

Seli Hydropower Project, Sierra Leone | Technical Overview





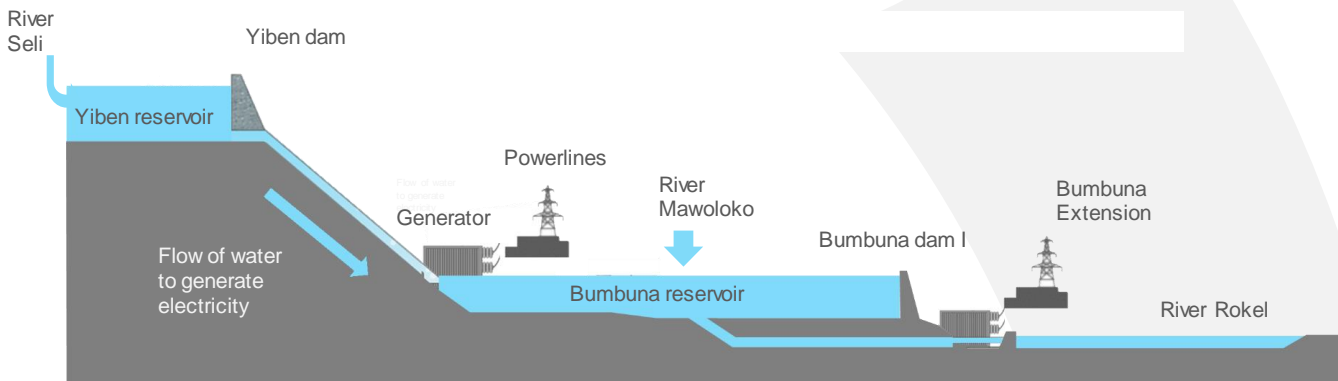
Introduction

Joule Africa Limited (“**Joule Africa**”) has been developing the Seli Hydropower Project (“**Seli HP**”), since 2011 based on exclusive rights granted to it by the Government of Sierra Leone (“**GoSL**”). Seli HP is a 143 MW Independent Power Producer (IPP) Project, comprising an 88 MW expansion (including a 4 MW environmental flow powerhouse) of the existing 50 MW Bumbuna Hydroelectric Power Project (“**Bumbuna I**” or “**BBI**”), commissioned in 2009, and the construction of a new upstream regulation reservoir and 55 MW power plant at Yiben. The Project will be owned under a build own operate and transfer concession, whilst Bumbuna I will remain under the ownership of the GoSL. Joule Africa will maintain a long-term interest in the Project and has created a Project Company, Seli Hydropower Ltd (“**SHPL**”, or “**ProjectCo**”) to manage the construction, commissioning and operations of the Project.

Seli Hydropower Scheme: Location and Plant Layout

The Seli Hydropower Scheme (also known as ‘Bumbuna II’) has been designed to optimise the Seli Basin hydro-electric potential for the needs of Sierra Leone. Most of the significant additional capacity is delivered as firm-power, which can be relied upon throughout the year, providing improved access to power for retail users but also encouraging industrial users and consequent near term economic growth opportunities. With a configuration focussed on firm power, the scheme provides more power during the dry season than it does during the wet, whilst the Yiben dam is filled and the Bumbuna reservoir is supplied by the Mawoloko river.

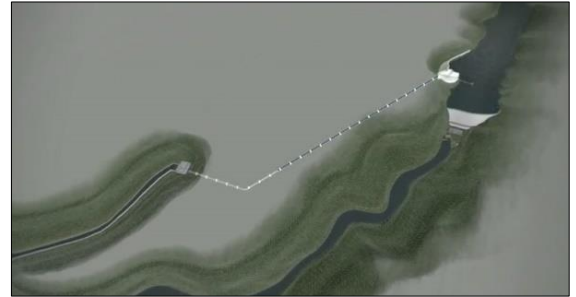
Figure 1: Scheme Overview



Bumbuna Extension

The Bumbuna Extension component of the Project will utilise the same reservoir as Bumbuna I, but with a separate intake, tunnel and new power generation facilities. It will feature the following key structures:

- 93m intake tunnel located slightly upstream of the Bumbuna I dam;
- 1.9km concrete-lined headrace tunnel connecting the intake with a surge shaft and steel-lined penstock;
- Open-air powerhouse accommodating 2 vertical turbines, each with rated net capacity of 40.2MW;
- 1.7km trapezoidal tailrace channel canal with a bottom width of 17m to convey the powerhouse discharge back to the Seli River; and
- Environmental flow powerhouse diverting water from the Bumbuna I headrace tunnel to a powerhouse with a generating capacity of c.3.6MW, to be situated close to the current Bumbuna I powerhouse.



Yiben

- The Yiben component of the Project comprises a new dam and power generating capacity located 32km upstream of Bumbuna I, and featuring the following key structures:
- 114.6m high dam (of which 86m rises above ground level, to allow for excavation down to good foundation rock as determined from site investigation) with a crest length of c.728m. The dam structure will also contain the spillway intake and powerhouse;
- Overflow spillway equipped with radial gates at the top of the spillway;
- Open-air powerhouse at the toe of the dam containing 2 vertical turbines, each with 26.5MW net capacity; and
- 300m trapezoidal tailrace channel canal with a bottom width of 30m running parallel to existing river bed.



Bumbuna I

- Bumbuna I is the existing 50MW hydroelectric power generating facility in the Bumbuna Falls area. The facility is (and is intended to remain) in the ownership of the GoSL.
- Significant refurbishment was successfully undertaken in 2013 (in particular turbine rehabilitation works).
- It is currently operated by Salini under a two-year operations and maintenance services contract.

