

Solar power at Diavik

Diavik Diamond Mine's 3.5 megawatt capacity solar plant was installed and activated in the summer of 2024. With over 6,600 panels, it is the largest off-grid solar power plant in Canada's North.

The plant was installed at a cost of approximately C\$5.7 million. It is expected to be a key generator of power during Diavik's closure. It can then be dismantled and relocated off-site for future use.

The solar panels are bi-facial (double sided). They not only generate energy from direct sunlight, but also from light that reflects off the ground, including off snow in the winter. The panels are held in place by metal gabion baskets filled with crushed rock.



Installation

Solar panels, racking, and gabion baskets were shipped to Diavik on the winter road and assembled at site over three months. An excavator and loader were needed for construction. In total, approximately 15,000 tonnes of crushed rock were used for ground preparation and basket ballast.

A crew of 28 was needed for construction – half were local labourers and operators while the others worked for a solar installation contractor, Yukon-based Solvest. Electrical wiring installation could not be carried out in temperatures lower than -20 C, however all other work was able to take place at any temperature.

Key numbers

Capacity

- Total capacity of 3.5 MW DC/3.1 MW AC
- Approximately 4.2 million kWh of electricity produced per year, or about 3% of Yellowknife's annual consumption
- Expected to account for 25% of Diavik's electricity needs during closure activities

Environmental

- 1.1 million litres annual reduction in diesel usage
- 3,100 tonnes annual reduction in CO₂ emissions, equivalent to removing over 630 cars from the road

Dimensions

- 6,624 total panels in 23 rows
- Covers an area approximately 70,000 square metres, equivalent to about 7 city blocks
- 15,000 tonnes of crushed rock used in construction

Technical

- 23 inverters to change direct current (DC) to alternating current (AC)
- 30 year expected life span at time of installation
- Cold temperatures increase the efficiency of the panels, with output about 15% higher at -25 C than at +25 C

Maintenance

The solar plant is relatively easy to maintain, with Diavik's in-house engineering team and electricians troubleshooting issues as required. Remote support is available from the supplier.

Occasional snow removal from the panels is required, depending on wind conditions and how wet the snow is.

Diavik keeps spare parts at site, including panels, for replacement as needed.

As the ground thaws and freezes each year, some adjustment of the racking may be needed to keep the alignment of panels correct.

Operation

Power generation at the solar plant is variable and depends on weather conditions. Major swings in generation can occur on a day-to-day or hour-to-hour basis, depending on cloud conditions.

However, solar generation is more predictable than wind. It is understood that there will be no generation at night, it peaks around noon, and will be lower in the dark winter months.

The bi-facial panels absorb additional light reflected from the ground year-round, not just in the winter.

Decommissioning

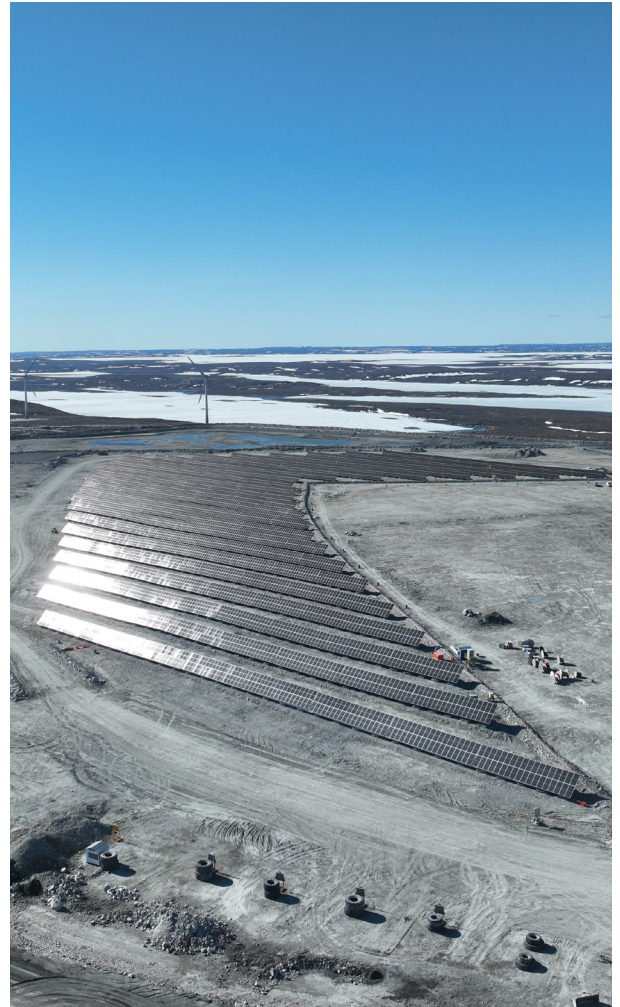
As the solar panels will have approximately 25 years of life remaining following their use at site, Diavik intends to decommission the panels and is actively pursuing opportunities for them to be relocated and used in the future.

Deconstruction will be completed by a similarly sized and skilled crew as the one used for installation.

The panels and racking will be loaded into sea cans, which will greatly reduce the chance of damage, and shipped off site on the winter road.

Additional questions? Contact us at
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