



Coober Pedy Hybrid Renewable Project

Setting a global benchmark for renewables in off-grid, remote communities.

Highlights

- Combining 4MW wind generation, 1MW solar generation, a 1MW/500kWh battery and other integration technologies with the existing diesel power station enables a seamless transition from 100% diesel to up to 100% renewables for the remote town of Coober Pedy.
- The project has give Coober Pedy more reliable electricity supply at world-leading renewable energy penetration rates. The site record for 100% renewable energy supply was 97 continuous hours in December 2019.
- Collaboration between EDL, the District Council of Coober Pedy, the local community and the South Australian Government and support from the Australian Renewable Energy Agency (ARENA) was integral to the project's success.
- The project won the *Excellence in Innovation: Productivity Improvement* award at the South Australian Premier's 2018 Awards in Energy & Mining, and the *Environmental Upgrade* award at the 2019 Global Energy Awards.

The background

Historically, the remote South Australian mining town of Coober Pedy has relied on diesel-fired generators for its electricity supply. From 2004, EDL supplied that electricity from a 3.8MW diesel-fired power station. Electricity demand in Coober Pedy averages 1.4MW and EDL has a peak contractual demand of 3.4MW.

The Coober Pedy Hybrid Renewable Project came online in July 2017—combining 4MW wind generation, 1MW solar generation, a 1MW/500kWh battery and other technologies fully integrated with the diesel power station.

The challenge

Many remote Australian communities are not connected to the power grid and rely on diesel generation for their electricity.

Diesel generation is expensive to run as transporting fuels to remote locations is costly, can be dangerous and dependent on weather conditions. Further, the use of diesel, a fossil fuel, results in the emission of carbon dioxide (CO₂). Remote communities' reliance on diesel subjects them to the volatility of fuel prices. For the District Council of Coober Pedy, this volatility made accurate budgeting difficult.

At a glance

Start of operations
2017

Production
12GWh

Primary fuel
Hybrid



The solution

For an off-grid community like Coober Pedy that enjoys high levels of sunshine and wind, renewable energy has unique advantages over fossil fuels.

In 2013, EDL began investigating the potential to integrate renewable energy into Coober Pedy's existing diesel-fired power station to reduce the town's reliance on diesel. We worked with the District Council of Coober Pedy and the South Australian Government from 2013 and undertook a series of community workshops prior to project commitment and during construction and operation. With the support of both Council and the state government, EDL successfully secured Australian Renewable Energy Agency (ARENA) funding for the project.

The next-generation Coober Pedy Hybrid Renewable Project was developed to provide distributed energy—both off-grid and grid connected energy—to reduce the use of diesel and therefore the community's exposure to fuel price volatility and carbon emissions, while still continuing to meet the community's energy needs.

The outcomes

More reliable energy supply

System modelling predicted that 50% of the time, the town would be supplied with 100% renewable power (using zero diesel) with an average of approximately 70%. The project has outperformed this estimate, achieving 100% renewable 51% of the time with an average of 73.5% to date. This means that 73.5% of the diesel fuel supply to the site has now been replaced by renewable energy sources.

Power quality and reliability has also improved with this hybrid renewable model, with fewer supply outages from generation issues as shown in the table below.

The site record for 100% renewable energy supply was 97 continuous hours in December 2019.

Coober Pedy Power Station unplanned outage history

Period	Year	Unplanned outages	
		Number	Duration (hours)
Pre-hybridisation	FY15	4	3.5
	FY16	5	1.1
	FY17	4	4.2
	Average	4.3	2.9
Post-hybridisation	FY20	2	0.3

Innovation in technology

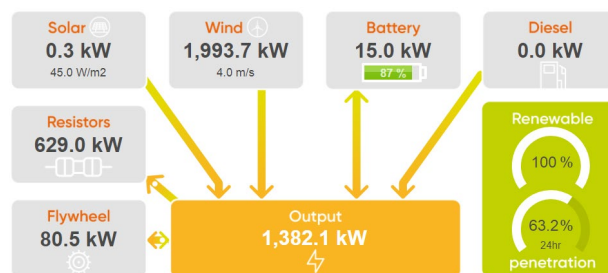
The project's system is innovative in the way the components interact to maintain power quality and reliability. The system is extremely resilient and can continue to operate with some components out of service.

Coober Pedy's geographical location is ideal to balance solar and wind generation, and the enabling technologies that EDL has put in place (resistor, short-term storage and fast start diesel generators) have significantly reduced diesel consumption.

The real-time dashboard is another significant project innovation, keeping residents and the wider public informed on how the combination of technologies are operating at any one time to power the town.

The public can view the dashboard via the company website edlenergy.com/project/coober-pedy/

Coober Pedy Hybrid Renewable Project dashboard



Stabilising the cost of electricity

The project demonstrates that renewable energy can provide high levels of stability and penetration without compromising power quality and reliability at a remote site where power connectivity is critical.

The future

The project provides a building block for future deployment. Learnings from the project will enable the renewable configuration to be fine-tuned to reduce cost and improve performance in future distributed renewable energy solutions.

The project also provides a solid platform to further increase renewable penetration at Coober Pedy, reducing reliance on fossil fuels and increasing the town's energy sustainability, which could be a blueprint for other remote communities.

EDL is also sharing the learnings from the success of the project via the ARENA Knowledge Sharing Program, and direct engagement with customers and stakeholders.

Sources:

- ARENA website <https://arena.gov.au/projects/coober-pedy-renewable-diesel-hybrid/>