Renewable Energy: Advantages and Challenges

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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
- 71 Hydro Power plants & 1 Wind power plant
- 5 Thermal Power plants

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

Market Operator: ESCO

Independent Commission: GNERC

Transmission Lines:
- GSE/ET/
- SakRusEnergo

Ministry of Energy

Distribution:
- Energo-Pro Georgia, Telasi, Kakheti Distribution

Generation:
- Private Owners
Strategic Directions of Energy Policy

- **EU Association Agreement Signed**: 2014
- **Energy Strategy**: Under development
- **Energy Community Treaty**: Ratified 2017
- **New Energy Policy**: 2015
  - Implication on EE and RE development
- **Net Metering (100 kV) & promotion small scale RE development**
Ensuring security of energy supply and improving Georgia’s overall Energy security by:

- Diversification of the energy supply resources, optimal utilization and reserve creation of the Georgian energy resources;
- Efficient exploitation of renewable energy resources;
- Gradual approach of Georgian legislation to EU legislation;
- Georgian energy market development and improvement of the energy trade mechanisms;
- Increasing the role of Georgia as a regional transit country;
- Georgia – clean energy production and regional center for the energy trade;
- Creation of unified approach on Energy Efficiency and its execution;
- Consideration of the environmental issues while implementing energy projects;
- Improvement of the service level and consumers rights protection.
Installed Capacity of the System
3836.15 MW

**Hydro Power:**
Operating HPPs
Installed Capacity – 2911.75 MW

**Wind Power:**
1 Operating WPPs
Installed Capacity – 20.7 MW

**Thermal Power:**
5 Operating TPPs
Installed Capacity – 924.4 MW
Electricity Resources

Electricity Supply by Sources

- Fossil Fuel (Natural Gas)
- RE (Hydro & Wind)
- Import

Seasonal Asymmetry of Generation and Consumption

Winter
- LOW
- HIGH

Summer
- HIGH
- LOW

Electricity Supply by Sources

2008-2016

- Import
- Fossil Fuel (Natural Gas)
- RE (Hydro & Wind)

GWh

<table>
<thead>
<tr>
<th>Year</th>
<th>Import</th>
<th>Fossil Fuel natural gas</th>
<th>RE hydro</th>
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<tbody>
<tr>
<td>2008</td>
<td>0.65</td>
<td>1.28</td>
<td>7.17</td>
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<tr>
<td>2009</td>
<td>0.25</td>
<td>0.99</td>
<td>7.42</td>
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<tr>
<td>2010</td>
<td>0.22</td>
<td>0.68</td>
<td>9.37</td>
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<tr>
<td>2011</td>
<td>0.47</td>
<td>2.21</td>
<td>7.89</td>
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<tr>
<td>2012</td>
<td>0.61</td>
<td>2.48</td>
<td>7.22</td>
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<tr>
<td>2013</td>
<td>0.48</td>
<td>1.79</td>
<td>8.27</td>
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<tr>
<td>2014</td>
<td>0.85</td>
<td>2.04</td>
<td>8.33</td>
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<tr>
<td>2015</td>
<td>0.7</td>
<td>2.38</td>
<td>8.45</td>
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<tr>
<td>2016</td>
<td>0.6</td>
<td>2.23</td>
<td>9.3</td>
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Wind and Solar Energy Utilization

Wind Power Plant KARTLI – Pilot Project

Location: Shida Kartli, Gori
Installed Capacity: 20.7 MW
Annual Generation: 88 GWh
Exploitation: October, 2016
Company: JSC GEDF

Operating Solar Pvs: 400 kV in remote areas for households

Grant from the Japanese government for:

- 316 KW Solar PV installations at Tbilisi International Airport
  337,000 kWh annual generation, covers 40% of Terminal total consumption
- 35 KW Solar PV installations at Ilia State University
  30,000 kWh annual generation, covers 15% of building’s total consumption
## Renewable Energy Potential

<table>
<thead>
<tr>
<th>Hydro Potential</th>
<th>Theoretical</th>
<th>137 billion KWh</th>
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<tr>
<td></td>
<td>Technically feasible</td>
<td>90 billion KWh</td>
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<td></td>
<td>Economically feasible</td>
<td>50 billion KWh</td>
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<tr>
<th>WIND Potential</th>
<th>Generation</th>
<th>- 4 billion KWh</th>
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<tbody>
<tr>
<td>Theoretical</td>
<td>Installed capacity</td>
<td>-1500 MW</td>
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</table>

<table>
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<tr>
<th>SOAL</th>
<th>Theoretical</th>
<th>250-280 sunny days</th>
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<tr>
<td></td>
<td>average radiation</td>
<td>4.2 kwh/m²</td>
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<td></td>
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<td>2000-2500 MW</td>
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<tr>
<th>Geothermal water reserves</th>
<th>250 mln m³ per year</th>
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<td></td>
<td>30-100 ⁰ C</td>
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Further Developments

- 8 HPP expected to be commissioning in 2017;

- Construction and licensing Stage:
  35 HPP projects - total installed capacity 1.642 MW; Generation 5371 GWh; Estimated total investment - 3 billion US Dollars;

- Feasibility stage with construction liabilities:
  23 HPP Projects - total installed capacity 1,173 Mg. 5,189 GWh. Estimated total investment - 2 billion US Dollars;

- Feasibility Study Stage - 60 RE Projects - estimated total investment 3 billion US Dollars
  10 Wind Project total installed capacity 822 MW;
  3 Solar Project total installed capacity 555 MW.
RE Supporting Policy Development

- NET Metering for small scale RE technologies – Implemented;

- Drafting the regulation for RE integration in to the electricity grid - initial stage under the DANIDA Project

- Improvement of existing legislative framework in compliance with EU Directives -2017-2018:
  - Emending Law on Electricity and Natural Gas;
  - Finalization of first National Energy Efficiency Action Plan;
  - Elaboration of National Renewable Energy Action Plan
Advantages
- Diversification of energy supply sources and increase of energy security;
- Boost of Economic development – Job creation;
- Reduction of GHGs.

Challenges
- Difficulties of curtain technologies cussing unreliability of the energy system;
- Technology price;
- Environmental aspects;
- Regional characteristics.
Thank you for attention!

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