

# WAYS TO STORE POWER FROM WIND TURBINES

**The Economist** recently featured an article (Trapped wind) about ways to improve the storage of the energy captured by wind farms. It focused specifically on “compressed air”. The air is hermetically stocked up to be released when needed to provide electricity by turning a generator.

The storage of the energy is a key advance in order to minimize the inconvenients of a source of energy that is intermitent, such as wind, and to capture excess electricity that is generated -and wasted- at times when usage is low (e.g., at night).

For the main wind power producing areas, the benefits of a way to store, and therefore export the energy, are enormous. In Europe, there is an ongoing project seeking to link the electricity grids to achieve a better match of supply and demand by crossing national borders. In the USA, a group of municipal power companies from Iowa in the **American Midwest** are building a wind-powered compressed-air plant to take advantage of the windy Great Plains. They have just selected a site in Iowa, (**Iowa Stored Energy Park**) and hope to be operational by 2011.

The article also mentions a more direct approach, from General Compression, a small firm in Massachusetts. Its windmill compresses air directly. This eliminates two wasteful steps: the conversion of the mechanical power of a windmill into electricity and its subsequent reconversion into mechanical power in a compressor. The snag is that an air-compressing windmill cannot transmit electricity directly to the grid.

In Spain, another way to enable the storage of excess wind power that has been put to the test is through the use of hydrogen, in the experimental wind farm of Sotavento (Galicia).



**Sotavento** features 24 turbines using 5 different technologies and showcases R+D applications related to renewable energies (optimization of wind farm management principles, prediction of energy production, solar thermal monitorization and automation, etc.)

As for the storage plant, the production of hydrogen is obtained by an electrolyzer which works on electricity from wind turbine generators. The electrolyzer

produces hydrogen at low pressure, which is compressed to reduce the volume of storage in steel cylinders at about 200 bar. The H<sub>2</sub> is stored in containers under pressure until the moment when it is used to generate electricity in situations of demand or need.

A company that is developing this concept in Spain is Acciona Energia. It is the project coordinator of **Wind-Hy**, a utility scale *Wind-Hydrogen Integration* project in Navarra. The main objective of this project is to design, develop, construct and test a new large-scale wind turbine operation technology, based on an integrated concept of wind + electrolyzer technology.

The project will include the adoption of an onshore 1.5 MW grid connected wind turbine, a large Electrolyzer system (350/700 kW) and other components required for their direct integration. The difference with **Sotavento** is that **Acciona** will also explore the use of the hydrogen thus obtained as a fuel destined to transportation purposes, through a distribution network.

Source: <https://technology4life.wordpress.com/2007/08/10/ways-to-store-power-from-wind-turbines/>