

Wind Hybrid Power Systems: An Overview

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EDITORIAL

Wind hybrid power systems integrate wind turbines with other storage and/or generating sources to create a hybrid power system. Wind energy's intermittent nature is one of its major drawbacks. As a result, a variety of energy storage systems have emerged. A wind-hydro system combines wind turbines and pumped storage to generate electricity. The combination has long been debated, and in the late 1970s, Nova Scotia Power installed an experimental plant at its Wreck Cove hydroelectric power station, which also tested wind turbines, but it was abandoned after 10 years.

As of late 2010, no alternative system had been implemented at a single place. Wind-hydro stations use all or a substantial portion of their wind power to push water into pumped storage reservoirs. Grid energy storage is implemented using these reservoirs. The generation potential of wind is inherently changeable. The potential energy of water is very stable when this energy source is used to pump water into reservoirs at an elevation (the theory behind pumped storage), and it can be used to generate electrical power by releasing it into a hydropower plant when needed. The combination is said to be especially well-suited to islands that aren't connected to larger grids. An installation was suggested in the Netherlands in the 1980s. Wind turbines would be installed on the dike of the IJsselmeer, which would serve as a reservoir. Feasibility studies for installations on Ramea Island (Newfoundland and Labrador) and the Lower Brule Indian Reservation have been completed (South Dakota).

As of 2010, an installation on the Greek island of Ikaria was under development. The world's first wind-hydro power station is

anticipated to be completed on the island of El Hierro "A blueprint for a sustainable future on planet Earth," according to Current TV. It was supposed to be operational in 2012, and it was supposed to cover 80-100 percent of the island's power. However, these expectations were not met in practise, owing to a lack of reservoir volume and continuous grid stability issues. 100% renewable energy systems necessitate a surplus of wind or solar power. The creation of hydrogen from water electrolysis is one method of storing wind energy. This hydrogen is then used to generate energy during times when wind alone is unable to meet demand. Fuel cell technology or a combustion engine attached to an electrical generator can turn the energy in the stored hydrogen into electrical power. Many challenges must be solved in order to successfully store hydrogen, such as embrittlement of the materials utilised in the power system. Many countries are working on this technology.

In 2007, an Australian company called Wind Hydrogen went public, with the goal of commercialising this technology in both Australia and the United Kingdom. The corporation changed its name and shifted its focus to fossil fuel exploration in 2008. To generate electricity, a wind-diesel hybrid power system combines diesel generators and wind turbines, frequently with ancillary equipment including energy storage, power converters, and different control components. They're made to boost capacity while lowering the cost and environmental impact of electrical generating in remote towns and facilities that aren't connected to the grid. During the second half of the twentieth century, wind-diesel generating systems were being developed and tested in a number of areas. In rural areas, a growing number of suitable sites have been built with better reliability and lower technical support costs.

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