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Recommended citation:
3 Asia
3.5 Western Asia

3.5.3 Georgia
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<table>
<thead>
<tr>
<th>Key facts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>4,570,934</td>
</tr>
<tr>
<td>Area</td>
<td>69,700 km²</td>
</tr>
<tr>
<td>Climate</td>
<td>Very diverse climate. It varies significantly with elevation. Many of the lowland areas of Western Georgia have a Mediterranean climate, relatively warm throughout the year with average temperatures from 5 °C to 12°C. In the north, Georgia is mostly mountainous with the Great Caucasus Mountains and in the south the Lesser Caucasus Mountains. The foothills and mountainous areas experience cool, wet summers and snowy winters. Eastern Georgia has a transitional climate from humid subtropical to continental.²</td>
</tr>
<tr>
<td>Topography</td>
<td>Mostly mountainous with Great Caucasus Mountains in the north and Lesser Caucasus Mountains in the south; Kolkhet‘i’s Dablobi (Kolkhida Lowland) opens to the Black Sea in the west; Mtkvari River Basin in the east; good soils in river valley flood plains, foothills of Kolkhida Lowland.</td>
</tr>
<tr>
<td>Rain pattern</td>
<td>Western Georgia (humid subtropical zone) has annual precipitation ranging from 1,000-4,000 mm, while Eastern Georgia (transitional climate from humid subtropical to continental) has annual precipitation ranging from 400-1,600 mm.²</td>
</tr>
</tbody>
</table>

Electricity sector overview
Georgia is steadily liberalizing its electricity market and this has encouraged private acquisition of assets and operations within the sector. The total installed electricity generation capacity is 3,400 MW. Hydropower alone contributes about 2,700 MW. Thermal contributes to 700 MW but it is used only to meet peak load demand. In 2011, large hydropower contributed 55 per cent of the total electricity generation (the two largest plants Enguri and Vardnili Cascade alone accounted for 36 per cent); medium hydropower provided 17 per cent and 3 per cent originated from small hydropower (figure 1). Only 21 per cent comes from thermal power (gas). Some 93 per cent electricity produced is regulated (>13 MW capacity) and 3 per cent is unregulated (<13 MW). A further 4 per cent is imported and 11 per cent exported. Exporting electricity to Turkey and the European Union is restricted, because it contributes to investor risk.³

![Figure 1 Electricity generation in Georgia](image1)

Source: Gazadze and Shengelia³
Note: Data from 2011.

The generation tariff for hydropower is the lowest in the region at US$0.02/kWh, as compared favourably to the cost of thermal energy (US$0.03/kWh), which is high despite subsidized oil prices.³

Small hydropower sector overview and potential
There are 26,000 rivers in the country with a total rivers length of approximately 60,000 km. Around 360 rivers are significant in terms of hydropower production.² In 2009, the un tapped small hydropower potential was estimated at 5,000 GWh, while by definition, small hydropower (termed as unregulated) plants have capacities of <13 MW.

Of all the hydropower plants in Georgia, 66 per cent or 5,217 MW are seasonal regulation dam/reservoir type plants, 30 per cent or 2,379 MW are run-of-river type and 4 per cent or 296 MW have capacities lower than 13 MW and are therefore considered small hydropower (figure 2).³

![Figure 2 Small hydropower capacities in Georgia](image2)

Source: Gazadze and Shengelia³, Birkadze⁴ and Ministry of Energy and Natural Resources³

An overview of the potential small hydropower sites up for tendering is available on the website of the Ministry of Energy(www.mener.gov.ge).³ A list of 41 potential sites exists; of which 24 sites are between 1 MW to 10 MW, with a total projected installed capacity of 125.96 MW and are all run-of river type plants. The following table is a list of ongoing investment projects.
Small hydropower investment projects in Georgia

<table>
<thead>
<tr>
<th>Name</th>
<th>Company / country</th>
<th>Installed capacity (MW)</th>
<th>Annual generation (GWh/year)</th>
<th>Estimated investment (US$)</th>
<th>MOU signing date</th>
<th>Start of construction</th>
<th>Completion of construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bakhvi HPP</td>
<td>Bakhvi Hydro, Turkey</td>
<td>6.0</td>
<td>35</td>
<td>9 700 000</td>
<td>May 2009</td>
<td>October 2011</td>
<td>August 2012</td>
</tr>
<tr>
<td>Aragvi HPP</td>
<td>Energo Aragvi, Georgia</td>
<td>8.0</td>
<td>50</td>
<td>11 000 000</td>
<td>September 2007</td>
<td>February 2012</td>
<td>February 2015</td>
</tr>
<tr>
<td>Lukiuni HPP</td>
<td>Rutsmetal LLC, Georgia</td>
<td>7.5</td>
<td>46</td>
<td>12 623 762</td>
<td>July 2009</td>
<td>May 2020</td>
<td>December 2024</td>
</tr>
<tr>
<td>Kvirila HPP</td>
<td>Zoti Hydro, Chezh Republic – Georgia</td>
<td>5.2</td>
<td>22</td>
<td>11 611 650</td>
<td>May 2009</td>
<td>December 2010</td>
<td>December 2015</td>
</tr>
<tr>
<td>Shida HPP</td>
<td>Georgian Green Energy Development, Georgia</td>
<td>4.8</td>
<td>28</td>
<td>6 000 000</td>
<td>-</td>
<td>October 2011</td>
<td>October 2013</td>
</tr>
<tr>
<td>Bakvhi 5 HPP</td>
<td>KGM, Turkey</td>
<td>2.0</td>
<td>11</td>
<td>3 400 000</td>
<td>August 2011</td>
<td>January 2012</td>
<td>July 2013</td>
</tr>
<tr>
<td>Gubazeuli 6 HPP</td>
<td>EMCT, Turkey</td>
<td>3.1</td>
<td>20</td>
<td>4 200 000</td>
<td>August 2011</td>
<td>December 2011</td>
<td>December 2013</td>
</tr>
<tr>
<td>Kintrishi HPP</td>
<td>-, Georgia</td>
<td>5.0</td>
<td>30</td>
<td>8 000 000</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nabeglavî HPP</td>
<td>Alliance Energy, Georgia</td>
<td>1.9</td>
<td>13</td>
<td>2 800 000</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Ministry of Energy and Natural Resources
Note: HPP - hydropower plant

In February 2010, the United Nations Development Programme (UNDP) began seeking bids for consulting services for small hydropower development in Georgia. The request for proposals included constructing the 5.4 MW Khadori 2 on the Alazani River. It also included reconstructing the 6.5 MW Ritsela on the Ritsela River, increasing capacity of the Pshavela project to 25 MW (from 450 kW), and reconstructing the 1 MW Achi plant.

Financially, hydropower is in a strong position with the Kreditanstalt für Wiederaufbau Renewable Energy Fund, facilitating renewable energy and particularly hydropower projects by providing capital to Georgian banks so that loans can be extended. In 2012 additional €25 million (about US$32.25 million) were allocated to the Fund.²

Renewable energy policy
Georgia has vast resources of almost all types of renewable energy – solar, wind, geothermal, hydro and biomass.¹ The Ministry of Energy is considering the effective use of the country’s major energy potential i.e. hydropower resources, and the construction of small, medium and large hydropower stations.

The Georgian Government started to restructure its energy sector in 2004, with the main long term policy objective published as early as 2006 to fully satisfy the country’s overall demand for electricity with domestic hydro resources.³ In 2008, the Government of Georgia approved the Renewable Energy State Program which regulates and supports the construction of new renewable energy projects in the country with a capacity up to 100 MW. It offers long-term purchasing agreements and favourable feed-in tariffs and licence-free electricity generation for power plants up to 10 MW. The Government was tendering for 91 potential new hydropower sites with capacities ranging from 0.6 MW to 99 MW under this programme, with a focus on the development of small- and medium-sized hydropower plants.²

Legislation on small hydropower
Small hydropower is defined as small (termed as unregulated) if the installation capacity is <13 MW. The regulation of the hydropower sector offers potential investors many advantages. Newly built hydropower plants remain the exclusive property of investors through a Build-Operate-Own Scheme. Newly constructed small hydropower plants with an installed capacity of <13 MW do not require an operating licence. They do, however, require a construction and environmental permit.³

Barriers to small hydropower development
Some of the barriers to small hydropower development in Georgia include:

- Small hydropower plants (especially newly built ones) are not competitive in terms of cost of generation compared to large and medium capacity power.² However, investment in small hydropower projects can be made more attractive by grouping them to allow collective procurement, enhancing economies of scale.³
- Small hydropower plants have profound seasonality and dependence on river run-off conditions. In the winter time, rivers in Georgia suffer from insufficient water flow, influencing electricity supply.³
- Rivers have an unfavourable annual generation profile, with maximum production in summer when power generation exceeds the demand.¹ In general, hydropower production and consequently electricity surpluses can be exported to Georgia’s neighbour, Turkey.³

References


