

Night Wind

Project Acronym : Night Wind

Project Title : Grid Architecture for Wind Power Production with Energy Storage through load shifting in Refrigerated Warehouses

Coordinator : TNO Built Environment and Geosciences, Refrigeration and Heating Technology (Netherlands)

Website : www.tno.nl/rci

ABSTRACT

The Night Wind project proposes to design grid architectures for Wind Power Production combined with Energy Storage means of load management of Refrigerated Warehouses (Cold Stores). Distributed Renewable Energy Resources have a large potential for Energy supply in Europe with hindsight on reduction of CO₂ emissions.

However, renewables like Wind and Solar energy are difficult to integrate due to their intermittent contribution. Refrigerated Warehouses are constant power users, day and night. Electricity is converted by the refrigeration installation into thermal energy in refrigerated or frozen products. When the temperature of stored frozen products in the EU is allowed to vary by 1 degree Celcius, the warehouses can act as a 50.000MWh battery on the grid i.e. store over twice the projected 2010 EU average hourly wind power production.

Balancing the wind power production with fossil fuel generation systems can lead to inefficient operation of those plants, balancing the wind power production with refrigerated warehouse load management promises to be a clean and cost effective method. For warehouse owners, it has the potential to lower operational (energy) costs.

The Night Wind project addresses the topics necessary to assess this option for demand side management :

- potential, economic and trade aspects of Wind Power DER + Cold Store DSM
- design and modelling infrastructures for island operation of Wind Energy + Cold Store DSM
- control concepts and algorithms for Wind Energy + Cold Store DSM grid integration
- quality preservation of frozen products during minor temperature fluctuations
- legal issues
- demonstration and introduction outline plan

The project will conclude with a demonstration phase for islanded operation, on an existing (Dutch) cold store owned by one of the project partners. The Night Wind project is a medium term solution, a forerunner of long-term hydrogen storage.

PARTNERS

Forskningscenter Risoe – **Denmark** ; Essent Energy Trading B.V. – **Netherlands** ; Partner Logistics Bergen Op Zoom B.V. – **Netherlands** ; Fundacion Cener-Ciemat – **Spain** ; Tehnice Universitet Sofia – **Bulgaria** ; Vereniging Van Nederlandse Koel - En Vrieshuizen – **Netherlands**