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Redstone concentrated solar power plant, South Africa – update

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Redstone concentrated solar power (CSP) plant.

Name of the Project

Location

Postmasburg, near Kimberley, in the Northern Cape, South Africa.

Project Owner/s

The project will be owned by Acwa Power SolarReserve Redstone Solar Thermal Power Plant, comprising

Acwa Power Redstone Holdings (50%) and SolarReserve (10%); GEPF Renewable Energy Investment 1 (13.5%), a vehicle incorporated by the Government Employees Pension Fund and managed by the Public Investment Corporation; the Redstone Community Trust (6.5%), a broad-based black economic-empowerment entity; Old Mutual Life Assurance Company of South Africa 10%; and Pele Green (10%).

Project Description

The Redstone CSP was procured under round 3.5 of the Renewable Energy Independent Power Producer Procurement Programme, signed in April 2018. The project is the biggest renewable-energy investment in South Africa to date.

The CSP will displace an estimated 440 t/y of carbon dioxide emissions, is certified under the Climate Bonds Standard and Certification Scheme, and aligned with the goals of the Paris Climate Agreement.

According to the International Finance Corporation, the project includes the construction and operation of a concentrated solar thermal power plant with associated infrastructure and services to generate renewable electricity for the national power grid.

The power plant will be built adjacent to the 75 MW Lesedi and 96 MW Jasper photovoltaic (PV) solar power projects. These three projects comprise the world's first combined concentrated solar thermal power and PV solar park, with a total generating capacity of 271 MW.

The project, which will have a footprint of about 8 km2, will produce an estimated 480 GWh/y net of renewable energy, with a

nominal net generating capacity of about 100 MW.

The project will comprise a circular heliostat field with a mirror-reflective surface that reflects the sunlight to a 200-m- to 220-m-high central receiver tower, rated at an estimated 565 MWt, where the heat transfer fluid and molten salts are heated.

Each heliostat will be between 12 m and 15 m high. A thermal energy collection and storage system, with a molten salt loop, and hot and cold salt storage tanks, will harness the heat used in the steam generation system that drives the steam turbine generator. The electricity will be connected to State-owned power utility Eskom's overhead distribution power lines using pylons about 32 m high.

The power plant will be dry cooled, with 12 hours of energy storage.

The project infrastructure includes a collector field consisting of:
• about 6 500 to 500 000 dual-axis tracking heliostats, providing a reflective surface area of about 1.08-million cubic metres;
• a thermal to electric power block, with a 115 MW reheat and multiple extractions high-temperature subcritical steam turbine and generator;
• two molten-salt thermal storage tanks;
• an air-cooled condenser for the steam cycle to minimise the consumption of water;
• water reticulation and purification works, including water reticulation from the Sedibeng bulk water supply pipeline for industrial water use, and a water treatment and purification system to provide water for domestic and process use;
• sewage reticulation and treatment works;

- an evaporation pond/s comprising three compartments, with a combined area of about 26 ha, to completely contain all rejected water from the water treatment system and the steam cycle;
- roads and stormwater infrastructure;
- two liquid diesel auxiliary burners for startup;
- two emergency diesel generators;
- a substation and switchyard of about 100 m × 100 m, containing transformers and associated structures;
- two power lines to connect the proposed plant to the national grid – a 16 km, 132 kV overhead line from the plant to the Karats substation, and a 34 km, 132 kV overhead line from the plant to the Olien substation;
- a construction camp, accommodation and associated facilities for about 800 people;
- administrative and office buildings;
- a visitors centre;
- an equipment and materials lay-down area;
- an assembly plant;
- a concrete batching plant;
- vehicle workshops and wash bays;
- a fuel storage area;
- a temporary, general-waste storage facility; and
- a hazardous-material storage facility.

State-owned power utility Eskom is the offtaker for 100% of the energy generated by the project as per the power purchase agreement signed between Eskom and the Acwa Power SolarReserve Redstone Solar Thermal Power Plant in 2018.

Potential Job Creation

The project will reach close on 44% local content on procurement during the construction period, create more than 2

000 construction jobs at peak, with about 400 from the local community, and create about 100 permanent direct jobs during operation.

Capital Expenditure
The total project cost is estimated at R11.6-billion.

Planned Start/End Date
Commercial operations are expected to start in the fourth quarter of 2023.

Latest Developments
The Redstone CSP project has achieved its first debt drawdown on the biggest renewable-energy investment in South Africa to date, development finance institution the African Development Bank (AfDB) has said.

AfDB has acted as the mandated lead arranger and coordinating bank, committing R2.31-billion to the transaction.

The project has also secured financing from international and South African financial institutions including Absa Bank, CDC Group, the Development Bank of Southern Africa, Deutsche Investitions- und Entwicklungsgesellschaft, Nederlandse Financierings-Maatschappij voor Ontwikkelingslanden, Investec Bank, Nedbank, Sanlam and the Industrial Development Corporation.

Construction of the project is well under way and is in its ninth month.

The engineering works for the project are more than 58% complete, whereas procurement and construction works are more than 45% and 6% complete respectively.

A key construction milestone, the tower foundation for the project, has been completed, with the start of operations scheduled for the third quarter of 2023.

Key Contracts, Suppliers and Consultants

None stated.

Contact Details for Project Information

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