



A zero-emission vehicle will transport the mobile thermal battery

All images © WH

INNOVATION FUND

Driving clean innovative technologies towards the market

WH: Water Horizon Renewable Energy Solution

The Innovation Fund is 100% funded by the EU Emissions Trading System



Project summary

The Water Horizon (WH) project will develop at commercial scale an innovative thermal storage technology, the mobile thermal battery. The approach relies on recovered heat from a waste incinerator that will charge thermal batteries, the stored thermal energy will then be made available at a sports complex located 20km away. A zero-emission vehicle will be used to transport the battery between sites. This innovation represents a pioneering solution to provide energy where district heating or cooling infrastructures are absent. The 1 MW capacity thermal battery will be able to provide most of the energy needs of the end-user. Overall, the project is forecasted to supply thermal energy with 100% of greenhouse gas (GHG) emissions avoided compared to a conventional technology.

COORDINATOR

Water Horizon

LOCATION

Toulouse, France

SECTOR

Renewable heating/ cooling

AMOUNT OF INNOVATION FUND GRANT

EUR 2 456 505

RELEVANT COSTS

EUR 4 094 175

STARTING DATE

01 January 2022

PLANNED DATE OF ENTRY INTO OPERATION

01 July 2023

The Water Horizon project

A breakthrough first-of-a-kind solution to provide thermal energy where a heating/cooling network is absent

Industrial waste heat represents a tremendous source of renewable energy, however currently it remains only partially exploited. One of the main challenges for large-scale heat recovery is related to the connection and storage between the producer of the heat being recovered and the consumer. Today, waste heat recovery and usage usually happen at a single location, via a continuous process. The Water Horizon project will tackle this challenge by scaling-up its prototype Mobile Thermal battery to an industrial 1MW first-of-a-kind, full scale thermal battery that goes beyond state-of-the-art solutions in waste heat recovery. With the development of an innovative transportable solution, the project will ensure storage and transfer of the thermal energy to the place of use where either district heating or cooling networks are not available, whilst being able to satisfy energy needs at any time.

With the same battery, Water Horizon is able to distribute heat, cold or both to the end-user.

The project goal is to have two batteries in operation, to ensure a continual cycle of energy recovery and energy supply: one battery will be recovering waste heat, while the other will be distributing heat and cold to the sports complex. The batteries will then be switched over to create seamless supply.

The Water Horizon project will recover 6 GWh per year from the waste incinerator and distribute 4 GWh of heat and 2 GWh of cold to the sport complex (which currently consumes 4.76 GWh of heat and 1.96 GWh of cold annually). Thus, the project will help to fulfil a very large proportion of the heating and cooling requirements of the sports complex.

A circular energy solution: from industrial waste to clean energy

The project aims to decarbonise the distribution of thermal energy, by implementing its circular solution that brings heat that would otherwise be lost, from industrial processes to end users. The developed technology offers an alternative solution to fossil fuels traditionally deployed for heating or cooling.

In its first implementation, the renewable heat and cold produced will substitute a gas boiler and a heat pump to heat a swimming pool and cool an ice-rink in the sport complex. This solution will avoid 100% of GHG emissions from the current infrastructure, representing more than 13 600 tCO₂ over ten years of operation. The overall solution is entirely carbon free since the transport of the batteries to the end users will be performed with a zero-emission truck, electric or hydrogen powered. As previously mentioned, due to its storage, the Water Horizon solution allows great flexibility of consumption (variable power) and permanent availability (long-term storage), that are the usual advantages of traditional fossil fuels.

An inherently scalable project, replicable in almost all sectors where waste heat is produced

Being a modular battery, the project is scalable in its technology and could be replicated at sector and regional level. The targeted market for the Water Horizon innovation covers the entire heating (<80°C) and cooling (>-10°C) needs above 1-2MW across the industry, tertiary and housing sectors. Therefore, the proposed concept of transportable heat and cold storage can be replicated economy-wide in almost all industries that produce waste heat. In particular, the proposed technology can be coupled with decentralised solar thermal, biomass and biogas waste heat, as well as existing and new heating networks. Based on its battery's reversibility (i.e., a focus on only cold distribution), the technology could also be applied to cool data centres and servers with renewable energy, reducing the environmental impact of the digital economy.