

Report from Mayor Carol Cox:

Visit to **King Island Renewable Energy Integration Project (KIREIP)**

- Organised and sponsored by Hydro Tasmania.

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Contingency:

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Cr Marc Cobham Flinders Council

Cr MaryAnne Roberts Flinders Council

* The community members were selected by Hydro Tasmania (Hydro) through a community draw for seats.

Note: The writing in this report that is in italics is taken from the Hydro website. More information on the KI project can be viewed on the Hydro Tasmania website.

Itinerary: Power Station Tour
Huxley Hill Wind Farm
Lunch and meet with King Island Mayor and Community members

Solar Farm:

The solar farm that is adjacent to the power station is a privately owned facility that feeds into the power station for a payment on energy produced. The solar farm currently requires some major maintenance and is not functional.



The Power Station:

The technologies within the station have been developed to enable the integration of diesel and renewable energy production. Energy output from renewable sources is governed by the environment and is unpredictable, thus to supply a steady and reliable energy flow to the grid requires instantaneous management of the variable flow of renewable energy into the station. The changing inputs and outputs can be viewed on screens such as these from the meeting/lunch room.



Enablers for utilization of renewable energy:

Uninterruptible Power Supply class Diesel engine or D-UPS

In the King Island system the D-UPS allows all primary diesel generators to be switched off when there is a period where renewable energy generation is greater than the customer demand, resulting in what is called 100 per cent renewable energy penetration.



The D-UPS provides an immediate short-term backup for the primary diesel generators – it makes sure that there is not a gap in generation when the customer demand rapidly exceeds renewable generation.

The flywheel of the D-UPS contains significant inertia and if renewable generation drops, the inertia of the flywheel can quickly start the attached secondary diesel generator. The D-UPS unit can cover the gap for enough time to allow a larger primary diesel engine to be started.

The completion of the D-UPS is a huge step in the King Island renewable energy journey allowing the island to have periods where it is powered by 100 per cent renewable energy.

Resistor: (Heat bank) *The “system employs a large resistive load which can be varied rapidly to absorb excess wind generation rather than spill it through shutting or throttling back wind turbines. Instead of reducing output the wind turbines are allowed to produce as much power as possible with the excess generation to be absorbed by the resistor. As the resistor can be adjusted rapidly this effectively converts spilled wind into “spinning reserve” that can be used to supplement diesel generation”.*



Switching Room:



Dynamic Resistor:

A low cost way of maximizing the contribution of renewable energy in the absence of further enablers e.g. energy storage. On its own it can reduce diesel storage by up to 10%. When used in conjunction with the diesel uninterruptible power supply D-UPS 100% renewable generation can be achieved for significant periods of time. Adding energy storage extends these periods of time. The dynamic resistor is a scalable modular system from 1MW.

Energy Storage



To extend those periods of 100-percent-renewable energy penetration, and because there is often more wind power than can be used, Hydro Tasmania is installing energy storage. Its 3 megawatt/1.6 megawatt-hour UltraBattery storage system, the largest battery ever installed in Australia, will have the capacity to power the entire island for up to 45 minutes. Storing wind energy when there is excess generation and making it available when it is needed to meet demand will help maintain the stability of the power grid.

The Vanadium Redox Battery trial was unsuccessful and this battery is in the process of being decommissioned.

The picture above is the battery bank installation. The picture on the right is a portion of the battery installed in a pretested shipping container to make the module battery that can be shipped to island sites as a functioning unit.



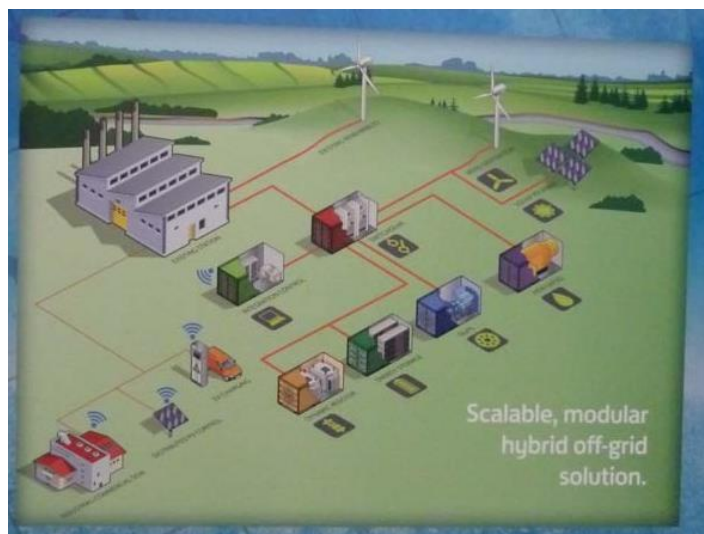
The Flinders Project:

Hydro's aim is to modularise the above elements into approved shipping containers so that it is possible to ship the elements required to the many other islands around the world that currently rely on diesel generation. The need is based on the assumption that the cost of diesel will continue to rise.

Whilst King is the trial site Flinders is proposed to be the demonstration site for the final product.

DA approval has already been given to place the modules at the Flinders power station and for a solar farm adjacent.

Funding is being sought by Hydro from the Federal government to support the development on the Flinders Project.



Smart Grid – King Island

Another part of KIREIP currently in progress is the Smart Grid Project. The smart grid will match the level of energy demand with renewable generation. Hydro Tasmania is currently enlisting volunteer households to have smart grid technology in their homes connected to their electric hot water system. When the wind slows down, instead of increasing diesel generation, the smart grid will turn off hot water services for a couple of seconds, until the wind picks up again. While the temperature of the hot water won't drop, the impact of not needing to start up the diesel generators will make a huge difference. This pilot program will last for up to three years with the hope of expanding it over the entire island.

Biodiesel Trial



Testing the use of bio diesel as a mix with mineral diesel has lead Hydro to the view that a mix of 20% biodiesel into the mineral diesel is the best mix. Bio diesel was imported to King Island for the trial.

Community Meeting:

The feedback I received from interaction with the King Island Mayor, General Manager and community members was that the project had had some issues early on, depending where on the island you lived, but that for quite some time now the power supply had been reliable.