Towards 100% Renewables

Presentation of the International Solar Energy Society
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Topics

Solar Example: Drake Landing (Canada)

Hybrid Example: King Island (Australia)

Modeling Support: HOMER

Drake Landing Solar Community

- First solar heating/seasonal storage community in North America
- First in world >90% solar fraction
- Reduction of 5 tonnes GHG per home per year
- Largest subdivision of R-2000 single family homes in Canada (52 homes)

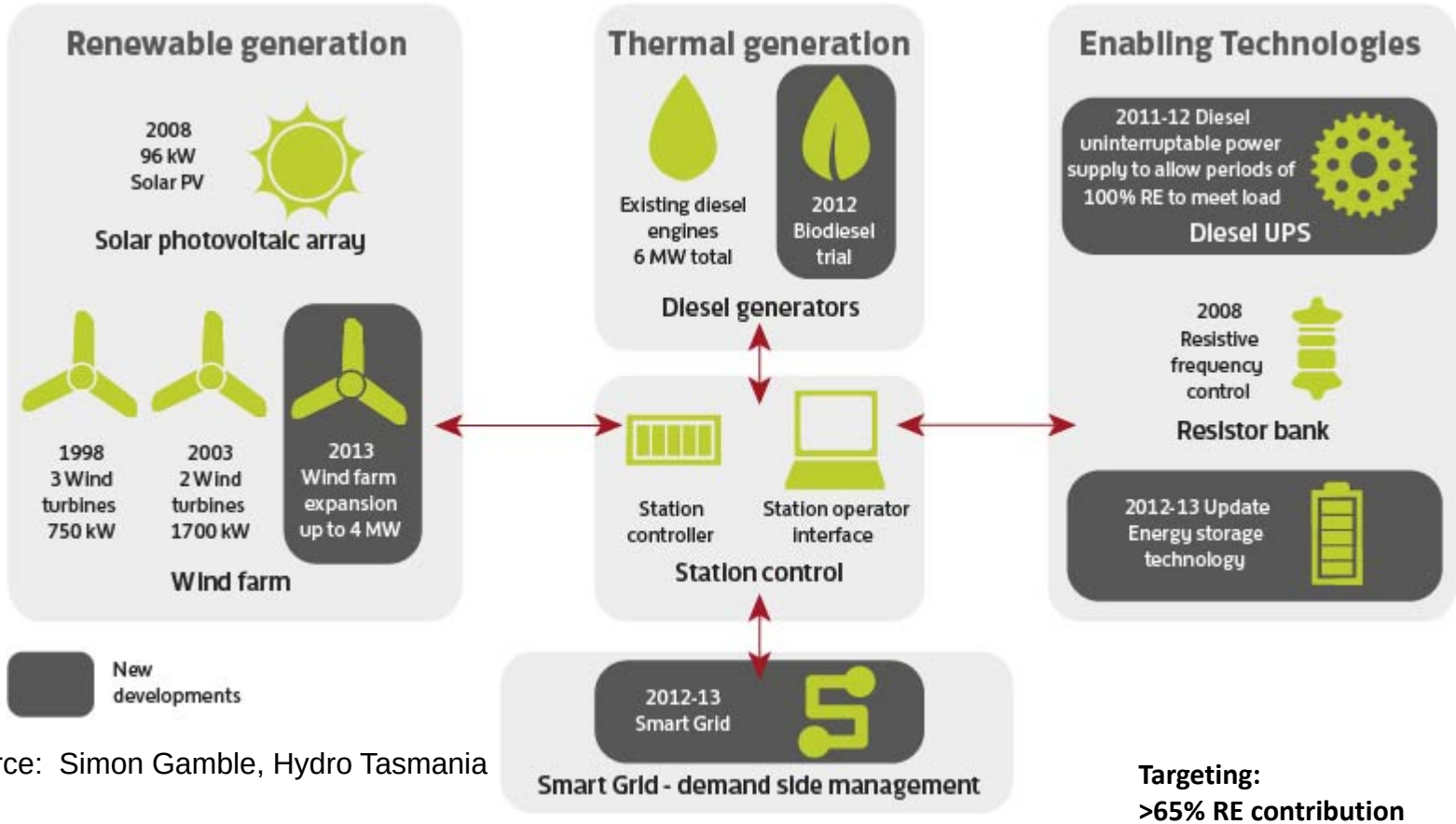
Source: Doug McClenahan, CanMet Energy

King Island

Image source: Google Earth

- Small, mostly agricultural island between Tasmania and mainland Australia, ideally placed for wind generation
- Electricity network owned and operated by Hydro Tasmania – opportunity to implement whole system changes
- 3.3 MW peak / 16 GW-hr annual
- Currently 30% wind utilisation in the diesel system
- Renewable energy penetration is very high (85% peak) but remains limited by the intermittent nature of wind

King Island Renewable Energy Integration Program (KIREIP) – Current Project



Source: Simon Gamble, Hydro Tasmania

Targeting:
>65% RE contribution
100% RE instantaneous
>95% GHG reduction

HOMER: Micropower Optimization Model

How does HOMER work?

HOMER simulates thousands of different user-defined systems for every hour of the year. It then ranks them by financial performance and technical feasibility. HOMER's built-in sensitivity analyses also allows planners to measure the impact of inputs such as changing fuel prices, carbon costs, wind speeds or other variables.

Source: Green Island Power
(http://homerenergy.com/pdf/HOMER_energy_brochure.pdf)

What resources can HOMER model?

- Solar photovoltaics
- Wind Turbines
- Biomass
- Diesel Engines
- Microturbines
- Electrolyzers
- Batteries
- Fuel Cells
- Combined Heat & Power
- Flywheels
- Load management