



# Update on Power Contingency Plans of Georgia

**JSC “Georgian State Electrosystem”**

December 2015



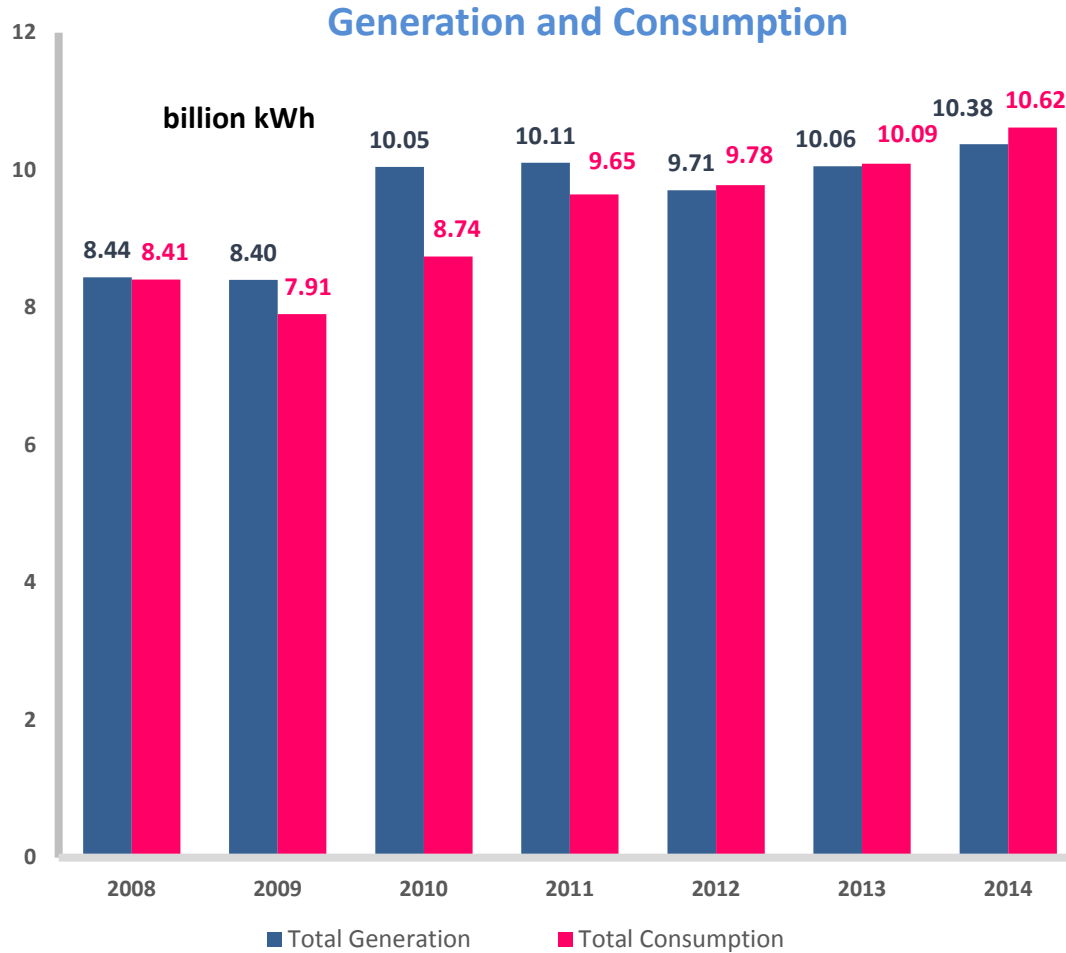
**GSE**



# Emergency Import/Export with Neighboring States

YEAR	Neighboring State							
	Russia		Azerbaijan		Armenia		Turkey	
	GWh		GWh		GWh		GWh	
	Import	Export	Import	Export	Import	Export	Import	Export
2008	8.34	36.77	-	-	-	-	-	-
2009	17.65	39.28	-	-	-	-	-	-
2010	59.41	45.98	-	-	-	-	-	-
2011	21.57	41.86	-	-	-	-	-	-
2012	14.62	12.99	0.3	-	-	-	-	-
2013	17.46	0.77	-	-	-	-	3.33	3.34
2014	15.78	0.08	-	-	-	-	0.78	0.78
2015(1-11)	17.29	0.09	-	0.01	-	0.004	1.75	1.77
<b>TOTAL</b>	<b>172.11</b>	<b>177.81</b>	<b>0.3</b>	<b>0.01</b>	<b>0.0</b>	<b>0.004</b>	<b>5.87</b>	<b>5.89</b>

# Current Situation



Average consumption growth from 2010 : 4.2%

- **Grid Code - Resolution of Georgian National Energy and Water Supply Regulatory Commission “On approval of Network Rules”**. According to the Grid Code the Dispatch Licensee is obliged to conduct necessary studies for transmission network planning periodically or upon necessity for providing economical, safe, reliable and stable functioning.
- **“Ten-Year Network Development Plan of Georgia” (TYNDP)** – legal bases established by *The Law of Georgia on Electricity and Natural Gas*.

Main purposes of the **TYNDP** are:

- Forecasting and modelling different scenarios of the future development;
- reliability, safety and sustainable development of the transmission network;
- provision of electricity of adequate quality;
- raise the transit capacity of the electricity network of the country.

# Primary Development Drivers of Georgian Transmission Network

New legal framework of Georgia recognises two predominant network development drivers, which serve improving reliability of power system and security of supply:

**i. Security of supply:**

- a) adequacy – ability of the system to uninterruptely meet the demand for electricity, in both planned outages and emergency cases;*
- b) stability – ability of the system to withstand disturbances such as short circuit or unexpected outages of system elements.*

**ii. Compliance with N-1 criteria:**

*Outage of network element (OHL or 500/220 kV AT) will not cause overloaded of elements left in operation, decrease/increase of voltage below/above acceptable level.*

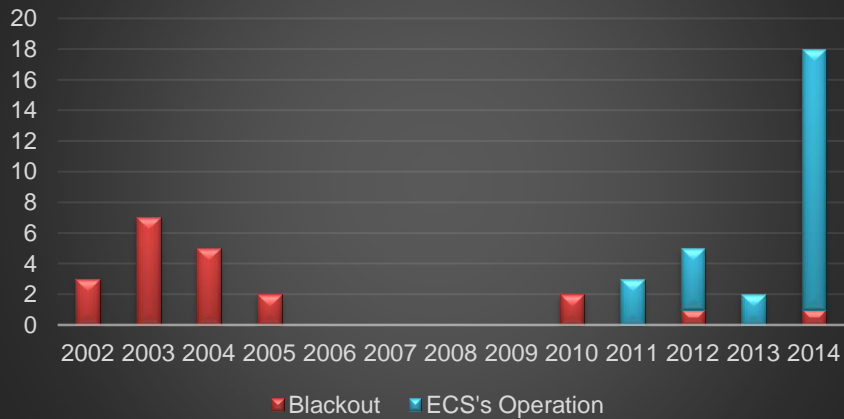
# GEORGIAN POWER TRANSMISSION GRID EMERGENCY CONTROL SYSTEM (ECS)

**Emergency Control System (ECS)** was installed from 2011. Main goals of **ECS** are:

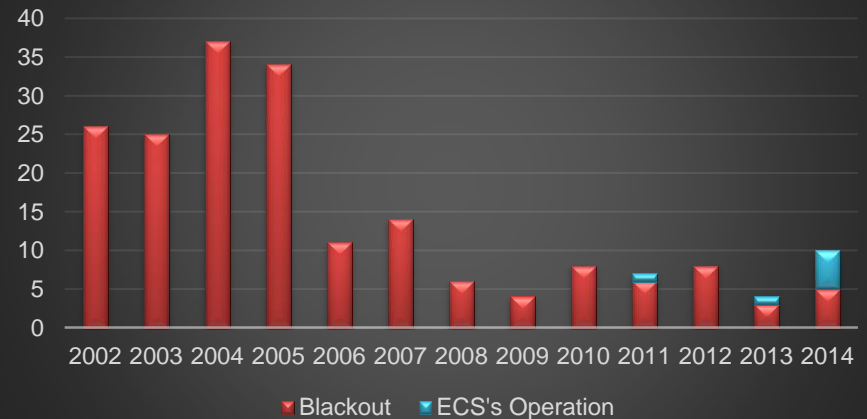
- *Improving stable operation of Power System of Georgia and electricity exchange between Georgia and its neighbor countries;*
- *Restriction and interruption evolution of emergency scenarios in Power System;*
- *Ensuring maintain of steady-state, transient and dynamic stabilities of Power System.*

# PARTIALLY AND TOTAL BLACKOUT STATISTICS

## TOTAL BLACKOUT



## PARTIAL BLACKOUT



# The destination of System Services

- **System services -**

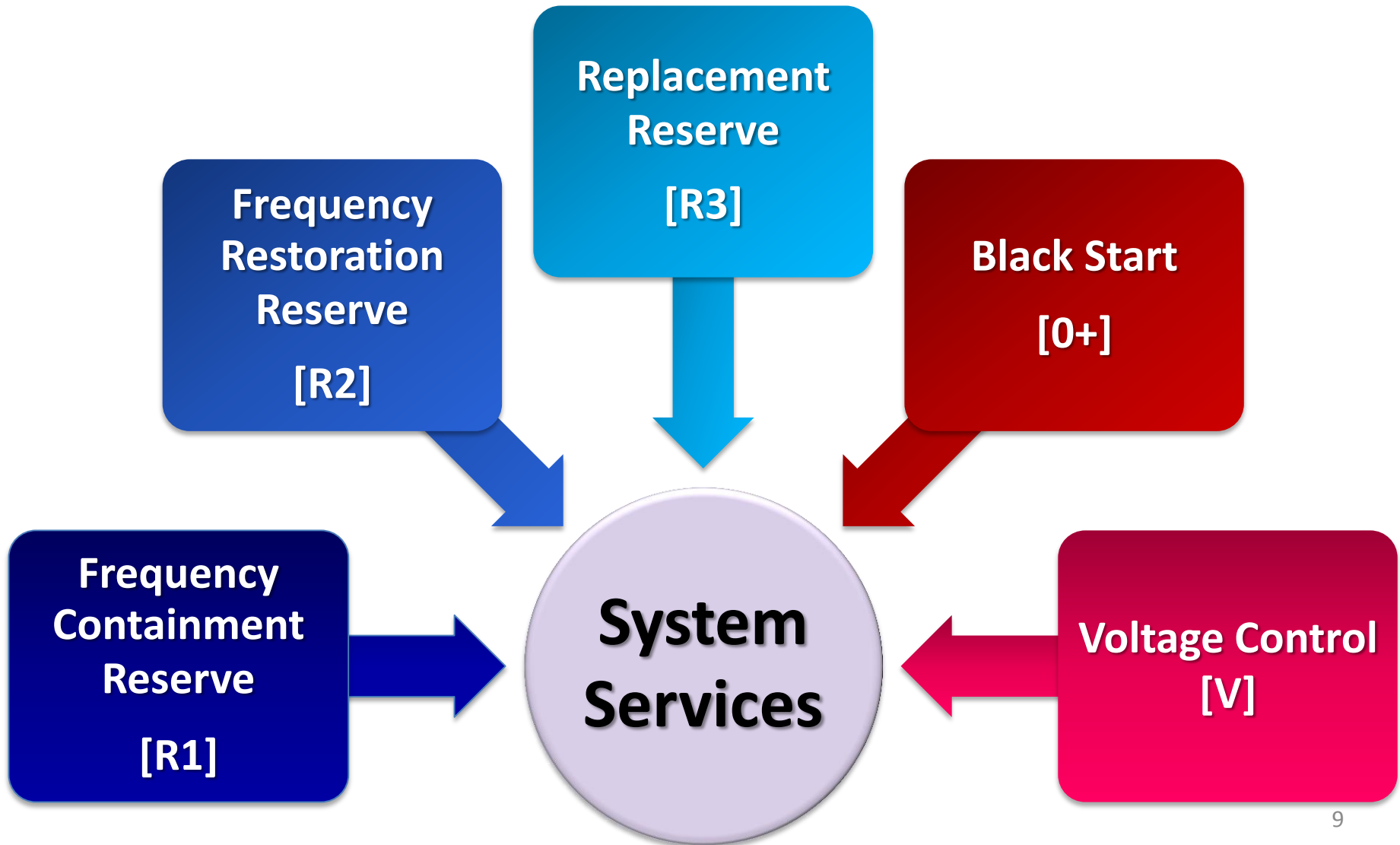
Set of Services to be provided by the TSO with support from the participants of electric system.

- **Purposes of Services**

- Reduction of risks of Emergencies
- Increasing of independence of power system
- Increasing of Power Quality
- Integration to the Grid of Wind and Solar Power Sources
- Integration with the Turkish and European Power Markets



# Types of System Services



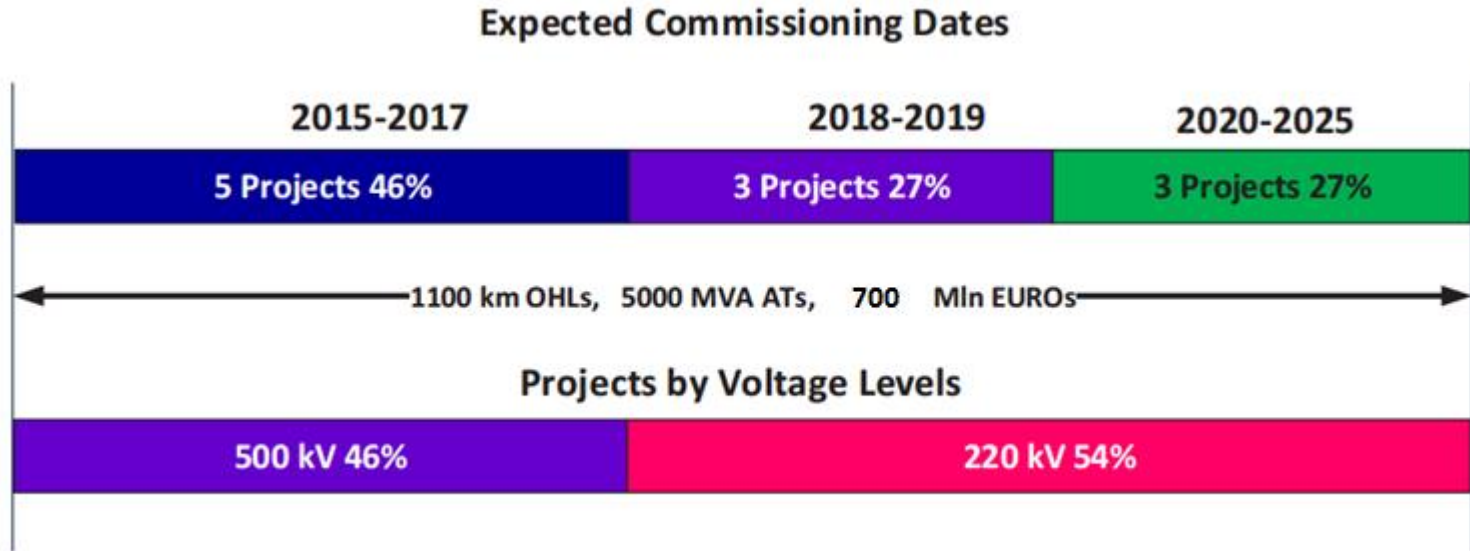
# Ten Year Network Development Plan (TYNDP) of Georgia

The goal of JSC “Georgian State Electrosystem” (GSE) is development of stable, reliable, cost-effective and efficient transmission system ensuring at any development stage:

- Network security;
- Power quality;
- Sufficient transfer capacity for
  - integration of renewable energy sources into the network and
  - power exchange with neighbouring countries;
- Preparedness for integration into ENTSO-E’s Ten-Year Network Development Plan.

The reason of long-term development planning is explained by the need for the future transmission network satisfying all applicable design requirements, main from which is **single contingency (N-1) criterion**.

# Identified projects and investments for network reinforcement



## According the TYNDP

- OHLs LENGHT will be increased by 1100 km
- Capacities of Substations will be increase by 5000 MVA
- Investments of 700 Million € will be needed for network reinforcement

As a result it will be possible

- Integration of more than 100 HPPs
- Total Capacity of integrated HPPs is 4000 MW.
- Annual Generation will be increased by 15 Bill kWh
- Total investments of HPPs will be 5.2 Bill €





*Thank You For Your Attention!*



**GSE**