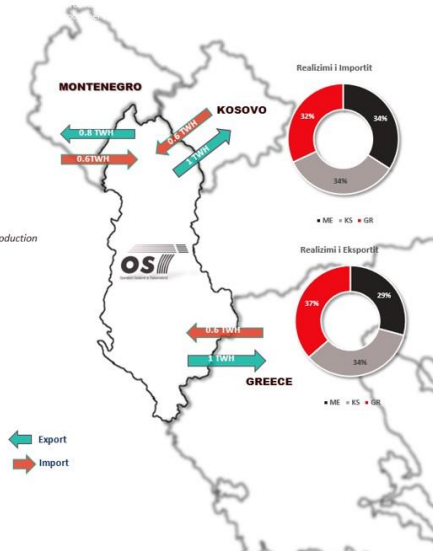
Year 2023

10.14 TWh, Energy In

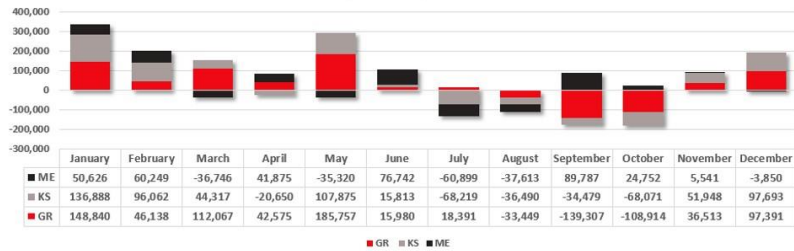
8.24 TWh, Domestic Production

1.9 TWh, Import

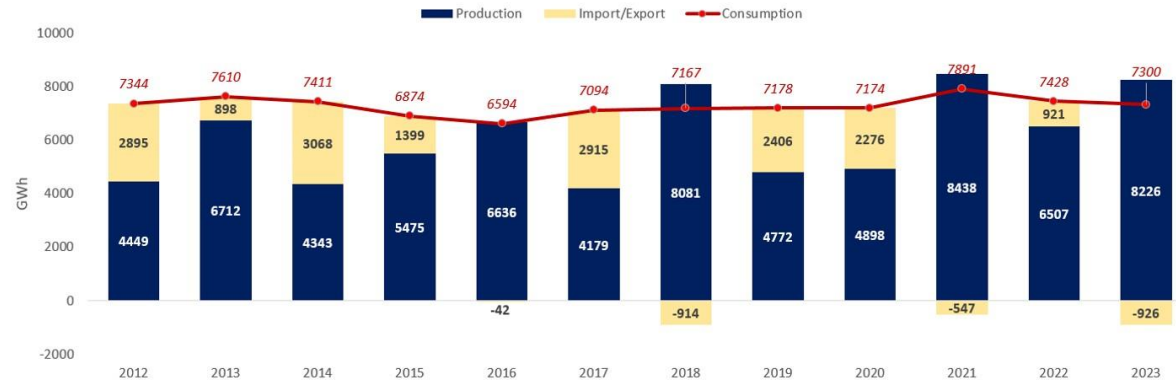
2.8 TWh, Export



Net exchange for 2023 by month and border



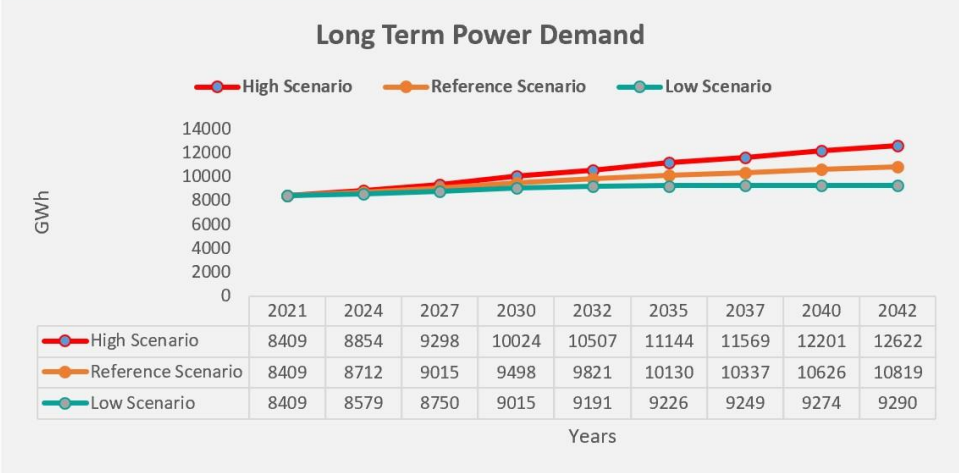
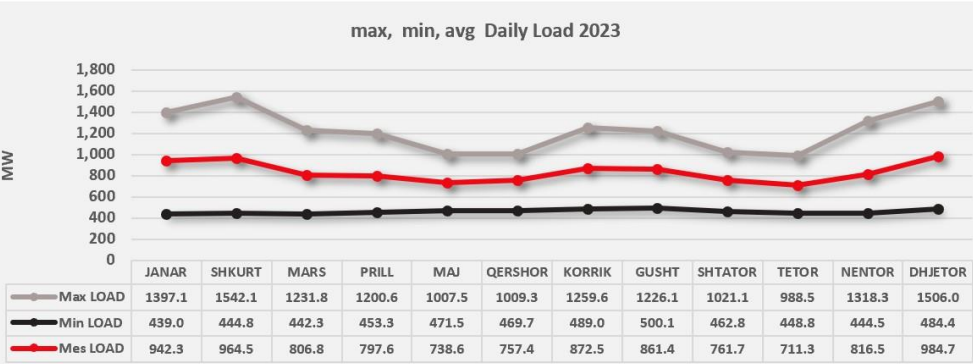
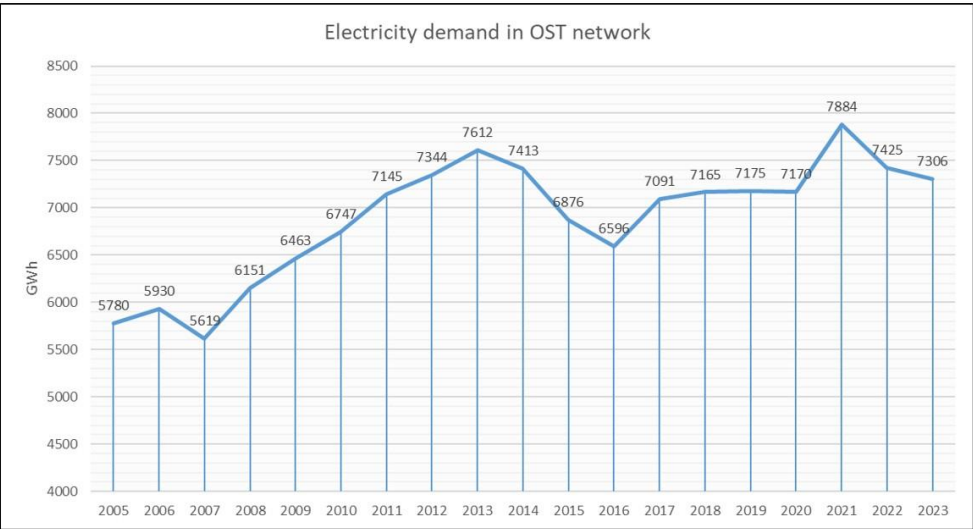
OST SYSTEM POWER BALANCE



Energy Losses in the Power Transmission network for the period 2015-2023



ENERGY DEMAND



Load Forecast- End user model MAED

	2018	2023	2028	2033
Energy (GWh)	7,639	8,168	9,265	10,716
Winter peak load (MW)	1,484	1,566	1,743	1,999
Load factor (%)	58.7	59.5	60.5	61.2
Summer peak load (MW)	1,085	1,158	1,307	1,556
Annual minimum load (MW)	452	614	736	

	2018	2023	2028	2033
Energy (GWh)	7,639	8,068	8,888	9,902
Winter peak load (MW)	1,484	1,547	1,668	1,838
Load factor (%)	58.7	59.6	60.7	61.5
Summer peak load (MW)	1,085	1,143	1,253	1,434
Annual minimum load (MW)	452	511	593	685

	2018	2023	2028	2033
Energy (GWh)	7,639	7,888	8,383	9,078
Winter peak load (MW)	1,484	1,518	1,586	1,697
Load factor (%)	58.7	59.3	60.2	61.1
Summer peak load (MW)	1,085	1,139	1,176	1,275
Annual minimum load (MW)	452	485	535	612

High Scenario

Reference Scenario

Low Scenario



TRANSMISSION POWER GENERATIONS DATA

Power Plant / Data	Number	Power (MW)	Share %
HPPs	46	2,230	91%
TPPs	1	97	4%
PVs	2	5	5%
Total	49	2,441	100%

HPPs	Number		Power (MW)	
	With Reservoir	Run of River	With Reservoir	Run of River
46 HPPS / 2236 MW in total	8	38	1,740	490
Ratio (%)	17%	83%	78%	22%

The **total installed capacity installed** in the transmission network amounts to a total of **2441 MW** of which:

- > **1850 MW (75%)** connected to the **220 kV network** (No.8)
- > **591 MW (25%)** connected to the **110 kV network** (No.41)

Most of the **new hydropower plants are of the run-of-river type**, the capacity of which reaches 490 MW. The **average capacity installed in the transmission network is about 50MW**.

- In **May 2022**, the first electricity production plant from photovoltaic panels built in the **Qyrsaq Dam with a capacity of 5.14MWp (4.51MWac)** developed by the KESH sha company was energized in the transmission network.
- A **97MW thermal power plant is connected to the 220kV network**, which is out of operation and kept in a state of conservation.
- In **December 2023**, the **large scale PV Plant Karavasta 140 MWp was energized**, connected to **220kV substation Fier**. The largest PV implementation plant up to now in Western **Balkan**

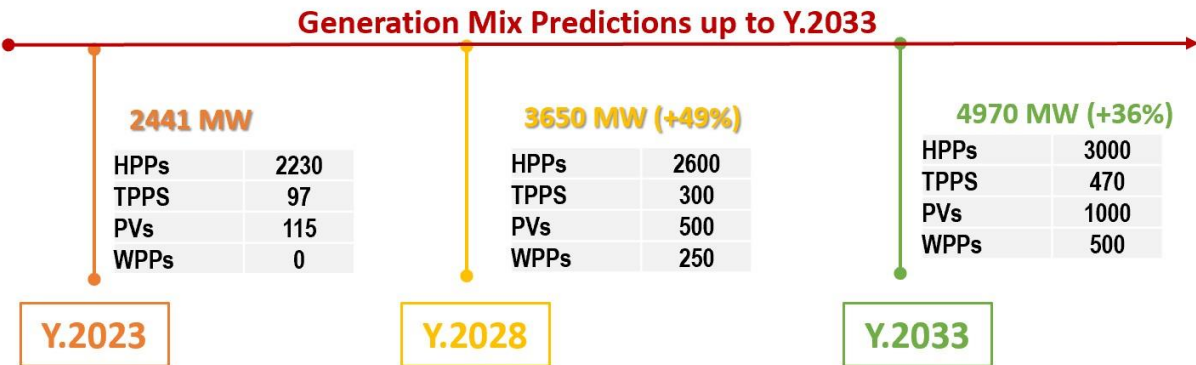


FUTURE POWER TRANSMISSION GENERATION MIX

GEN TYPE	Application Stage	Year 2023	
		Project No.	Power installed (MW)
HPPs	Prior Opinion		
	Approval in Principle	5	64
	Connection Agreement	3	39
PVs	Prior Opinion	63	5027
	Approval in Principle	8	273
	Connection Agreement	2	130
WPPs	Prior Opinion	41	4336
	Approval in Principle	5	294.6
	Connection Agreement		
Σ TOTAL	Prior Opinion	104	9363
	Approval in Principle	18	632
	Connection Agreement	5	169

Main RES Projects:

- **Skavica HPP** in the Drin Cascade by KESH Company. The feasibility study is under assessment.
- **Blue 1 and Nova Solar Photovoltaic Parks** (57.6 + 70 MWp) in Hoxhara, to start producing in Y.2024
- **Three eolic parks** winners for the total installation capacity of 222.48 MW were announced from the Wind Power Auction (July 2023)
- **300 MW PV Auction** in process



TRANSMISSION NETWORK MAIN CHALLENGES

The Albanian power transmission system is facing several challenges that affect its reliability, efficiency and security. Some of the main weak points of the network are:

The aging and obsolete infrastructure

which increases the risk of failures, outages and losses. Mainly the 110 kV network despite significant investment done still needs investment for increasing the actual capacities especially in Central, North-East and South-West Regions of the network.

A study by the World Bank (2018) estimated that the average age of the transmission lines in Albania is 35 years, and that the network losses amount to 2.4% of the total electricity transmitted, which is above the regional average of 1.9%.

400 kV Operational Challenges

The internal 400 kV transmission network does not form a ring configuration and the N-1 safety operation criteria according to ENTSO-E have not been met for the existing topology.

Also, the high voltage levels occurs during the seasons with low demand but this a regional phenomenon because of the high load of this grid.

The low level of automation and digitalization

which reduces the operational flexibility and resilience of the system. The Albanian power transmission system lacks wide adequate monitoring, control and communication systems that would enable a more efficient and secure management of the network.

This is mainly typical for primary side of 110 kV substations and some generation units.

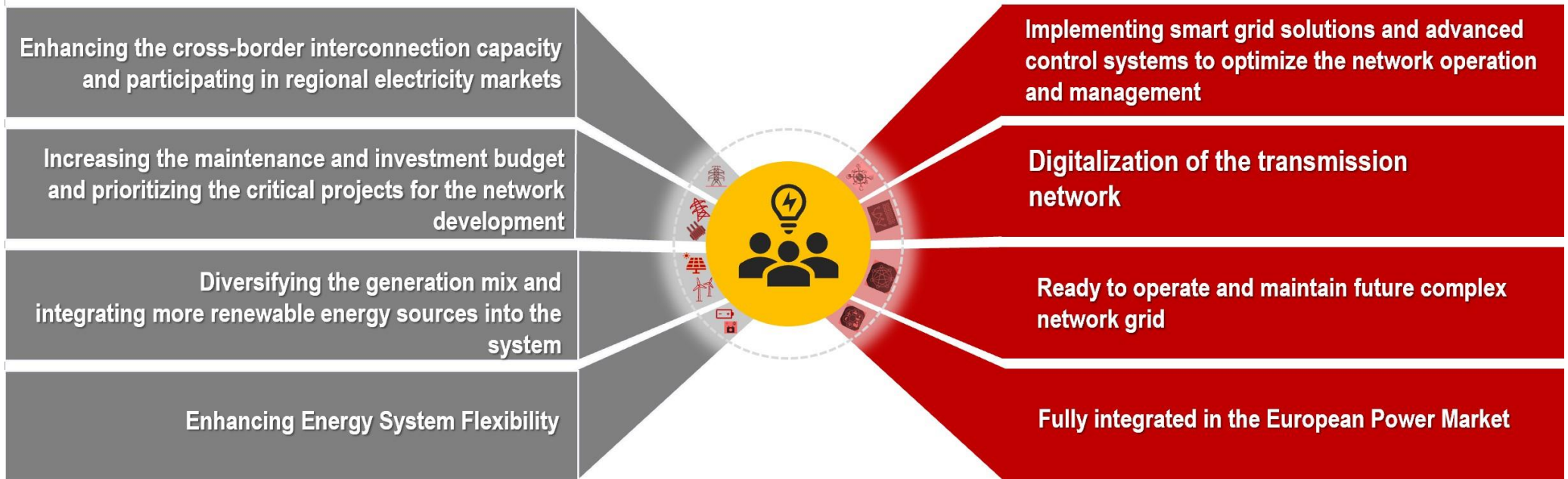
The high dependence on hydropower generation

which exposes the network to seasonal and climate variability. Albania relies almost entirely on hydropower for its electricity generation, which accounts for more than 95% of its total installed capacity. This makes the system vulnerable to hydrological conditions and climate change impacts, such as droughts, floods and temperature changes, which can affect the availability and stability of the power supply.

OST LONG TERM VISION FOR ENERGY TRANSITION

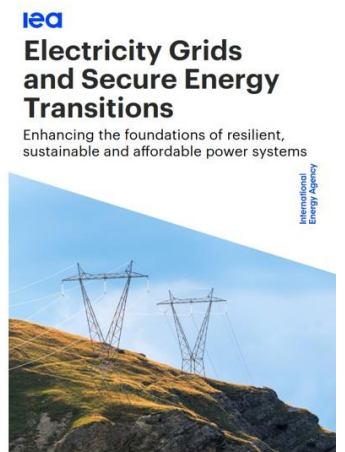
The vision for the power transmission system in Albania is

- to become a **reliable and efficient network** that connects Albania with other countries in the region and Europe, enabling the exchange of electricity and enhancing the energy security and diversity.
- The power transmission system will also **support the economic and social development of Albania** by providing high-quality service to customers, creating new opportunities for investment and employment, and fostering social inclusion and environmental awareness.
- The power transmission system will also embrace **innovation and sustainability** by adopting new technologies and practices that improve its performance, resilience, flexibility, and adaptability to changing conditions.



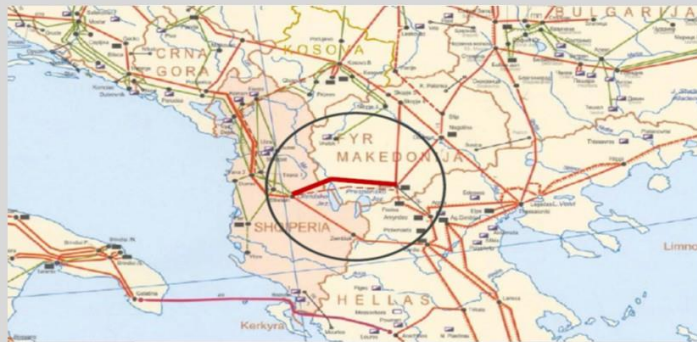
MAIN FINDINGS FROM IEA REPORT_OCTOBER 2023

- **Grids are the backbone of electricity systems** and their importance is growing as electricity is expanding into sectors previously dominated by fossil fuels, such as transport, heating and cooling, and hydrogen production.
- **To achieve countries' national energy and climate goals, the world's electricity use needs to grow 20% faster** in the next decade than it did in the previous one. This requires adding or refurbishing over 80 million kilometres of grids by 2040, the equivalent of the entire existing global grid.
- **Grids are essential to decarbonise electricity supply and effectively integrate renewables**, which account for over 80% of the total increase in global power capacity in the next two decades. This calls for modernising distribution grids and establishing new transmission corridors to connect renewable resources that are far from demand centres.
- **Modern and digital grids are vital to safeguard electricity security during clean energy transitions.** As the shares of variable renewables such as solar PV and wind increase, power systems need to become more flexible to accommodate the changes in output. This requires enhancing grid operations, deploying energy storage, enabling demand response, and increasing interconnections.
- **Grids currently receive too little attention from policy makers and face multiple barriers to their development**, such as regulatory uncertainty, social acceptance, financing gaps, and institutional fragmentation. These barriers need to be overcome by adopting a holistic approach to grid planning and management that considers long-term objectives, system-wide benefits, stakeholder engagement, and innovation.



MAIN PROJECTS IN THE PIPELINE

➤ 400 kV Transmission Line Albania – North Macedonia (Fier - Elbasan - Qafe Thane)



50% Progress

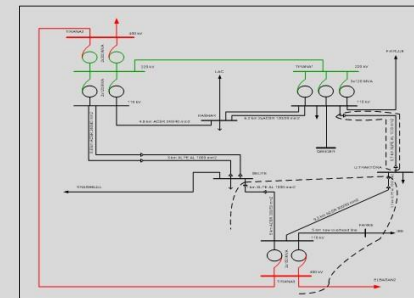
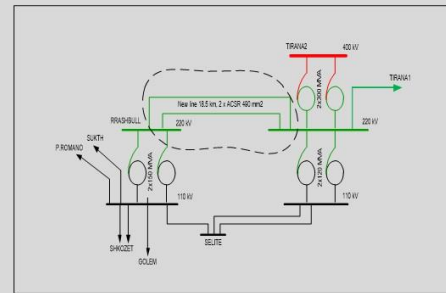
Financing: German Financial Cooperation (through KfW), WBIF grants and OST own funds

Lot 1: Overhead Lines, pertaining to the construction of a 400 kV transmission line between Fier - Elbasan - Qafe Thane (Albania/North Macedonia border).

Lot 2: Substations, pertaining to the construction of a new substation Elbasan 3 and the reinforcement and extension of substation Fier.

Ending time: Early Months of Year 2026

➤ The “Energy Efficiency - Sector Program Electricity Transmission: Double Circuit OHL Tirana 2 - Rrashbull and 110 kV Tirana Ring



50% Progress

Financing: Financing: German Financial Cooperation (through KfW) and OST own funds.

Lot 1 Ss: Extension of the 220/110 kV Rrashbull Substation within the existing substation. Extension of the 400/220/110 kV Tirana Substation 2 inside the existing substation. The construction of the new substation Tirana 3- 400/110/20 kV.

Lot 2 Lines: Construction of a new transmission line with two 400/220 kV circuits between substations Tirana 2 and Rrashbull. Construction of the 110 kV Ring.

Ending time: Early Months of Year 2026

MAIN PROJECTS IN THE PIPELINE TSO-DSO Interaction

Investment for RES Integration

First Phase:

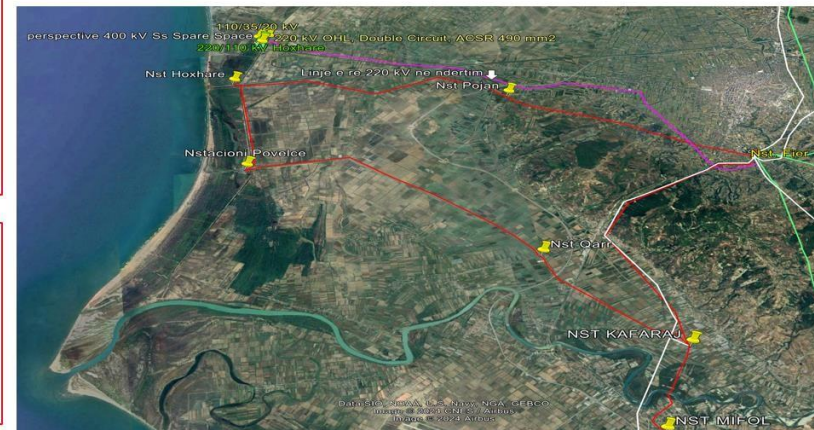
- New Hoxhara substation 220/110 kV, 1x120 MVA Transformer (2x150 MVA)
- 18 km OHL double circuit ACSR 490 mm²
- Connection to 110 kV side of OSSH new construction 110/35/20 kV, 2x40/50 MVA
- PV Integration ~ 250 MW

Second Phase:

- Upgrade to 400 kV
- Connection to Fier Substation (will be upgrade to 400 kV as part of 400 kV Interconnection Line Fier-Elbasan – Bitola)
- PV Integration ~ 350 MW

Third Phase:

- Possible connection to Italy via a submarine 400 kV Cable
- PV Integration ~ 500 - 600 MW
- Closing the internal 400 kV ring Fier-Rrashbull-Tirana2



NEW INTERCONNECTIONS

1

New 400 kV OHTL Fier (Albania) - Arachtos (Greece)

- Total Project Costs is around 104 € million. Lead Financial Institution for this project is [kfw](#).
- In progress for submission as a candidate project in TYNDP 2024 of ENTSO-E.
- In progress [ToR](#) finalization for FS study with WBIF TA Funds (June 2023)

2

Three Interconnection Lines with Montenegro

1. Reconstruction of 220 kV OHTL [Vau Dejes](#) (Albania) – Podgorica (Montenegro) and expansion to 400/220 kV of [SS Vau Dejes](#).
2. New 110 kV Interconnection line [Velipoje](#) (Albania) – [Ulqin](#) (Montenegro).
 - *CGES finalized the agreement with EBRD for FS Study*
3. New 400 kV Line [Koman](#) - [Lastva](#)

3

Two Interconnection Lines with Kosovo

1. New 110 kV Interconnection line [B.Curri](#) (Albania) – [Decan](#) (Kosovo).
2. New 400 kV Line [Fierze](#) (Albania) – [Prizreni2](#) (Kosovo)

4

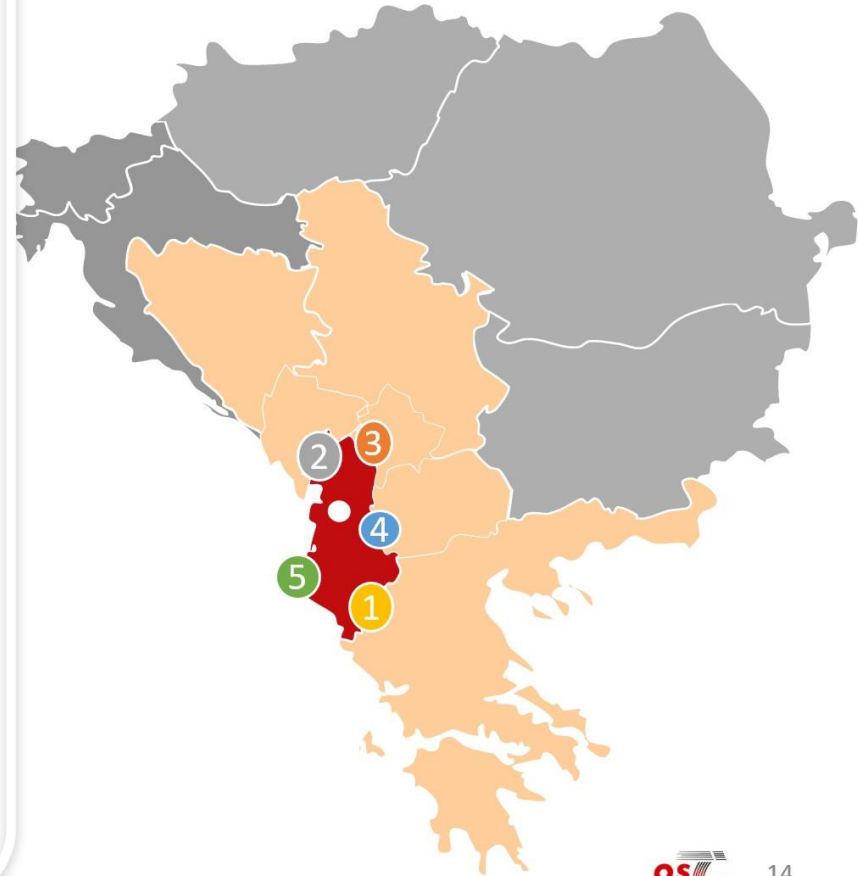
New 110 kV Line with North Macedonia

- The project is at the concept-idea [stage](#), but should be further addressed as part of a preliminary feasibility study. The estimated value of the project amounts to about €5 million.

5

The new undersea interconnection line with Italy

- The project consists in the construction of an underwater HVDC interconnection line with a transmission capacity of 500 MW to connect NS [Vlorë/Babice](#) (Albania) and will extend to [Brindizi](#), Italy, with a length of 85 km. Concept idea stage.



INTERNAL NETWORK DEVELOPMENT PLANS

1

Digitalization of the Energy Transmission System of Albania

Total Project Costs is around 46 € million. The Lead Financial Institution is kfW. The project will modernize up to 40 Substations (110 kV). Completing the line bay scheme and integration to SCADA/EMS platform.

2

Closing of the 400 kV ring Elbasan2 - Fier - Rrashbull – Tirana2.

The project includes:
 •Construction of a new 400 kV single circuit OH transmission line between Fier substation and Rrashbull substation about 78 km long with ACSR 2x490/65 mm² conductor.
 •Extension of Fier substation with a 400kV line bay.
 •Extension and reinforcement of Rrashbull substation.
 Estimated value of the project is around 31 mil €.

3

Expansion of V.Deja Substation with a 400/220kV , PS transformer, 400MVA installed power, Shunt reactor

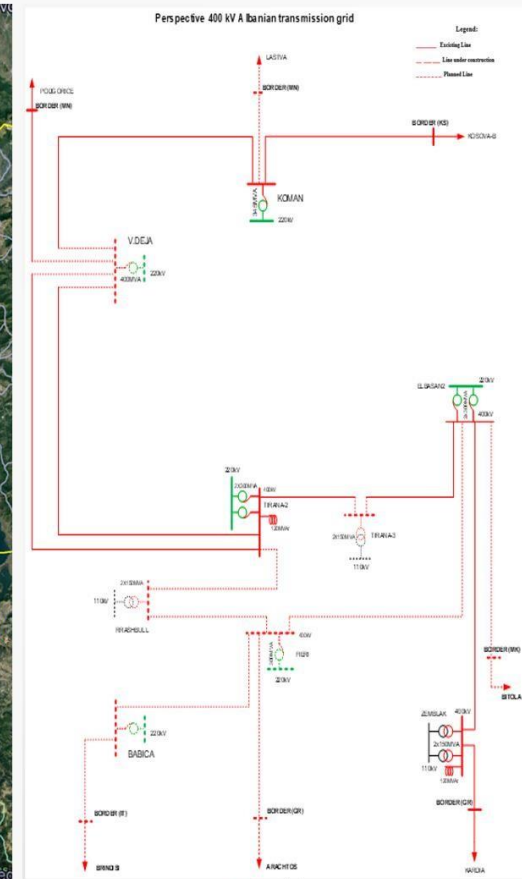
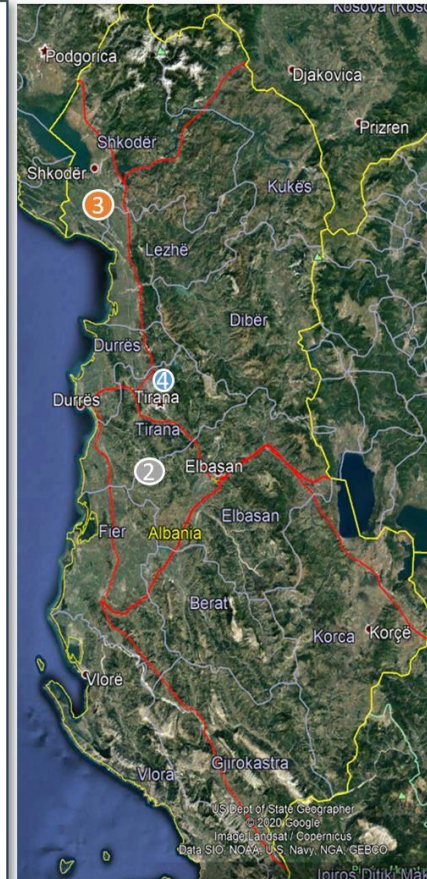
The indicative investment value of this project is estimated at around 50 million euros.

4

Extension and relocation of the existing Tirana 1 Substation with a voltage level of 400 kV

The project envisages the relocation of Tirana 1 near Fushë Kruja and the construction of a new 400/110 kV substation and the reconfiguration of the 110 kV and 400 kV lines that will come out of this substation.

The indicative investment value of this project is estimated at around 33 million euros.





***Thank You for
Your Attention!***

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