



**Wind Energy Program Technology Portfolio**

**Low Wind Speed Technology Phase II: Integrated Wind Energy/Desalination System**

**General Electric Global Research**

**Project Description:** The scarcity of fresh water is a growing global problem. According to the United Nations, the worldwide need for water in 2025 is expected to be billions of cubic meters per day. Desalination of abundant ocean salt water is an important solution, but its capacity is currently estimated at only 28 million cubic meters per day (m<sup>3</sup>/d). Because desalination is an energy-intensive process, energy cost has been the greatest barrier to its development. Among all the desalination process technologies, reverse osmosis has demonstrated the highest electrical energy efficiency (3–8 kWh/m<sup>3</sup> water). Even so, energy cost accounts for about 40% of total desalinated water cost by reverse osmosis. From both an energy cost and an environmental point of view, inexpensive and clean alternative power sources are needed to provide a low-cost desalination solution. Wind power is the least expensive renewable power source, so it is a desirable option for integration with desalination technologies.

The variable nature of wind presents the principal challenge for wind hybrid systems. Because water is simple and inexpensive to store, a transient process needs to be developed that can absorb the full variability in input energy. This project explores wind-desalination concepts, identifies technical issues, explores the feasibility of alternative concepts, and evaluates their economic viability.

**Project Type:** Conceptual Design Study  
**Total Project Budget:** \$199,823  
**Industry Cost Share:** \$0  
**DOE Cost Share:** \$199,823  
**Planned Project Duration:** October 2004–July 2005

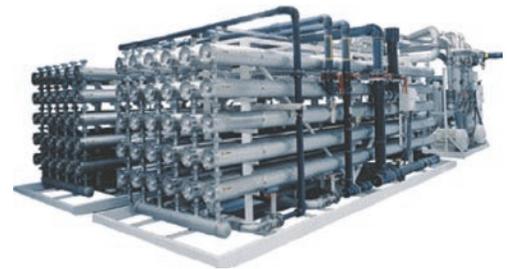
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**Current Status:** Project Complete



**Wind Turbine**



**Reverse Osmosis Desalination**



**Desalted Water**

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