

# REMOTE AREA POWER SYSTEMS: KING ISLAND

**End-User:** Hydro Tasmania and the Australian Greenhouse Office

**Application:** Enable large wind penetration while providing reliable and stable electricity supply in a remote area while minimizing reliance on diesel generation.

**Basic Specifications of the VRB Energy Storage System (VRB-ESS™):**

- Energy Stored:** 1100 kWh
- Continuous Power Rating:** 200 kW for 4 hours
- Peak Short Term Output:** 400 kW for 10 seconds, 300 kW for 5 minutes



**Operation Start:** November 2003

**Project Background and Objectives:**

King Island in the Bass Strait off southern Australia has a rich resource of wind power. Recently four 1500-kW diesel engine generators have been augmented with three 250-kW- and two 850-kW wind turbines. The wind that drives the turbines is neither reliable nor constant and power generated by the Huxley Hill Wind Farm does not necessarily coincide with the cyclical electrical load. This problem has been alleviated with the installation of a VRB-ESS.

**Project Benefits:**

The VRB-ESS is used to smooth the short term output variations in the wind generators and the customer loads while providing frequency and voltage control, and to implement a system of “load shifting,” ensuring optimum performance of the diesel and wind generation hybrid system. The presence of the VRB-ESS has raised the level of deliverable power and has allowed for the ability to provide “firm capacity” from the existing wind generation. The newly integrated system reduces the required use of the diesel generators thereby reducing fuel costs and emissions of diesel exhaust into the environment.

The installation of the VRB-ESS on King Island will also benefit the community by assisting to provide a more reliable and stable electricity supply utilizing the abundant wind resource available on King Island while minimizing the reliance on diesel generation. A reliable energy supply is important to the many businesses and residents on King Island. Some of King Island’s main export industries include kelp, crayfish, bottled water, beef and dairy products, all of which prosper due to the healthy condition and clean air of the environment on King Island.

**Economic and Environmental Benefits**

Source of Value	Quantity	Benefit	Annual Value
Reduce spinning reserve	8 hours per day	Eliminate 440 l/day of fuel @\$0.57/l	\$91,500
Improve operating efficiency	25 l/hour lower fuel consumption	Eliminate 400 l/day of fuel @\$0.57/l	\$83,200
Capture “spilled” wind	1100 kWh per day	Eliminate 246 l/day of fuel @\$0.57/l	\$51,200
Reduce maintenance	12 fewer genset run-hours per day	Longer maintenance intervals	\$23,000
<b>Total</b>			<b>\$248,900, providing a 3.5 year payback</b>
Reduce emissions	4,000,000 kg/yr CO <sub>2</sub>		
	99,000 kg/yr NO <sub>x</sub>		
	75,000 kg/yr unburned hydrocarbons		



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