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Title:

Cold stores acting as batteries on the electrical grid – The Night Wind project

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Abstract:

To use a refrigerated warehouse as a giant battery for wind energy. To store all electricity produced during nighttime by windmills all over Europe, and to release this energy again during the peak electricity demand hours in daytime. That is, in short, what the EU “Night Wind” project wants to demonstrate.

The integration of wind power into the national or EU energy supply systems is becoming more problematic with increasing installed capacity and production, due to a mismatch of supply and demand of energy. The wind energy is produced at random times, whereas the energy use pattern shows distinct demand peaks during day time and office hours, and low levels during the night. To use a refrigerated warehouse as a giant battery for wind energy will provide economical benefits from the cost difference between low and peak hour electricity prices. It can also assist in levelling out undesired peaks on the electrical grid. Storage of energy in cold stores is done by producing more cold than necessary – thus lowering product temperatures. The virtual release of energy arises from the difference between average cold store demand and zero demand (with product temperatures rising to the original value).

The Night Wind project will manage with existing technology and will develop new control strategies and control concepts that will set the temperature level in cold stores, taking into account economical aspects (derived from the actual balance between wind energy production and actual electricity demand), technical aspects and limits derived from food quality aspects. The benefits are first proven in a simulation environment; after which the new concepts will be tested in a real cold store system in The Netherlands.