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Massive mineral sands project made more viable by solar-hybrid energy supply

Have we reached a tipping point, from building the case with mining companies for deploying renewable energy … to where renewable energy is helping to build the case for mining?

BESS-backed hybrid energy systems are in demand in Australia's mining sector.

Image: Contract Power Australia

Strandline Resources, an emerging heavy mineral sands (HMS) developer, has inked a 15-year offtake agreement with Contract Power Australia, for energy from a hybrid gas and solar energy power station to be developed close to its proposed mine and mineral separation plant near Shark Bay in the Gascoyne region of Western Australia.

The Coburn Power Station to be built, owned and operated by Contract Power, will comprise 11 MW of solar generation, 4 MW of instantaneous dynamic battery support and 18 MW of low-emissions natural gas generation; its design is capable of supporting some 10 MW of average consumed power, with a maximum demand of 15 MW.

The now contracted power solution “enables Strandline to capture energy supply cost savings relative to the Definitive Feasibility Study (DFS)” for the mine, published in June 2020, said an ASX announcement by Strandline released in November 2020..

"We get a fair bit of sun in the Shark Bay region, so we've maximised our penetration of solar," Strandline CEO and Managing Director Luke Graham told **pv magazine Australia** of the cost-optimised energy supply, which he says also "leverages the relatively low-cost LNG gas supply we have in WA.

Strandline Resources' Coburn Heavy Mineral Sands Project, showing proximity to the minerals-export port of Geraldton.

Image: Strandline Resources

Graham says that over the mine's expected 40-year life (which includes an initial 22.5 years' of useable reserve with an extension case of a further 15 to 17 years), both Contract Power and Strandline Resources will be incentivised to further reduce costs by increasing the renewable component of the generation plant with the addition of wind turbines.

"That could take us to about 50% and a maximum of 60% renewable power for our mine site, which is a pretty awesome aspirational target," says Graham who has been appointed to lead Strandline's HMS operations in Australia and Tanzania, from exploration to development and production.

Strandline's Coburn Heavy Mineral Sands Project was last year approved for a loan of up to $150 million by the Northern Australia Infrastructure Facility, on the basis that it will boost the Federal Government's critical minerals agenda, and benefit the local region to the tune of $922 million over 25 years", the Federal Minister for Resources, Water and Northern Australia, Keith Pitt, said at the time.

Starting out more sustainable

Although Strandline's main focus is to finalise its investment decision in what is expected to become one of the world's largest mineral sands projects, being a greenfield project also allows the company to deploy solutions from the outset that "maximise our environmental, corporate and social responsibility", says Graham.

Large-capacity bulldozers still relying on diesel fuel will be used to extract the ore, which will then be mixed into a slurry and pumped from the mine to processing facilities; once valuable materials have been separated, some 98% of the material will subsequently be pumped back to the mining void preceding progressive rehabilitation of the site.

Pumping accounts for the majority of the mine's electricity needs, however Graham says almost all other processes in the proposed mine will be automated and electrified; a mining camp for 200 workers will also draw from the power station — Graham anticipates employing an average of 150 direct workers during the mine's long operational phase.

Strandline already has offtake agreements for its zircon and titanium product, with 20-25% going to China, and 75-80% earmarked for Europe and the US.

Zircon is used in making ceramics, such as tiles, and is applied in foundry work, castings and 3D printing; while titanium is primarily used in production of pigments used in paint, ink, ceramics, plastics, toothpaste and sunscreen, and is also applied as an extremely strong, light metal in aircraft manufacture – contributing to lighter, more fuel-efficient aircraft that can take on longer non-stop routes.

Gas and diesel tuned to follow the sun

In 24-hour operation of the Strandline Coburn Mineral Sands Project, "gas generation will be reduced daily and follow the required load generation that is not provided by solar", says Mike Hall, Chief Operating Officer of Contract Power Group, a subsidiary of Pacific Energy, which is in turn owned by QIC (formerly Queensland Investment Corp), on behalf of its managed funds (which include the QIC Global Infrastructure Fund) and clients.

Pacific Energy also recently contracted juwi Renewable Energy Pty Ltd to construct a solar-diesel hybrid solution to help power Iluka's Jacinth Ambrosia project in South Australia, the world's largest supplier of zircon.

Mike Hall, Chief Operating Officer of Contract Power.

Image: Contract Power Australia

Contract Power has more than 30 years' experience in tailoring power plants to the needs and available energy resources of mines and offgrid townships.

Hall told pv magazine Australia that "upwards of 90% of tenders currently released to the market have a renewables component" and that the past year or so has also seen "an acceleration of Build, Own and Operate (BOO) hybrid power stations".

Among the other hybrid-energy-for-mining contracts awarded to or commenced by Contract Power over this period are Abra Power Station (10 MW gas, 6 MW solar and a 1 MW battery), powering a new lead-silver mining operation for Abra Mining; and theTellus hazardous waste-cleaning operation at Sandy Ridge near Kalgoorlie in WA, where a 1.2 MW solar farm and a 350 kWh battery allow the site to operate on 100% renewable energy during daytime hours, integrating with 2 MW of diesel generation to take over at night.

"A further three existing customers with fossil fuel power stations are looking to introduce and integrate renewables," says Hall.

Meeting development milestones

Once Strandline Resources reaches its final investment decision on the Coburn Heavy Mineral Sands Project, the mine will enter its estimated 18-month construction phase; and Contract Power will commence the 13- to 14-month-long construction of the power plant. "They'll be ready well in advance of us needing power," confirms Graham.

He adds that he sees the mining sector as being at the forefront of renewables integration: "We're adopting renewable power solutions across the sector, and with Coburn being a greenfield mine, we can really leverage the latest in technology right from day one."