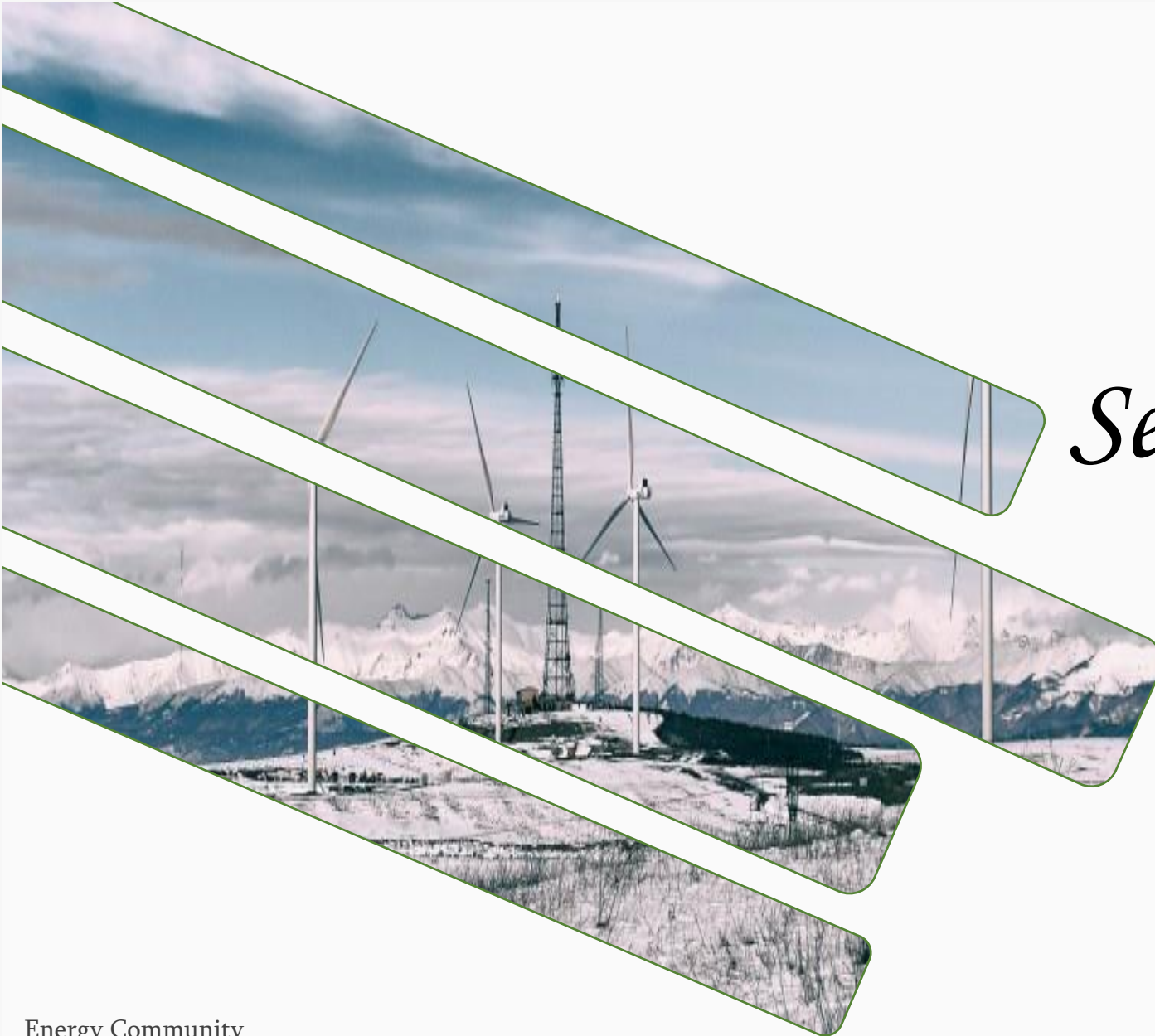


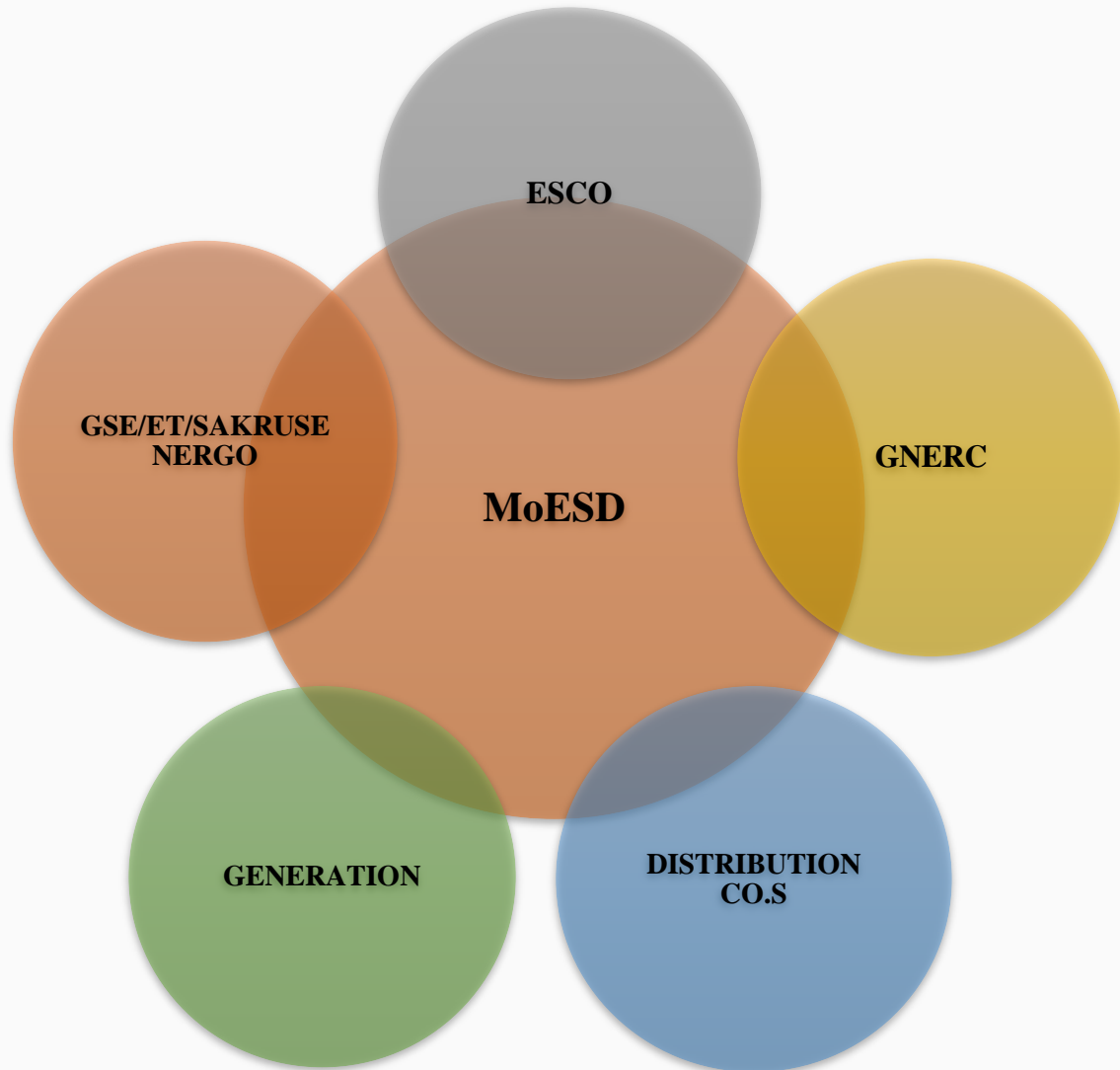
Georgia:

Security of Supply



MINISTRY OF ECONOMY
AND SUSTAINABLE
DEVELOPMENT
OF GEORGIA

ELECTRICITY MARKET OVERVIEW



Ministry of Economy and Sustainable Development of Georgia - Policymaker

- Development and implementation of the national policy, strategies and plans in the energy sector, including development of the legislative and regulatory framework
- Attraction of investment in the sector
- Development of competitive environment in the sector

Georgian National Electricity and Water Regulatory Commission (GNERC) - Independent regulator

- Issues licenses in electricity, natural gas and water sectors and controls/monitors of licensees activities
- Resolves disputes between licensees and customers
- Is responsible for market monitoring

Georgian State Electrosystem – dispatch licensee

Technical operator/Transmission Services - HV lines, HV substations

- GSE and ET (100% state owned)
- SakRusEnergo (50% state owned and 50% owned by Inter RAO)

Electricity System Commercial Operator (ESCO) -

- Balances market, emergency import/export
- Trades with reserve capacity

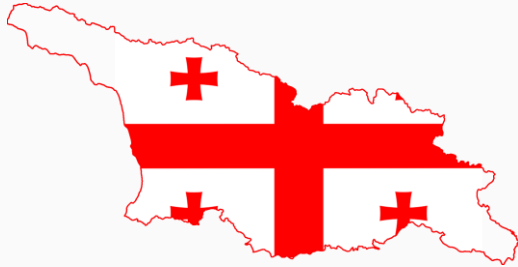
Generation

- 89 Hydropower plants
- 5 Thermal plants
- 1 Wind Power Plant

Distribution Companies

- All 2 Distribution Co.s under the private ownership: Telasi, Energo-pro Georgia

INSTALLED CAPACITY OF THE SYSTEM



Hydro Power:

89 Operating HPPs

Installed Capacity – 3285 MW

Wind Power:

1 Operating WPP

Installed Capacity – 20.7 MW

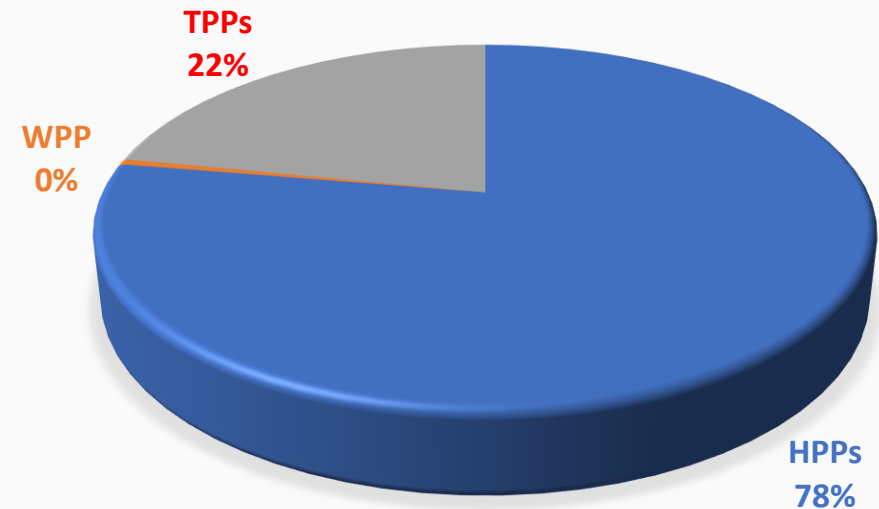
Thermal Power:

5 Operating TPPs

Installed Capacity – 924 MW

Total Generation Capacity
4230,57MW

GENERATION STRUCTURE



Hydro Potential of Georgia

➤ **Hydropower**

- 300 out of 26,000 rivers capable of providing excellent opportunities for hydropower production
- Only 22% of total hydro potential is utilized
- HPP Greenfield potential of 40 TWh

➤ **Wind Energy**

- The total installed capacity of wind power projects can be up to 1500 MW with average annual electricity generation of 4 billion kWh

➤ **Solar Energy**

- During the year in most regions there are 250-280 sunny days and the annual average amount of sunshine hours is over 2000



EXISTING ENERGY INFRASTRUCTURE

Transmission Network (GSE and Energotrans):

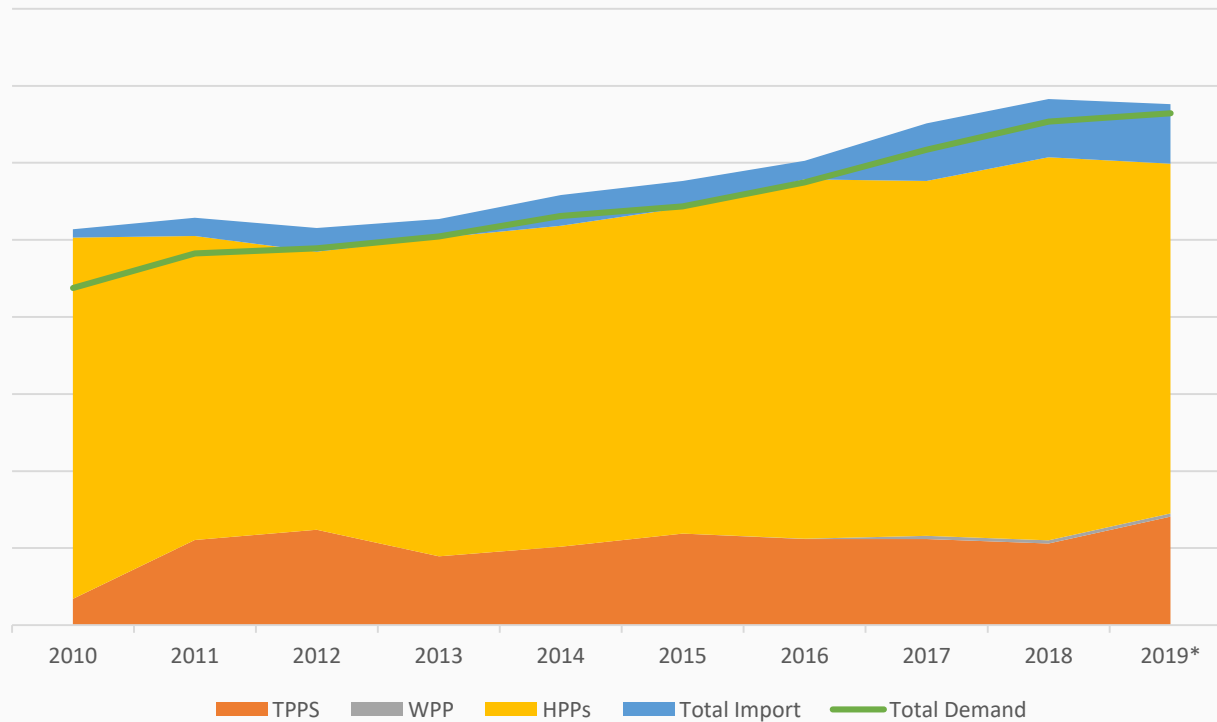
- ▶ 500/400/330/220/110/35 kv transmission lines with overall length of 4380 km
 - ▶ 500 kv transmission lines with total length - 815 km
 - ▶ 400 kv transmission lines with total length - 32.6 km
 - ▶ 330 kv transmission lines with total length - 21.1 km
 - ▶ 220 kv transmission lines with total length -1769.4 km

- ▶ 94 sub-stations,with total installed capacity- 12114 MWA
 - ▶ 6 substations of strategic importance - 500 kv
 - ▶ 24 substations -220 kv

Interconnectors

Country	Transmission line	Nominal voltage (kv)	Exchange	TTC Summer (MW)	TTC Winter (MW)
Russia	„Kavkasioni“ AC-3x300	500	export	570	650
			import	570	650
	„Salkhino“ AC-400	220	export	120	120
			import	120	120
Azerbaijan	„Mukhranis Veli“ AC-3x300	500	export	630	710
			import	630	710
	„Gardabani“ AC-480	330	export	210	240
			import	210	240
Armenia	„Alaverdi“ AC-300	220	export	150 / 100	150 / 100
			import	150 / 100	150 / 100
Turkey	„Meskheti“ AC-3x500	400	export	700	700
	„Adjara“ AC-400	220	export	150 / 150	150 / 150
			import	150 / 150	150 / 150

SUPPLY AND CONSUMPTION 2010-2018

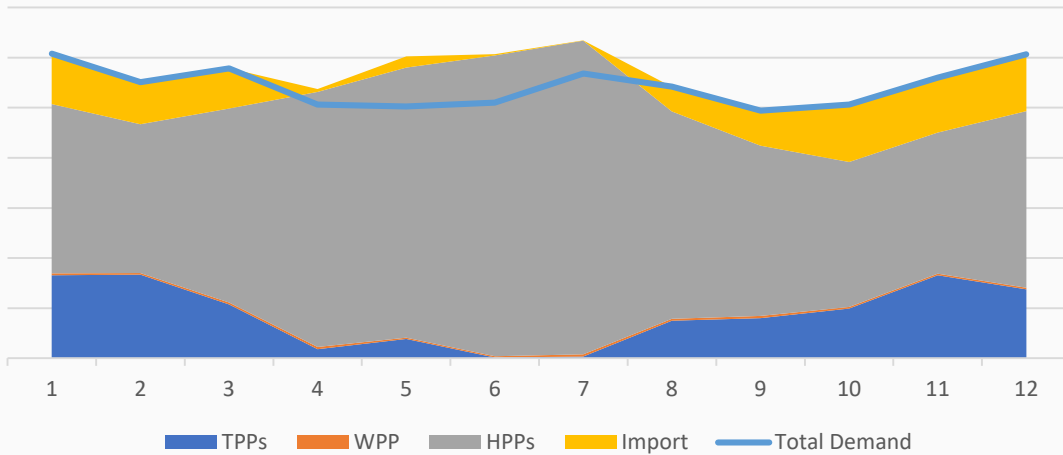


- Total Demand for 2010 - 8,755 mln.kWh
Total Demand for 2019* - 13,285 mln.kWh
Annual average growth - 5%
- Total Generation 2010 – 10,058 mln.kWh
Total Generation 2019 – 11,981 ,lm.kWh
Increased by 19%
More than 900MW new generation capacities
- Total Import 2010 – 222 mln.kWh
Total Import 2019 – 1,545 mln.kWh
Increased by 600%

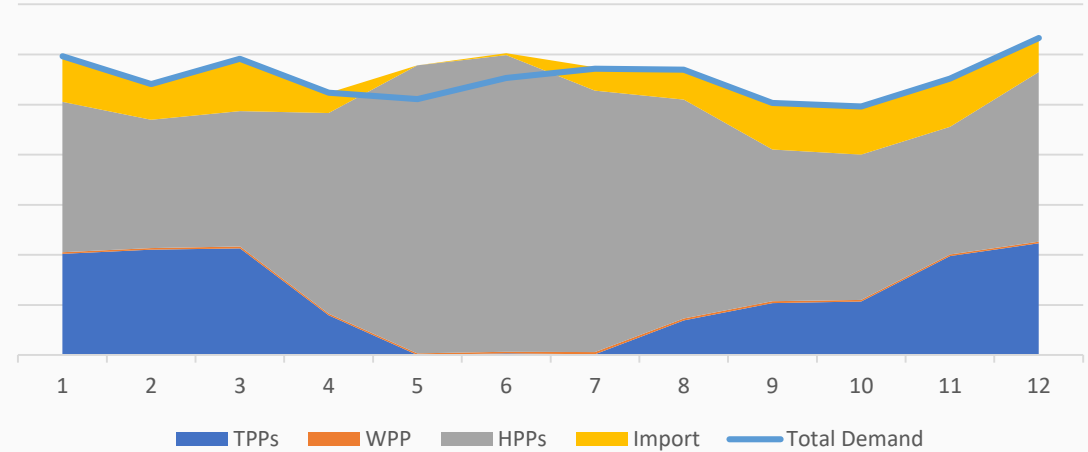
* For November-December – forecast data

SUPPLY AND CONSUMPTION 2018-2019

Supply&Consumption 2018



Supply&Consumption 2019

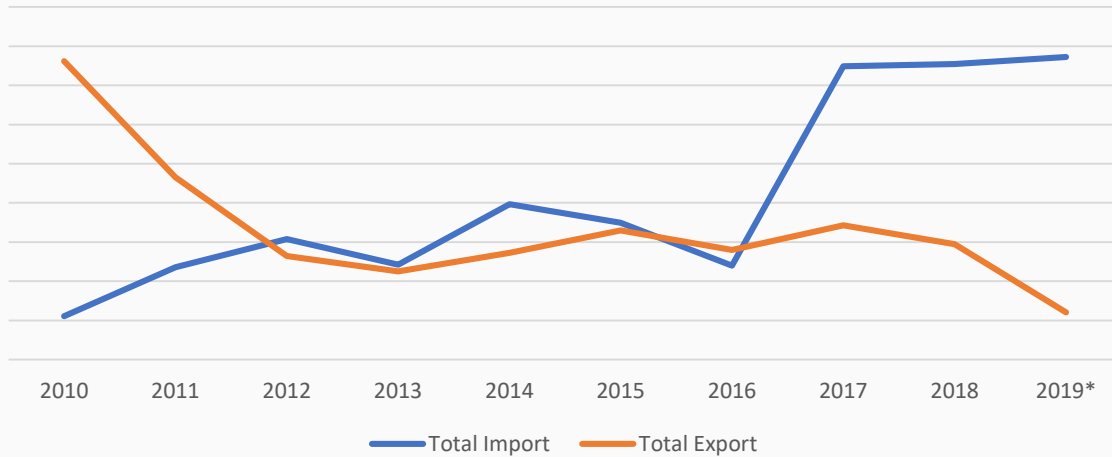


2019	1	2	3	4	5	6	7	8	9	10	11	12	Total
TPPs	404.60	420.20	425.70	158.60	0.20	7.20	3.40	137.70	207.30	213.70	395.20	446.40	2,820.20
WPP	5.80	7.40	8.20	6.80	6.10	5.50	8.90	8.30	7.20	5.80	6.00	6.70	82.70
HPPs	600.60	511.20	540.40	800.70	1,150.10	1,185.00	1,042.80	873.90	606.70	580.30	509.60	676.30	9,077.60
Import	181.70	142.50	208.90	80.80	0.20	8.00	94.00	119.20	185.30	195.30	193.20	136.00	1,545.10

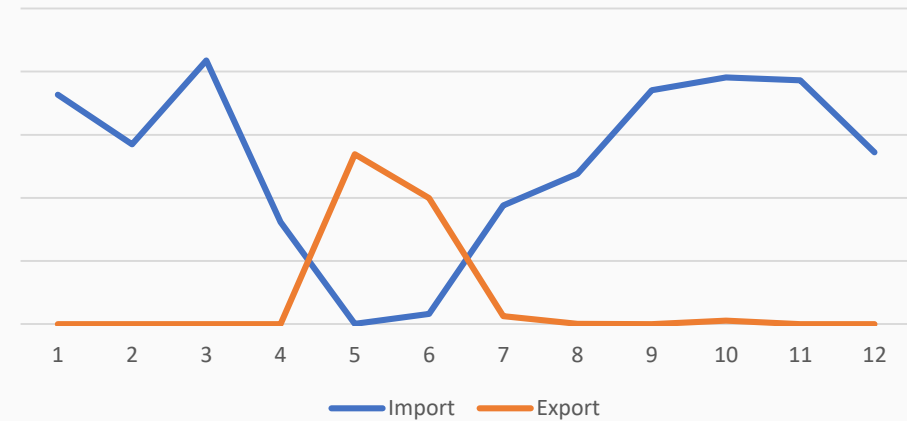
2018	1	2	3	4	5	6	7	8	9	10	11	12	Total
TPPs	331.38	333.75	214.83	35.43	76.22	2.97	7.07	149.61	160.29	197.82	330.84	274.74	2,114.93
WPP	7.13	6.22	7.05	9.37	5.19	5.17	8.06	7.58	8.10	7.20	6.75	6.46	84.28
HPPs	675.70	594.16	774.71	1,019.00	1,079.33	1,200.24	1,252.75	827.43	680.52	577.87	562.82	704.83	9,949.35
Import	202.14	167.89	160.76	11.22	43.96	6.17	1.16	99.65	139.46	229.51	219.20	227.71	1,508.82

IMPORT AND EXPORT 2010-2019

Import&Export (mln.kWh),
2010-2019



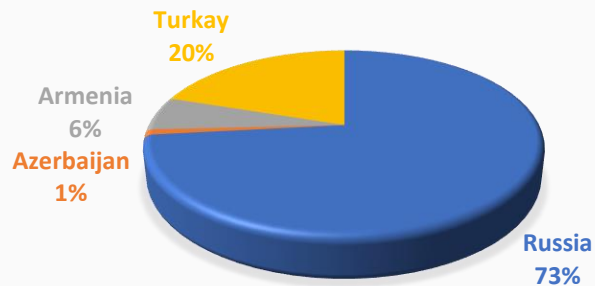
Import&Export (mln.kWh),
2019*



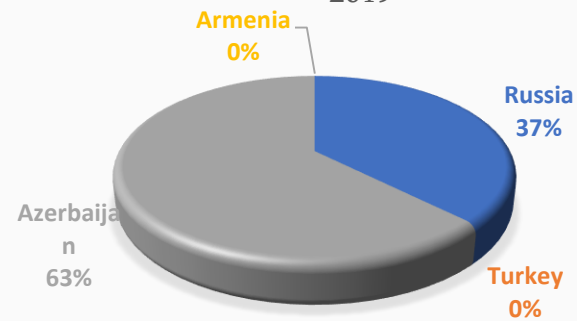
IMPORT BY COUNTRIES



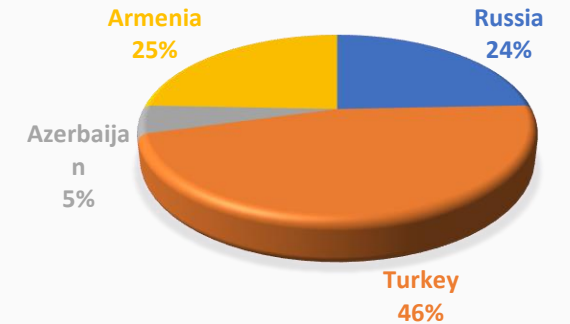
EXPORT BY COUNTRIES
2010



IMPORT BY COUNTRIES
2019*

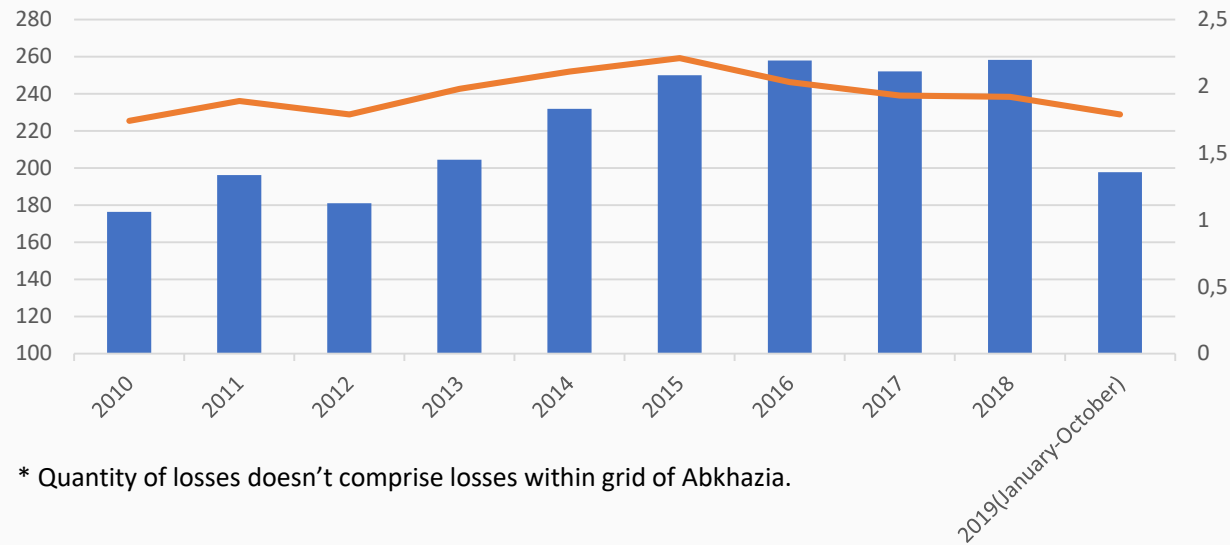


EXPORT BY COUNTRIES
2019*



* Period of January-October

LOSSES 2010-2019



* Quantity of losses doesn't comprise losses within grid of Abkhazia.

➤ Total losses for the transmission and distribution network

- ✓ 2001 – 18.53%
- ✓ 2006 – 13.20%
- ✓ 2016 – 7.21%
- ✓ 2018 – 6.48 %
 - Transmission network – 1.92%
 - Distribution - 5.09%

➤ Losses determined for 2018-2020

- ✓ for Transmission Licensees - 2.06%
 - was – 4.41%
- ✓ for Distribution Licensees –
 - JSCo Telasi – 5.88%
 - JSCo Energo-Pro Georgia – 9.8%



- GNERC Resolution N10 April 17, 2014 on Approving Network Rules
- GNERC Resolution N15 July 30, 2014 on Approving Rules of Calculation of the Electricity Normative Losses
- GNERC Resolution N34 December 12, 2017 On Approving of the Normative Losses of Electricity in the Electricity Networks of Georgia

SOLUTIONS

- Development of Renewable Resources
 - ✓ Hydropower – 126 projects
 - ✓ Wind - 18
 - ✓ Solar - 16
 - ✓ Biomasses

- Development of Transmission Network
 - ✓ Ten Years Network Development Plan (since 2015)
 - Construction and strengthening of internal transmission network
 - Construction and strengthening of interconnection network

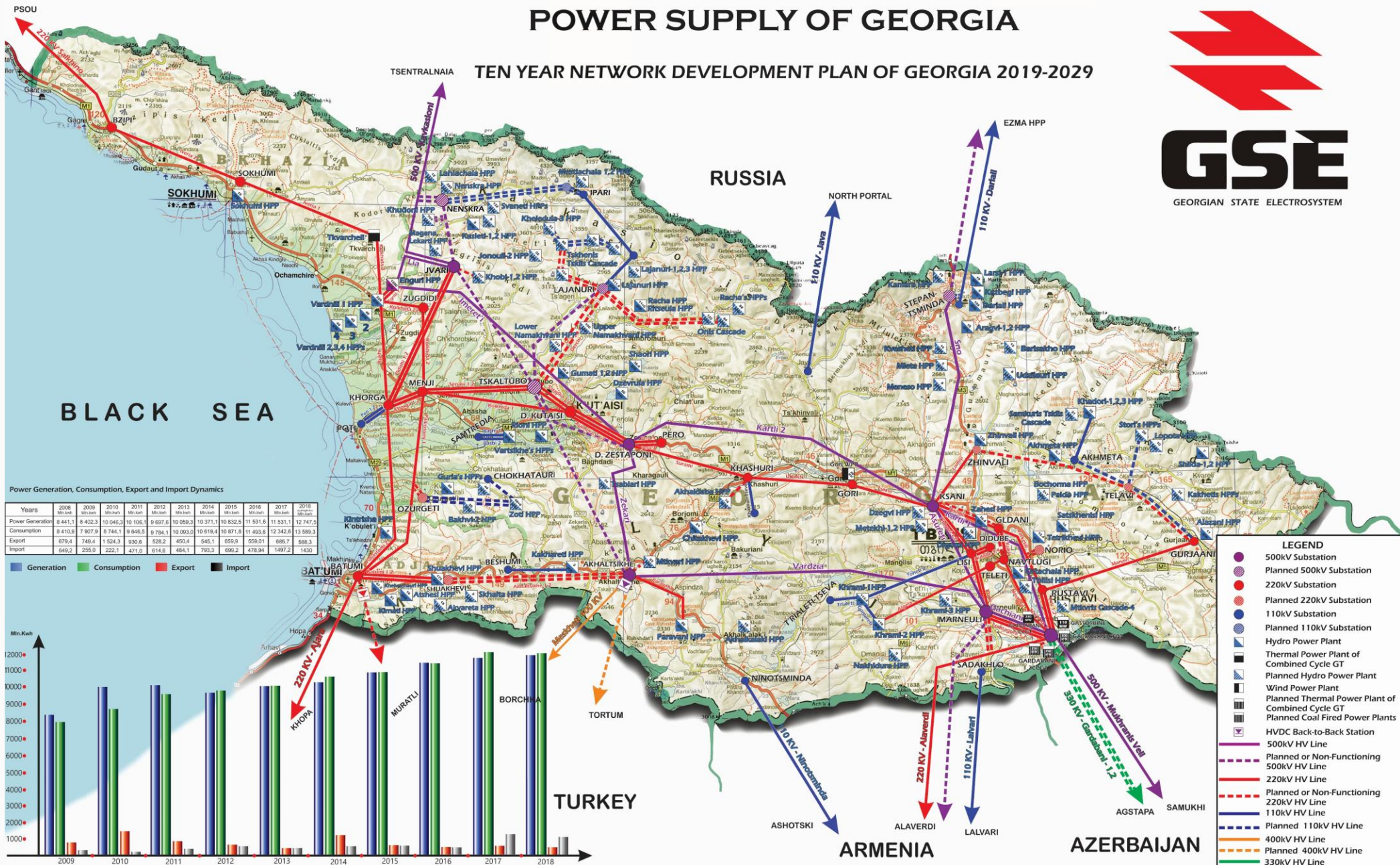
- Construction of New TPPs
 - ✓ 230MW TPP will be put into operation in 2019
 - ✓ ~ 250 MW TPP under elaboration
 - ✓ ~ 250 MW TPP planned



- Gas Storage
 - ✓ Feasibility study completed
 - ✓ Technical data: volume 23-250 mln m³
 - ✓ Project completion is planned in 2023
 - ✓ This project is the most crucial for the energy security of Georgia

POWER SUPPLY OF GEORGIA

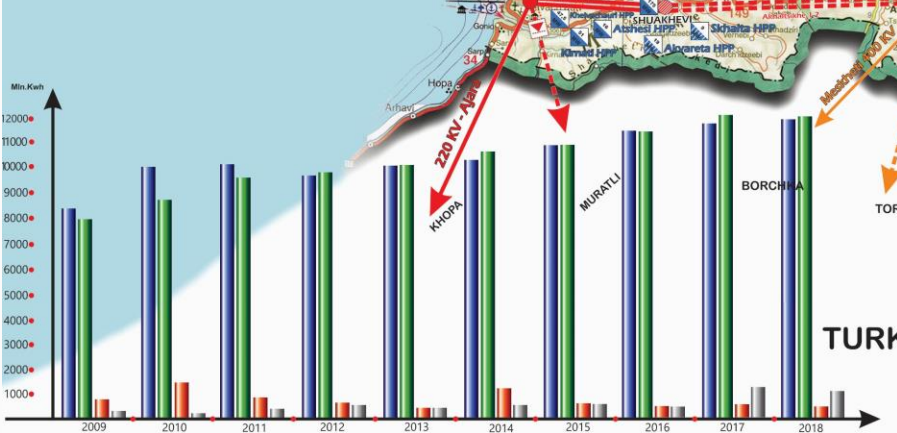
TEN YEAR NETWORK DEVELOPMENT PLAN OF GEORGIA 2019-2029



Power Generation, Consumption, Export and Import Dynamics

Years	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Power Generation	8 441.3	8 402.3	10 046.3	10 106.1	9 697.6	10 059.3	10 375.1	10 832.5	11 531.6	11 531.1	12 747.5
Consumption	8 410.9	7 907.9	9 744.1	9 646.5	9 784.1	10 093.0	10 619.4	10 871.8	11 483.6	12 342.6	13 589.3
Export	679.4	749.4	1 524.3	930.6	528.2	450.4	545.1	659.9	559.0	685.7	688.3
Import	649.2	355.0	222.1	471.0	614.6	484.1	793.3	699.2	478.94	1497.2	1430

■ Generation ■ Consumption ■ Export ■ Import



- LEGEND**
- 500kV Substation
 - Planned 500kV Substation
 - 220kV Substation
 - Planned 220kV Substation
 - 110kV Substation
 - Planned 110kV Substation
 - Hydro Power Plant
 - Thermal Power Plant of Combined Cycle GT
 - Planned Hydro Power Plant
 - Wind Power Plant
 - Planned Thermal Power Plant of Combined Cycle GT
 - Planned Coal Fired Power Plants
 - HVDC Back-to-Back Station
 - 500kV HV Line
 - - - Planned or Non-Functioning 500kV HV Line
 - 220kV HV Line
 - - - Planned or Non-Functioning 220kV HV Line
 - 110kV HV Line
 - - - Planned 110kV HV Line
 - 400kV HV Line
 - - - Planned 400kV HV Line
 - 330kV HV Line



Thank you!

Elene Gokhsadze

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