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Recommended citation:
1 Africa
1.1 Eastern Africa

1.1.13 Zambia
Malama Chileshe, Zambia

Key facts

<table>
<thead>
<tr>
<th>Key fact</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>13,817,479</td>
</tr>
<tr>
<td>Area</td>
<td>752,614 km²</td>
</tr>
<tr>
<td>Climate</td>
<td>Tropical; modified by altitude</td>
</tr>
<tr>
<td>Topography</td>
<td>Mostly high plateau with some hills and mountains</td>
</tr>
<tr>
<td>Rain Pattern</td>
<td>Rainy season: October to April. The annual rainfall decreases from an average of 1,200 mm in the north to an average of 600 mm in the south. Rainfall is 508-1,270 mm per year.</td>
</tr>
</tbody>
</table>

Electricity sector overview

Prior to 2007, no power plant had been built in Zambia for 30 years. The only power plant which has been added since then is the Zengamena mini hydropower plant, rated at 750 kW, which began operating in 2007. In December 2012, a 1-MW small hydropower plant at Shiwang'andu in the Northern Province of Zambia was commissioned, enabling 25,000 people to access electricity. In addition, new works in the Lusiwasi (12 MW) and Lunzua (750 kW) hydropower stations are also in the pipeline. A number of large hydropower projects, which are at various stages of implementation, are also expected to begin coming on stream in 2017. Such projects have been made possible by the alterations of the Zambia Electricity Supply Corporation Limited (ZESCO) tariffs to reveal their truer costs.

March 2012 saw severe electricity shortages as peak demand surpassed supply. In August 2012, ZESCO announced plans to increase tariffs by an average of 26 per cent by November 2012. It intends to invest in new power infrastructure in a bid to increase the generation capacity, to meet key performance indicators such as metering, quality of supply, new connections and loss reduction, and to mitigate annual rise in operational costs due to inflation and commodity price changes. Increases are also said to be necessary to achieve the Government’s plans to increase access to electricity from the current 20 per cent to 50 per cent, in line with the vision 2030 and the rural electrification master plan. The higher-priced tariffs are also expected to address the national deficit of 250 MW, including the copper mining problems in 2012. The electricity shortage should be overcome by December 2013, when 360 MW is added to the 660 MW that the Kariba North Bank hydropower station.

Small hydropower sector overview and potential

Currently the country’s installed capacity of small hydropower is 31 MW (figure 2). The estimated hydropower potential of Zambia is estimated to be 6,000 MW, of which 1,858.5 MW has been developed. The specific small hydropower potential remains unknown.

Figure 1 Electricity generation in Zambia
Source: Honourable Konga

Figure 2 Small hydropower capacities in Zambia
Source: Ministry of Lands, Energy and Water Development
The Zengamena power station is a privately-owned project with a capacity of 0.75 MW. As of 2010, the company had about 250 customers. There are plans to extend the capacity by another 0.750 MW. Being an off-grid power plant, the challenges faced by the company include complaints from customers for charging a higher tariff than those by the state utility ZESCO.6

The Zambian Rural Electrification Authority has carried out studies and designs for the following sites, with potentials ranging up to 3 MW: Chilinga (Nyimba District), Mumbotuta (Milenge District), Chikata (Kabompo District), Mujila (Mwinilunga District and Chavuma (Chavuma District). The development of these sites is key in the electrification of remote areas where grid extension is prohibitively expensive. Some private companies have also expressed to the Government interest to develop other sites in various parts of the country. However, these expressions of interest have not yet resulted in any developments.

Renewable energy policy
Under the Sixth National Development Report (2011-2015) the strategies employed to increase the prevalence of renewable energy are as follows:13
- To promote the development and use of solar technology systems;
- To introduce an appropriate cost-effective renewable energy feed-in tariff;
- To promote the production of electricity from geothermal energy;
- To promote the use of biogas for cooking, lighting and electricity generation.

Legislation on small hydropower
The Government of Zambia has put in place a National Energy Policy of 2008 that encompasses a range of energy options, including hydropower. Among the policy measures relevant to small hydropower development adopted in the National Energy Policy are the following:
- Encourage the development of identified potential hydro sites;
- Move towards cost reflective tariffs;
- Adopting an open access transmission regime;
- Application of smart subsidy mechanisms.10

The Government, with its appropriate institutions, is already working towards achieving some of the policy measures. Since the Energy Policy was adopted, it has supported the increment of electricity tariffs towards economic levels to encourage investment in the sector. The Government has also been working on adopting an open-access to the transmission network which is principally owned by ZESCO and Copperbelt Energy Corporation. As a first step towards this objective, a Grid Code, which is a technical document providing guidelines on how electricity industry players should interact, has been finalized and is awaiting adoption. In addition, the Government through the Energy Regulation Board has also authorized higher tariffs for Zengamena mini-hydropower than those for the state utility ZESCO, given that the former is connected to an isolated mini-grid. However, the implementation of the policy measure on smart subsidies has not taken off due to the lack of financial resources. The Rural Electrification Authority did however make a small contribution towards the construction of Zengamena mini-hydropower station.

Barriers to small hydropower development
The development of small hydropower plants has been hampered by some of the following challenges:
- Low Electricity Tariffs: For a long time, electricity tariffs in Zambia were low due to heavy subsidies. The Government has decided to promote a gradual migration towards cost-reflective tariffs. However,
the challenge remains as to whether or not some of the communities where off-grid projects are developed can afford to pay the cost-reflective tariff.

- Accessibility: A number of potential small hydro-power sites are located in areas where the road network is bad.
- Lack of connectivity to the national grid: Most of the sites are located far from the national grid. This poses a challenge as the generated electricity must be consumed by the surrounding communities, who may not have the capacity to absorb all the power.

References