King Island Renewable Energy Integration Project (KIREIP)

Location: King Island, Tasmania

Client: Hydro Tasmania

Role: Project developer, owner and operator

Background

Being a remote island community, King Island is not connected to either mainland Tasmania or mainland Australia for its electricity supply. Electricity on the island was traditionally generated entirely from diesel fuel supplied by the 6 megawatt (MW) power station, serving 12 gigawatt hours (GWh) of annual customer demand, peaking at 2.5 MW.

The King Island Renewable Energy Integration Project (KIREIP) was an initiative of Hydro Tasmania, with assistance of the Australian Renewable Energy Agency, which resulted in the development of a world-leading hybrid off-grid power system capable of supplying 65% of King Island's energy needs using renewable energy.

The system is capable of 100% renewable operation, the only mega-watt class off-grid system with this capability in the world today.

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Hybrid Energy Solutions

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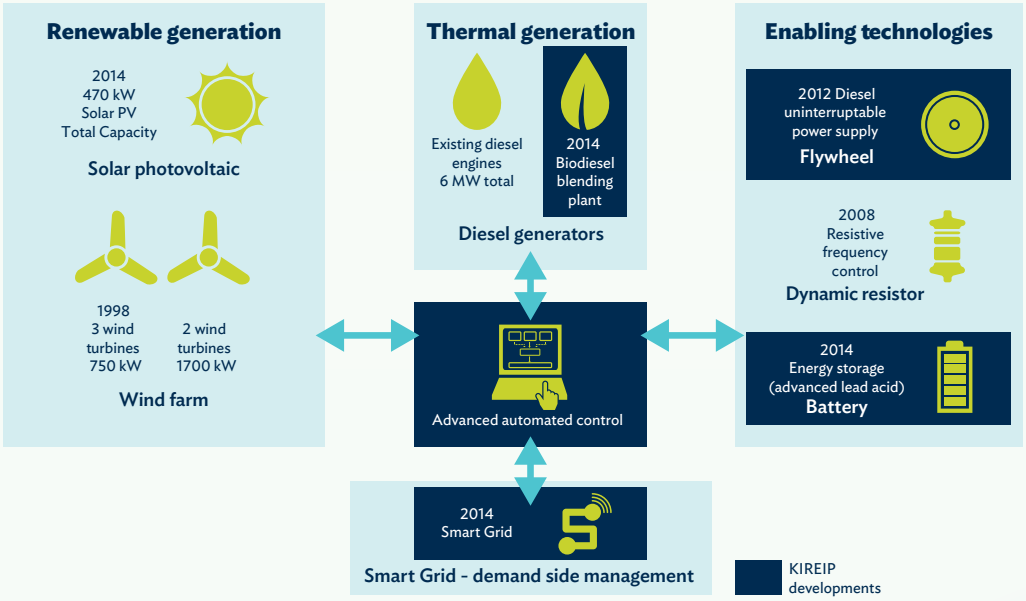

Solution

As the owner and operator of the King Island power system, Hydro Tasmania developed an integrated solution that comprised wind and solar generation supported by a range of innovative enabling technologies coordinated by its proprietary Hybrid control system.

Installed over several earlier phases of development were 2.45 MW of wind generation and 470kW of solar PV.

While the renewable energy sources being used were well-established, the enabling and storage technologies are highly innovative. The hybrid system includes a 3 MW/1.5 MWh battery, two 1 MVA flywheels that significantly aid system security and stability, a 1.5 MW dynamic resistor to manage surplus renewable generation, and an aggregated customer demand response system to provide additional reserves.

The real time performance of the system can be viewed at http://www.kireip.com.au or via the KIREIP iOS app.

Our Services

Hydro Tasmania developed the project concept and undertook the specification and design of the enabling systems and managed the entire development to ensure a timely and successful delivery of the $18M project. A number of proprietary technologies were developed by Hydro Tasmania during the project.

These included: the fully automated Hybrid power system controller; the dynamic resistor technology and aggregated demand management; and the integration designs for the flywheels and batteries sourced from third party suppliers.

Flywheel technology

Outcome

King Island is a world-leading hybrid power system that provides reliable and secure electricity supply using a high proportion of renewable energy (65% per annum).

When conditions are suitable KIREIP delivers 100 per cent of King Island's power from renewable sources, reducing the cost of providing electricity to the island. Recently the KIREIP system on average has over 20% per annum of diesel off operation, including periods of several days with no use of diesel generation, a world record for a grid of this scale.

The project was awarded Energy Supply Association of Australia (ESAA) Innovation Award 2013 and United Nations Association of Australia World Environment Day Award 2014.

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