

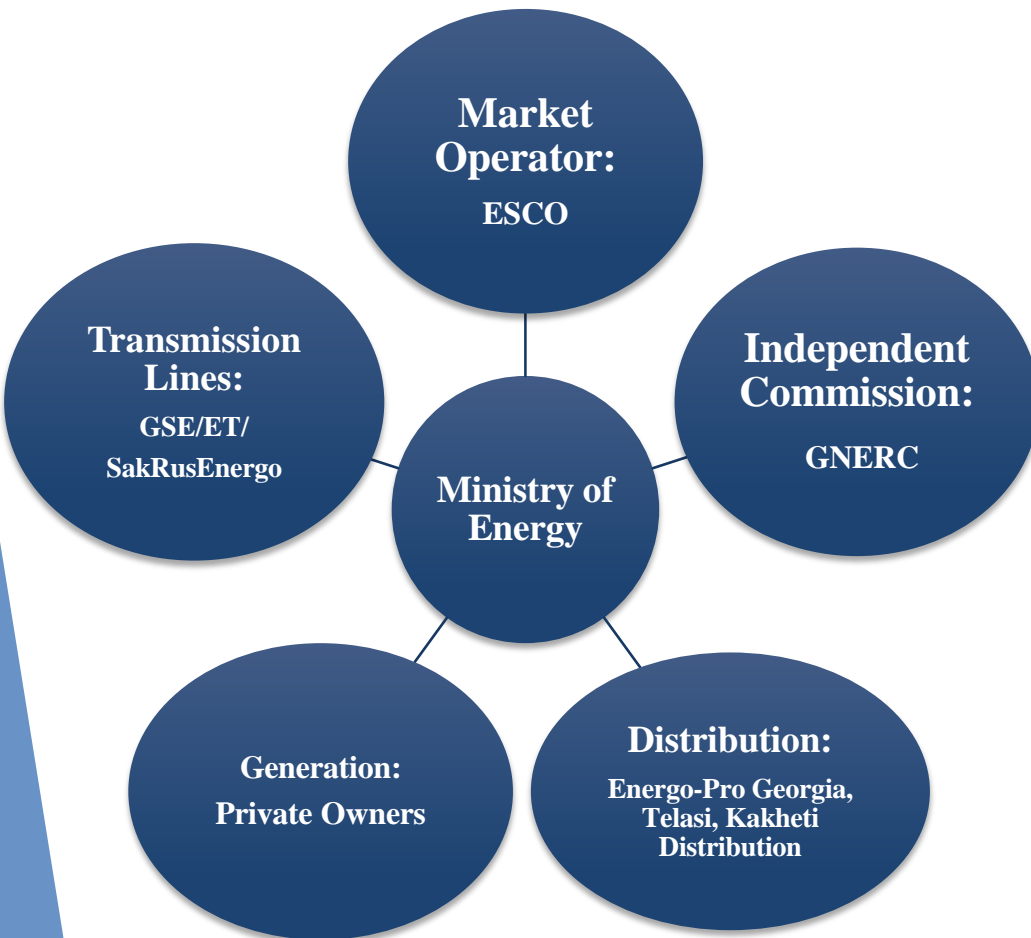
Case Study Georgia

Regional Seminar on: «Enabling Policies to Promote
Financing Renewable Energy Investments»

Baku, Azerbaijan

19-20 October, 2016

Energy Sector of Georgia



Ministry of Energy

- Sets policies and is responsible for facilitating investment projects

Independent regulator - GNERC

- Establishes tariffs, licensing rules and standards
- Resolves relations between customers and companies

Technical operator/Transmission Services - HV lines, HV substations and dispatching

- 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
- Reserves capacity trader

Generation

- 68 Hydro Power plants
- 5 Thermal Power plants

Distribution Companies

- All 3 Distribution Co.s under the private ownership: Telasi, Energo-pro Georgia, Kakheti Distribution

Energy Sector Characteristics

Installed Capacity

Total Installed Capacity - 3720 MW

Hydro Power:

67 Operating HPPs

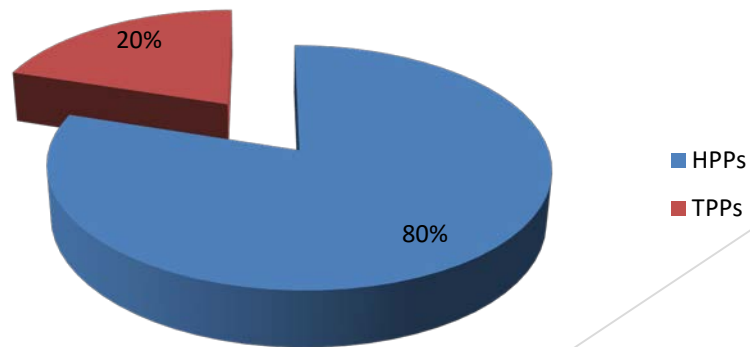
Installed Capacity \approx 2800 MW

Thermal Power:

5 Operating TPPs

Installed Capacity - 932 MW

Annual electricity generation
reached 10.8 TWh in 2015



Renewable Energy Potential

- ▶ Hydro Resources
 - ▶ Installed capacity of green-field hydropower plant projects' is estimated to be equivalent to 15 000 MW with annual generation potential to 50 TWh per year;
- ▶ Wind Resources
 - ▶ Average annual electricity generation from wind in Georgia is estimated to be 4 TWh with an installed capacity of 1450 MW;
- ▶ Solar Resources
 - ▶ total annual solar energy potential is measured to be 108 MW, however there are different considerations regarding the solar potential.
- ▶ Geothermal Resources
 - ▶ geothermal water reserves reach 250 million m³ per year and an average temperature of geothermal waters ranges from 30°C to 110°C in more than 250 natural and artificial water channels, while the total potential amount to be withdrawn is 160,000 m³ per 24 hours
- ▶ Biomass Resources have considerable amount as well

Assessment of the CO₂ emission reductions possible from the envisaged increased share of RE

- ▶ 20 billion KWh can be generated, which will save about 7 million tons of conventional fuels;
- ▶ At the regional scale the exploitation of outlined renewable energy resources will give an opportunity to reduce:
 - ▶ CO₂ - approximately by 9 million tons;
 - ▶ CO - approximately by 5000 tons;
 - ▶ NO₂ - approximately by 44 000 tons.
- ▶ In case of construction of 95 HPPs the reduction of the CO₂ emissions will reach to 2376.0 tons annually

The last decade dynamics of power generation

Year	Thermal Power Generation mIn KWh	Hydro Power Generation mIn KWh	Total
2006	2225	5 396	7 621
2007	1 515	6 831	8 346
2008	1 279	7 162	8 441
2009	991	7 412	8 403
2010	679	9 368	10 047
2011	2 216	7 891	10 106
2012	2 477	7 220	9 697
2013	1 787	8 271	10 058
2014	2 036	8 334	10 370
2015	2 379	8 454	10 833

According to the Table electricity generation of the country increased over the years.

The share of hydropower generation increased until 2011, while in 2010 the share of hydro generation reached 93% and only 7% share of thermal power plants. 2011 was marked by the sharp increase in thermal power plants generation, mostly caused by the fact that in 2011 non-sufficient water resources were in riverbeds and generated hydropower capacity was lower than the average hydrological year.

At the same time demand on energy had increased significantly. Electricity demand increased by 10% annually in 2009-2011.

In 2013 Hydro power generation started to increase again and thermal power generation continued to pattern as well.

Emissions from the energy sector yet remains roughly three times less comparing to the records in 1990 when energy sector was a heavy polluter. **In 1990 energy sector emissions were about 36.6 mln. tons of CO2 equivalents.**

CO₂ Emissions form TPPs

2015			
	Generation, Mln kWh	EF, kgCO ₂ /kWh	CO ₂ emissions, tones
Mtkvari	1,212.0	0.555	672,660
Tbilsresi	760.8	0.681	518,105
G-Power	24.9	0.627	15,612
Gardabani	355.9	0.45	160,155
Gardabani CCGT, test	24.8	0.45	11,160
Tkibuli	0.4	0.8	320
	2,378.8		1,378,012

2016			
	Generation, Mln kWh	EF, kgCO ₂ /kWh	CO ₂ emissions, tones
Mtkvari	317.6	0.555	176,268
Tbilsresi	36.9	0.681	25,129
G-Power	52.2	0.627	32,729
Gardabani	560.1	0.45	252,045
Gardabani CCGT		0.45	0
Tkibuli	4.7	0.8	3,760
	971.5		489,931

Energy Policy and Regulations promoting investments

- ▶ Law on Electricity and Natural Gas;
 - ▶ Support scheme for micro installations*
- ▶ Energy Policy of 2006 and Energy Policy of 2015;
 - ▶ Utilization of local renewable energy resources
- ▶ National Program “Renewable Energy 2008” ;
 - ▶ energy sector is deregulated, All power plants operating on renewable energy sources and constructed after 2008 are free to choose the buyer and set a price for produced electricity.
- ▶ Resolution No. 214 and Decree No40;
 - ▶ Facilitate rules for implementation of renewable energy projects;
- ▶ BOO Principal, PPAs and Simplified procedures related to obtaining permits and licenses;
 - ▶ Tools for supporting investments
- ▶ Ten-year network development plan of Georgia- 2015-2025;
 - ▶ program designed for reinforcement of national transmission system infrastructure and an integration of renewable energy sources into the network

Hydro Power Development

N	Project	Company	Installed Capacity (MW)	Generation (GWh)	Commencement of Operation (Year)
1	Khadori 2 HPP	Feri LLC	5.40	30.00	2012
2	Racha HPP	Georgian International Energy Corporation LLC	11.00	45.08	2013
3	Bakhvi 3 HPP	Bakhvi Hydro Power LLC	10.00	35.00	2013
4	Shilda HPP	Energia LLC	4.80	34.50	2013
5	Larsi HPP	Energia LLC	19.00	111.00	2013
6	Aragvi HPP	Energio Aragvi LLC	8.00	50.00	2013
7	Kazreti HPP	Water Energy LLC	2.50	11.00	2014
8	Alazani 2 HPP	Georgian International Energy Corporation LLC	6.00	40.00	2014
9	Akhmeta HPP	Geoenergy LLC	9.10	43.40	2014
10	Kazbegi HPP	Kazbegi HPP LLC	6.00	39.40	2014
11	Paravani HPP	Georgian-Urban Energy LLC	87.00	86.54	2014
12	Pshavela HPP	Stori Power LLC	1.90	9.50	2015
13	Debeda HPP	Hydro Georgia LLC	3.40	10.50	2015
14	Shaqshaqeti HPP	Medgroup Georgia LLC	1.50	7.66	2016
15	Saguramo HPP*	Georgian water and Power LLC	4.4	32.00	2016
Total			180.4	909	

Renewable Energy Projects

- ▶ 6 HPPs (400 MW) will be commissioning end of 2016;
- ▶ First Wind Power Plant is operating Since October 8, 2016 (20.7);
- ▶ 110 power plant projects (only RE) are different stage of development
 - ▶ *Total installed capacity 4688 MW ; Around 60 Project are subject of feasibility studies;*
 - ▶ *In addition to Hydro it includes Wind, Solar and Biomass Power Plant Projects.*

Barriers

- ▶ Lack of legislative framework is main weakness of in terms of promotion of non-hydro renewable energies:
 - ▶ A long term strategy;
 - ▶ Primary law on Renewable Energy;
 - ▶ National Renewable Energy Development Action Plan, along with proper awareness rising campaigns and relevant support schemes;

Such legislative framework could have synergetic results in rational utilization and sustainable deployment of renewable sources.

Thanks for Attention!

Marita Arabidze
Head of Energy Efficiency and Alternative
Energy Division
Ministry of Energy of Georgia

E-mail: m.arabidze@energy.gov.ge