



PRESIDENTIAL INITIATIVE

ON CLIMATE CHANGE, RENEWABLE
ENERGY & FOOD SECURITY



SIERRA LEONE

60 MW BUMBUNA HYDROELECTRIC UPGRADE PROJECT

PROJECT BACKGROUND

Context and history

The Bumbuna-1 hydropower plant, initially designed with a 200 megawatt (MW) capacity, but implemented with a capacity of just 50 MW, is critical to Sierra Leone's energy infrastructure. The plant consists of two 25 MW turbines, a regulator dam upstream, a powerhouse and an electricity evacuation substation onsite, connecting to a 161 kilovolt (kV) line to Freetown. The plant was commissioned in November 2009 and generates power at optimal capacity for about half a year. This is followed by a season of low capacity in the drier months, with a season of total shutdown for major repairs for about a month during the dry season.

A feasibility study for the expansion of the dam has been undertaken with the support of the Millennium Challenge Corporation. The study explored the possibility of increasing the dam's generation during the wet season, when a significant flow is released via the spillways. The proposal, therefore, is to install two additional 30 MW turbines, increasing the total capacity to 110 MW. The implementation of this upgrade will double the amount of renewable energy generation in Sierra Leone's energy mix, putting Sierra Leone firmly on the path to tripling the contribution of renewables to that mix.

The feasibility study also introduced the concept of floating photovoltaic (FPV) upstream of the dam, but emphasises the need for further investigation to determine its feasibility. Preliminary estimates suggest that the reservoir lake upstream could support the installation of up to 100 MW of solar PV, which would boost the plant's output, particularly during the dry months when hydropower generation typically declines. This approach could help stabilize the Bumbuna-1 site's power generation across seasonal variations.

Project objectives

Sierra Leone has an energy access rate of 36% – one of the lowest in sub-Saharan Africa. In line with Sustainable Development Goal (SDG) 7, the government has set a target of 70% electrification by 2030. In addition, power demand from mining is expected to grow from the current 148 MW to 286 MW by 2030. The upgrade of Bumbuna-1 has been identified as the least cost generation option in Sierra Leone's Integrated Resource Plan, 2020 to meet this growing demand. The Bumbuna-1 upgrade is also a critical investment in reducing dependence on

expensive emergency power generated from fossil fuel and therefore in reducing the cost of electricity for end users.

The project is a priority option in addressing the need for energy and water services in the county. Sierra Leone is energy deficient, requiring additional production that the Bumbuna-1 expansion would provide. Indeed, the project would add approximately 15.7% to the country's current production.

By increasing access to modern energy and electricity, the project will also generate positive impacts on the community, significantly increasing social returns, such as improved education and access to reliable information. In addition, the project will create new employment opportunities and contribute to the socio-economic development of the region.

Contribution towards Sustainable Development Goals (SDGs)

The project contributes to a range of SDGs. In particular, it contributes to SDG 7 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation and Infrastructure), and SDG 13 (Climate Action).

1. PROJECT PROFILE

Project name	60 MW Bumbuna hydroelectric upgrade project (additional capacity)
Project location	Sierra Leone
Technology	Hydropower
Project ownership	Public
Total capacity installed	60 MW
Total project cost	USD 67 million (United States dollars)
Type of funding requested	Debt and equity

2. PROJECT PROPONENT

Name of proponent	Electricity Generation and Transmission Company (EGTC)
Establishment year	1 January 2015
Country of the entity	Sierra Leone
Relevant project development record and team	The Electricity Generation and Transmission Company (EGTC) was created in 2011 through the Sierra Leone National Electricity Act and started operations on 1 January 2015. EGTC has an organogram with a governance structure that includes a highly trained, skilled and diverse team of professionals with extensive experience in their particular disciplines. EGTC's Hydropower Department is functional and headed by a

directorate supervising the operations of all government-owned hydroelectric power plants in the country. EGTC has previously collaborated with the supervising Ministry of Energy in the implementation of projects related to generation and transmission.
