



Cryogenic Energy Storage for Renewable Refrigeration and Power Supply!

CryoHub Scenario Analysis

The CryoHub team has recently produced an extensive analysis of when and where integration of the technology would be most valuable for business and at the energy system level. The Scenario Analysis was part of work package 10. This report assesses where and when the CryoHub technology could be deployed in the EU to provide the greatest value .

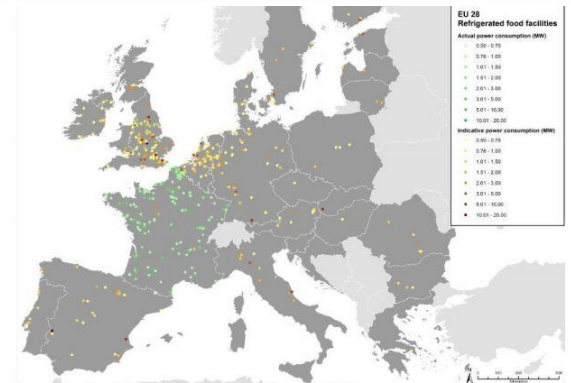


Figure 7 Map of Large Refrigerated Warehouses (>500kW) across the EU (20)

The team analysed energy scenarios and existing refrigeration infrastructure at EU and national level on selected European countries. Some of the most promising findings included the growing levels of electricity generation from variable renewable sources and a significant number of warehouses in the European Union where the CryoHub technology could add value over the next decade. However the analysis also highlighted that Liquid Air Energy Storage is still pre-commercial. The proportion of electricity from variable energy renewable sources remains low in many countries and currently, market conditions are unlikely to be suitable for a widespread development of the technology. The analysis found that countries in need of additional energy system flexibility such as Spain and the UK are likely to gain the most value from the technology. The report “ Analysis of when and where integration of the technology would be most valuable for business (D10.1)” is available on the CryoHub web site www.cryohub.eu/downloads

WHAT IS CRYOHUB?

CryoHub is an EU-funded innovation action entitled “*Developing Cryogenic Energy Storage at Refrigerated Warehouses as an Interactive Hub to Integrate Renewable Energy in Industrial Food Refrigeration and to Enhance Power Grid Sustainability*”. The aim of the project is to develop and investigate the potential of large scale cryogenic energy storage at refrigerated warehouses and food factories. The innovative CryoHub technology is based on storing renewable energy as a cryogenic liquid - which in the case of this project is liquid air. This cryogen is then boiled at very low temperatures to generate electricity for on-site use or feed into the power grid during peak demand periods. The cooling effect of boiling the cryogen is used to refrigerate industrial facilities.

FRIGOLOGIX JOINS CRYOHUB

Frigologix, one of the leading cold chain specialists in France and in Belgium, has joined the project as an industrial partner and has confirmed that it will host CryoHub technology demonstrator installation.



With its drive to find new ways to optimise the use of energy in the cold chain, Frigologix is an exciting addition to the project team.



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 691761.

www.cryohub.eu

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CryoHub to host next partner meeting at CENER

CryoHub's next partner meeting will take place at CENER - the National Renewable Energy Centre in Spain.



CENER is a technology centre specialising in applied research and the development and promotion of renewable energies. The department involved in this project is the Renewable Energy Grid Integration Department (IRE) and it is devoted to the increase and improvement of Renewable Energies integration into the grid. Their goal is to propose measures, including energy storage systems, to appropriately manage the system. IRE is structured in two different research areas, Grid Integration Area and Energy Storage Area.

The Energy Storage Area develops activities such as:

- ✳ Study of different Energy Storage Systems: Hydrogen technologies, Flow batteries, Conventional and Advanced batteries, Flywheel, super capacitors, Demand Side Management, etc
- ✳ Technical-economic feasibility studies of Energy Storage Systems and Renewable Energies integration and stationary applications. Project preliminary designs development.
- ✳ Analysis of Energy Storage Systems adequacy, sizing and economic analysis in different applications and Energy Management Strategies.

The Grid Integration Area develops activities such as:

- ✳ Electromagnetic transients analysis, in particular voltage dips. Simulations using specific software.
- ✳ Distributed Generation - Smart Grids (electrical and thermal).
 - Microgrid design.
 - Control design and optimization.
 - Implementation.
 - Simulation models development (hardware in the loop).
 - Storage systems integration.
- ✳ Power flow analysis and dynamic response of the electrical system using dedicated software (PSS/E, DigSilent...).

Visit www.cener.com to find out more about CENER's work and missions.

Events

✳ International Sustainable Energy Conference (ISEC 2018), 3 to 5 October 2018 in Graz.

In order to implement the agreement on global warming reached at the UN climate change conference in Paris, in December 2015, an almost complete phasing out of fossil energy supply is required by 2050. The event aims to be a platform for innovative ideas in the areas of renewable hybrid and interlinked energy systems and resource efficiency. More at www.aee-intec-events.org

✳ LNG 2019 19th International Conference & Exhibition on Liquefied Natural Gas, 1 to 5 April 2019 in Shanghai.

This event will show case the growth and development of the LNG industry worldwide. It is organised by the International Gas Union (IGU), Gas Technology Institute (GTI) and the International Institute of Refrigeration (IIR) and is the only LNG event run by the industry for the industry. LNG 2019 is supported by the Shanghai Government and hosted by the China LNG Association, China Gas Society, The Chinese Association of Refrigeration and the China Gas Association. More at <http://www.lng2019.com/>

✳ 15th IIR Cryogenics Conference & Exhibition, 7-11 April 2019 in Prague.

This IIR conference on cryogenics will explore the problems of the equipment and technologies in the area of temperatures below 120 K (-153°C), as well as with other devices and technologies related to the topic. The 15th Cryogenics 2019 is a joint Conference of IIR Commissions A1 (Cryophysics, Cryoengineering), A2 (Liquefaction and Separation of Gases) and C1 (Cryobiology, cryomedicine and health products).

✳ 25th IIR International Congress of Refrigeration, 24 to 30 August 2019 Montreal, Canada.

The theme of this, the largest gathering of the refrigeration scientific community, will be "Refrigeration for Human Health and Future Prosperity". The call for papers is now open at www.icr2019.org.

Sign up to the [website](http://www.cryohub.eu) for regular news and updates about the project.

CryoHub Open Workshop at ICR 2019

From August 24-30, 2019, Montreal (Canada), birthplace of the 1987 Montreal Protocol, will host the 25th IIR International Congress of Refrigeration – ICR 2019. Covering all fields of refrigeration, ICR 2019 will be a unique opportunity for researchers and engineers from all over the world to meet, exchange and publish the results of their research. With nearly 1,000 abstracts received, the 25th event in the series is set to welcome its largest audience to date. The CryoHub consortium workshop at the congress will include an introduction to the CryoHub project, a discussion of energy modelling of liquid air energy storage in refrigerated cold storage warehouses, an overview of thermal storage technologies, a presentation on the financial viability of liquid air energy storage applied to cold storage warehouses and a presentation on sustainable energy supply policy in Canada.

Check the ICR2019 website for updates on the conference schedule at <http://icr2019.org/>.

