WORLD SMALL HYDROPOWER DEVELOPMENT REPORT 2013

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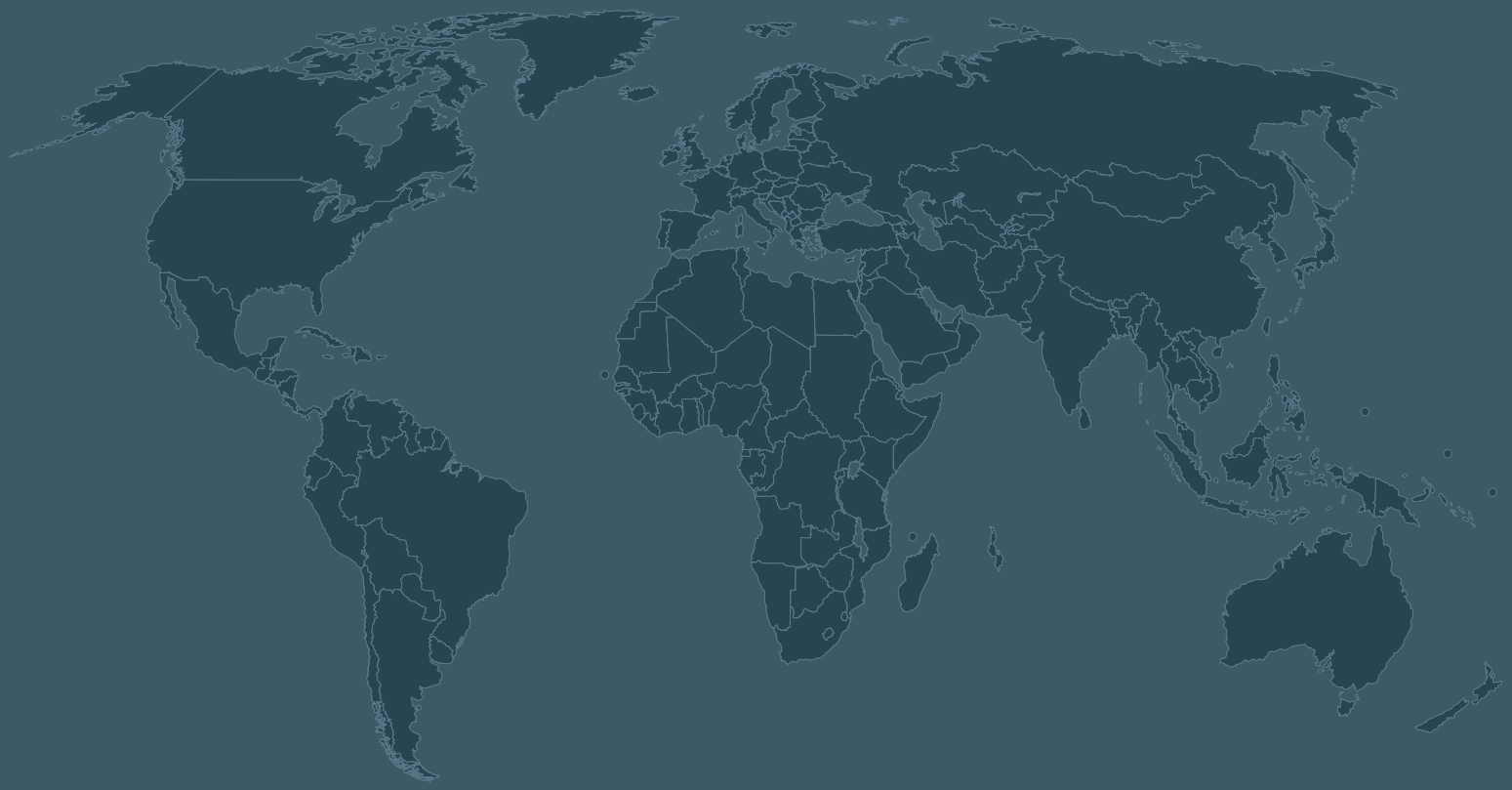
BENIN



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1 Africa
1.5 Western Africa

1.5.1 Benin

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Key facts

Population	9,598,787[1]
Area	112,622 km²
Climate	Tropical; hot, humid in south; semiarid in north.[1] Three climatic zones: in the South, the sub-equatorial zone with a bimodal rainfall pattern; in the centre the Sudanese Guinean transition zone between the Sudanese and sub-equatorial climates; in the far North the semi-arid Sudanese zone with uni-modal rainfall. Recorded temperatures vary between 27°C and 32°C.
Topography	Mostly flat to undulating plains; some hills and low mountains[1]
Rain Pattern	Two rainy and two dry seasons: principal rainy season April to late July; shorter less intense rainy period late September to November. Main dry season December to April; short cooler dry season late July to early September. Annual rainfall in the coastal area averages 3,600 mm.[2] Average annual rainfall varies between 800 mm and 1,200 mm depending on the year and the village.

Electricity sector overview

The electricity sector in Benin is jointly governed by an international agreement between Benin and Togo and the Benin-Togo Code of Electricity since 1968. This code was revised in December 2003 to reflect the new requirements of development in the sector, especially in terms of openness to independent producers and single buyer status.[3]

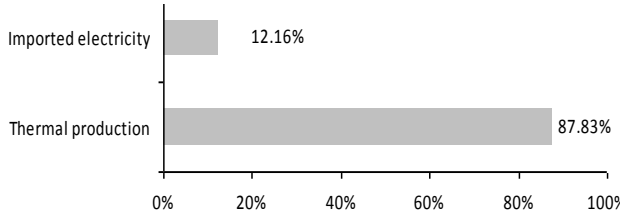

Figure 1 **Electricity generation in Benin**
Source: La direction générale du Trésor[4]

The national electrification rate of Benin was 27.4 per cent in 2010, but only 3.53 per cent in rural areas. Electricity production in Benin is managed by the company Communauté Électrique du Bénin (CEB), which is owned by Benin and Togo. Societé béninoise d'Energie électrique (SBEE) is responsible for electricity distribution. SBEE imports electricity directly from neighbouring countries such as Ghana, Ivory Coast and Nigeria. It also engages in its own electricity production using rented and owned diesel generation (figure 1).[5] In 2010 the country had a self-sufficiency rate of only 10 per cent.[6]

The stakeholder agency responsible for the electrification of rural areas is Agence Béninoise d'Électrification Rurale and de Maîtrise d'Énergie (ABERME).[7] Its electrification efforts are based on usage of hydropower, biomass, solar photovoltaic and wind.[3]

Small hydropower sector overview and potential

By 2009, micro-hydro plants with a total capacity of about 2 MW were completed.[3] The small hydropower plant of Yeripao, an installed capacity of 500 kW, is currently not in operation and requires maintenance.[6]

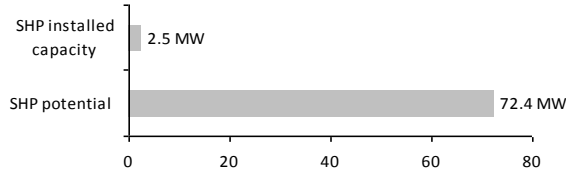

Figure 2 **Small hydropower capacities in Benin**
Source: Innovation Énergie Développement[3], ECOWAS Centre for Renewable Energy and Energy Efficiency[8]

The overall hydropower potential of Benin is not known, several sources indicate different potentials. According to a map issued by the Ministry of Mines, Energy and Water, there are nine sites, with capacities ranging between 2 MW and 9 MW and a total potential capacity of 42 MW, to be constructed.[6] There are three principal lists, two of which include hydropower sites with the capacity ≤10 MW:[8]

- List of 85 micro hydropower sites that includes potential sites <4.4 MW, with a total of almost 50 MW (200 GWh)
- List by ABERME based on work six sites by the Canadian Tecsult in 2009. Out of 20 potential sites, 6 were chosen for feasibility studies. The feasibility studies are available for six micro hydropower sites under 1,000 kW, with a total potential capacity of 1,240 kW.[3] [6]

The lists above are summarized in the *Baseline Report on Small-Scale Hydropower* in the Economic Community of West African States (ECOWAS) Region. There is a feasible potential of 305 MW and 99 sites in Benin for

small-scale hydropower plants up to 30 MW and 88 sites with an unexplored potential capacity of 69.87 MW (applying up to 10 MW definition).[8]
According to a 2010 analysis for innovative energy development in Benin, there is potential for small hydropower deployment due to an abundant nationwide coverage of rivers, political support, including tax incentives and exemption of customs duties, as well as financing interest of some donors.[3]

Renewable energy policy
The Strategy for the Supply of Energy Necessary for Achieving the MDGs in Benin in 2006 mentioned solar PV, hydropower, biogas and wind as renewable energies available in the country.[9] It also concluded that several problems associated with the sub-sector of renewable energy, such as the lack of national energy policy as basis for developing a renewable energy strategy, lack of operational structures for the promotion of renewable energy and lack of a coherent policy for promoting renewable energy project implementation, especially in remote communities.

In April 2011, Benin's Minister of Energy announced that the Government intended to raise the rural electrification rate with renewable energy, from its present 3 per cent to 50 per cent by 2025.[7] A national agency for the development of renewable energy is under development.[8]

Barriers to small hydropower development
Several barriers to small hydropower development exist in Benin, including a lack of local hydropower equipment supply and an absence of local manufacturers. There is, however, potential for the establishment of a local hydropower manufacturing and reparation industry. It would need, however, institutional and regulatory framework that facilitates licenses, permits, authorizations and a buyback tariff.

In conjunction with the hydropower potential, problems of low flow and drying up of rivers need to be considered.[9]

While there is a Rural Electrification Fund in place and electricity production has been liberalized, independent power producers have not yet explored the option of small hydropower and there is no feed-in tariff for small hydropower in place.[8]

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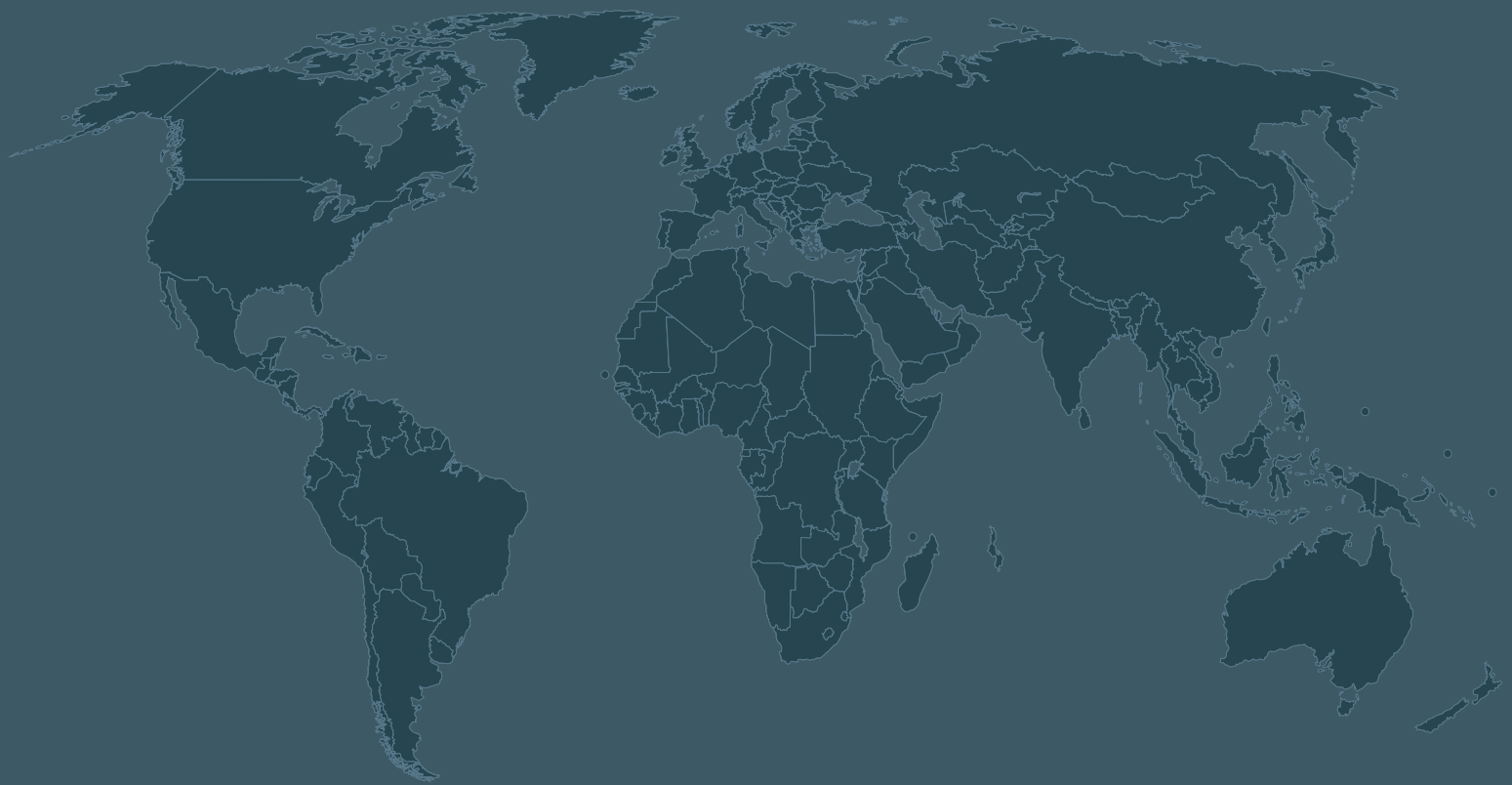

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