



The Heat Pump Award (HPA)

Winning projects of 2021



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The Heat Pump Award

Awarding the most outstanding heat pump projects

The **Heat Pump Award (HPA)** is an EHPA project which recognises the most efficient, smart and sustainable Heat Pump project at local level.

The HPA was launched in 2011 under the name of Heat Pump City of the Year (HPCY) Award to highlight cities and regions that have put in place an energy efficient project which takes advantage of Heat Pump technology.

The international appeal of the award has grown year after year and now attracts participants from all over Europe and beyond.

The Heat Pump Award Ceremony takes place every year.



Decarbonising winner 2020, Gate Maritime, Photo by Vivian Hertz

The award aims to:

1. Collect best practice examples of Heat Pumps in urban areas to present to EU authorities.
2. Create role models for those who still hesitate to change.
3. Raise people's awareness of the potential of Heat Pumps.
4. Recognise the innovative and continues work in the sector.

Since 2011:



202

Submissions
(each year we receive
more than the previous)

149

Participating cities

35

Participating countries
From Europe and beyond

In 2021:

Five different projects were recognised in five different categories:

- **Heat Pump City of the Year Award:** heat pump projects deployed at local level and with the city support.
- **Decarbuilding Award:** smart use of waste heat and heat pumps in industrial processes.
- **Decarindustry Award:** projects developed on residential and tertiary sectors.
- **Out of the Box Heat Pump Award:** innovative heat pump projects which do not fit in the other awarding categories, and that present a high-level of creativity to solve a unique problem.
- **People's Choice Award:** the most popular heat pump project elected online by the audience.



Awards Heat Pump Award 2019 edition

Apply now!

1 Download your Application template at hpa.ehpa.org

2 Fill in all the Information and Resources (e.g. Pictures) required, indicate in which of the category you want to submit your project (max 1), and use the PowerPoint presentation as a way to showcase and underline the importance, work done and results of your project.

3 **You must select 1 of the following categories to apply:**

- Heat Pump City of the Year,
- DecarbBuilding,
- DecarbIndustry,
- Lighthouse Heat Pump Project.

4 **Fill in the form to the right of these instructions, with:**

- Your Name;
- Your Email;
- Objective: HPA2022 Application- Title of your Project;
- Attach the filled-in PowerPoint Template (max 10MB).
- Click 'Submit Project'



Join the Heat Pump Award Community

Apply here



About EHPA

Our Mission

In a fully decarbonised Europe, heat-pump technologies are the number one heating and cooling solution, being a core enabler for a renewable, sustainable and smart energy system. They integrate multiple energy sources, bridging the electric and thermal sector on a local and regional level (micro grids, DHC). Heat pumps are easy to install and widely used in all thermal applications (buildings, transport, white goods) and industrial processes. Refrigerants and other components are available in sufficient quantities. The technology is recognised for its merits in legislation and existing energy models.

Our Vision

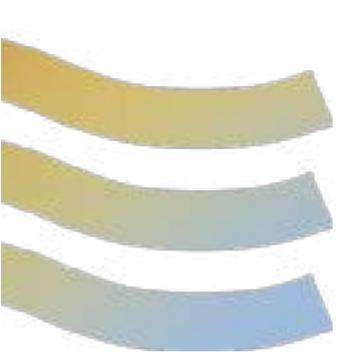
EHPA will be a forward-looking association aiming at putting heat pumps at the centre of the energy system by communicating the benefits of heat pumps, providing relevant information and being a reference point and integrator to all stakeholders.



Keep up-to-date with EHPA activities

Scan for direct links





Awarded Projects

Heat Pump City of the Year Award "Queens Quay"

Description

The water source heat pump project (WSHP) delivered at Queens Quay is at the forefront of an exciting new chapter of Scotland's heating infrastructure and is the UK's first major WSHP project of its type.

The scheme comprised of an energy centre housing two x 2.65MW water source heat pumps, a 130,000 litre thermal store and back up gas boilers which adds resilience and contributes towards the 20MW peak demand.

The heat pumps and thermal store are capable of delivering approximately 82% of the peak demand at final development build-out and in early years will provide greater than 95% of the heat demand.

Objectives

West Dunbartonshire Council had two core objectives:

- Combat the levels of fuel poverty which stands at 28% in West Dunbartonshire by producing more affordable heating and hot water.
- Reduce carbon emissions for the Queens Quay development to a minimum.



The 2 x 2.65MW Water Source Heat Pumps From Star Renewables.

Technical Details



The two 2.65MW water source heat pumps installed at Queens Quay are the primary heat generating technology on the development and also make it the largest project of its type in the UK.

The ammonia heat pumps are capable of meeting the required 80°C temperatures and are combined with a 130m³ thermal store to maximise their contribution. This provides around 80% of the 51,000MWh annual heat demand, with the remainder supplied by backup, gas-fired boilers. There is also scope for two heat pumps to be added as the build out progresses and the heat demand increases.

Queens Quay was a particularly complicated project as it will serve a mix of new-build and retrofit projects, each with differing heat demands. By choosing the heat pumps from Star Renewables, Vital Energi were able to create a scheme which will deliver a coefficient of performance in excess of 3:1 whilst meeting new build and legacy premises.

In summary, the water source heat pump system is at the heart of the Queens Quay development, delivering more affordable, cleaner heat and hot water. It will contribute to combatting fuel poverty and achieve large carbon reductions.

It is important, as well, to acknowledge that this investment in heat pump technology by West Dunbartonshire Council has national significance. As the first major water source heat pump project of its kind, and at 5.2MW is the largest, it is the first example of a technology which can transform the way the UK generates low carbon heat.



Environmental relevance

The heat pump project is responsible for significant carbon reductions at the Queens Quay Development:

- 409 tonnes of CO² (per annum) reduction after phase 1.
- 1,903 tonnes of CO² (per annum) reduction at full build out.
- 5,705 tonnes of CO²(per annum) reduction by 2040 due to grid decarbonisation.

VITAL
ENERGI

West
Dunbar
Council

Location: Clydebank, Scotland

Project start date: 2018

Funding of the project:

- Low Carbon infrastructure Transition Programme
- West Dunbarsonshire Council Committee funding
- The Renewable Heat Incentive

Project website:



A drone image of the energy centre and wider-development.



The flue for the Energy Centre.



Delivery of a 2.65MW Heat Pump

Decarbuilding Award

“Heat pumps as a key enabler in achieving a positive energy building”

Description

Powerhouse Brattørkaia is a positive-energy building, meaning that it produces more energy than it consumes. The surface of the building is covered in solar cells to generate electricity, and this leaves a 5% surplus in the grid for the benefit of the city.

Today, building stock accounts for 40% of the world's total energy consumption. By changing the way we build and focus on construction methods that turn buildings into renewable energy producers, the Powerhouse Brattørkaia is making huge strides towards less energy-consuming buildings.

Powerhouse Brattørkaia is the first building of its kind in Norway and a pioneering project in terms of technology, energy efficiency and production of green energy. The very dense construction of the building, good ventilation and optimal use of the sun and other renewable energy sources ensure greatly reduced energy consumption.

A prerequisite for buildings with low energy consumption is an efficient heating system, in this case a heat pump with an overall COP average of 6, which uses seawater both as a source for free cooling and as a source for the heat pump. This is combined with a low temperature central heating system.

The high COP of the heat pump is the key enabler to the building going “over the top” and becoming a surplus energy building.



Powerhouse Brattørkaia, Heat pump as a key enabler in achieving a positive energy building, Decarbuilding Winner 2021

Objectives

The heat pump installation aims to deliver the highest possible COP and be able to cope with the variations in load and capacity that occur in an office building, with one machine only.

Efficiency is key, as the solar panels on the building generate the energy themselves, and after the building was commissioned, the performance of the installed heat pump was shown to meet specifications.

Environmental relevance

The building produces all electricity itself, and the solar panels on the entire building generate nearly 500.000kWh/year of electricity.

50% of the electricity consumption is used for heating the building with the heat pump and 45% for electricity

consumption in the offices. A surplus of 5% remains, which is fed back into the grid.

If the efficiency and COP of the heat pump were lower than they are, then it would not be a surplus case and would not have achieved 100% carbon neutrality.



Location: Trondheim, Norway

Project start date: 2019

Energy generation: Appr. 485,000 kWh/year

Environmental classification: BREEAM Outstanding

Funding of the project:

Private funding and governmental subsidized.

Project website:



Technical Details: Central heating from Sea Water

Type	HeatPAC-104S single-stage heat pump R717 Step less load control 15-100%
Heat sink	Sea water with intermediate circuit
Hot side	Central heating or thermal storage
System integration	Central heating system Single heat pump covering full load

Key facts and figures design

Cold side	=	+5° C / +2° C
Hot side	=	+40° C / +50° C
Cooling capacity	=	204 kW
Heating capacity	=	265 kW
Power consumption	=	61 kW
COP _{heat}	=	4.3



Powerhouse Brattørkaia, Heat pump as a key enabler in achieving a positive energy building, Decarbuilding Winner 2021



Sabroe HeatPAC SMC 104R, Heat pump as a key enabler in achieving a positive energy building, Decarboning Winner 2021



Powerhouse Brattørkaia, Heat pump as a key enabler in achieving a positive energy building, Decarboning Winner 2021

Decarbindustry Award

"Zero emission heat for Orion Medical factory"

Description

The modular AmbiHeat® heat pump plant utilizes waste heat from the production processes of Orion and energy from outdoor air (-15°C ... +30°C), producing zero emission heat (up to +90°C) for the district heating network of the medical factory. Calefa designed and delivered a modular heat pump plant as a turnkey solution to Orion Oyj.

The system improves the competitiveness, production security, sustainability and responsibility from an already good level.

Objectives

The system improves the competitiveness, production security, sustainability and responsibility of the factory. By utilizing waste heat from their own production and energy obtained from outdoor air, Orion will reduce the need of purchased energy by as much as 70%.



Factory-installed and factory tested heat pump plant modules being delivered to the site.



Environmental relevance

Zero-emission energy obtained from production waste heat and outdoor air will reduce the CO² emissions of Orion by as much as 1000 tons per year.

Benefits

- Zero-emission heat produced from already existing heat sources
- Combining different sources in one system improves usability. The outdoor air is available also during production breaks and weekends when waste heat is not available.
- Low-cost energy production and lower need for purchased energy
- Investment pay-pack time less than 4 years (ROI ~25%).
- Improved cooling capacity and cooling security, which results in increased production capacity in the medical factory.
- Decrease of CO² emissions by 1000 tn CO²-eqv./a.

Technical Details

The modular heat pump plant is the core of the system:

- The heat pumps recover heat from the cooling water network of the factory, producing 900 kW of cold water @+7°C for the processes.
- The heat collectors also recover heat from outdoor air (outdoor air -15°C ... +30°C).
- The process waste heat from the medical plant and heat from outdoor air are utilized to produce 1,5 MW of heating to the district heating network. Temperatures up to +90°C can be produced.
- The overall COP is 3,1.



Location: Turku, Finland

Project start date: 13 July 2020

Funding of the project:

Mainly Private funding

Orion gets public energy aid which will amount to 20% of the total investment.



Factory-installed and factory tested heat pump plant modules being delivered to the site.



The system consists of three Calefa high-temperature heat pumps with total heating power of 1,5 MW.



The installation are complete and the modular AmbiHeat – heat pump plant produces Zero Emission heating and cooling for Orion Medical Factory needs.

Out of the Box Heat Pump Award "Floating Office Rotterdam"

Description

Floating Office Rotterdam is the largest floating office in the world. It is a building for a new age. Off grid and carbon neutral, it floats if water levels rise due to climate change. It forms a key element in a newly redeveloped port environment by providing public waterside space – and even a swimming pool. The anchor tenant is the Global Centre on Adaptation (UN sustainability department). Its mission is to develop and share knowledge on climate change.

The building is built entirely of timber and made from a fully demountable skeleton (to minimise its carbon footprint). It will make use of natural energy thanks to 900 m² of PV-panels. Overhanging balconies around each floor provide shade. The water from the Rijnhaven is used for heating and cooling by using heat pumps with surface water heat exchange. This showcases the building's mission for sustainability and circularity.

Objectives

Floating Office Rotterdam aims to become a new icon for Rotterdam and a showcasing for sustainability and climate change.



Building - Front View, Floating Office Rotterdam. Picture by Marcelij Zerman.



Environmental relevance

The heat pump has a high energy efficiency, achieved by using surface water instead of air for the heat pump. The system is robust, creating a comfortable indoor climate, does not produce noise pollution, thus creating more comfort and wellbeing. By using Glycol (30%) the heat pump system can reach temperatures of -7°C in the winter and 50°C in the summer. The surface water temperatures will be between 1°C and 30°C . Depending on the season and the function of the heat pumps, the Coefficient of Performance (COP) varies between 3.7 for heat generation and 8.0 for cooling. Depending on the building needs, cold and heat is available at the same time. Temperature in each room can be independently adjusted (energy efficiency improves even more).

Technical Details

The heat pump with surface water heat exchange is one of the innovations that showcases the building's mission for sustainability, climate change and circularity. The heat/cold generation is supplied by two heat pumps, which are placed in the floating building's pontoon. The pontoon consists of 15 similar prefab concrete floating boxes, with heat generating network of tubes is poured in the concrete bottom-plate, which extracts heat/cold from the surface water. The pontoon functions as the heat exchanger between the river water and the building, by feeding the gained heat/cold feeds to the climate ceilings on the office floors. This type of heat pump with surface water heat exchange is the first of its kind. It is remarkable because it uses the architecture of the floating office (a building on a float) to gain energy. Other systems are pumping surface water around to gain heat. This pumping creates challenges in the maintenance and the lifespan of the heat exchanger.

All the electricity for the heat pumps is delivered by the solar PV-panels on the roof of the building, making it a net zero installation. This type of heat pump with surface water heat exchange is the first in its kind; it uses the architecture of the floating office (building on a float). The energy system is the product of a unique collaboration between RED Company, Eteck & Roodenburg.



Building - Front View, Floating Office Rotterdam. Picture by Marcelij Zerman.



Location: Rotterdam, The Netherlands

Project start date:

3 March 2020 (Construction)

28 April 2021 (Delivery)

Funding of the project:

Private funding

Project website:





Building at night, Floating Office Rotterdam

People's Choice Award

"The earth's favourite little healthy drinks factory 'the blender'"

Description

innocent currently builds one of the world's first carbon neutral factories, dubbed the blender. GEA, as one of the main suppliers, and innocent worked together from the start and gave the planet a seat at the factory design table.

The key to solving the energy cascade is zooming out from the micro to the macro perspective: heating and cooling requirements are factored into the process design right at the planning stage.

Objectives

So exactly what levers are the GEA and innocent working group pulling to ensure the blender operates as a carbon-neutral facility powered by renewable energy? During the planning process, four sub-tasks emerged that will help innocent reduce energy consumption, recycle and reuse it as well as regeneratively produce its own power:



Exterior of the Blender, Innocent, The earth's favourite little healthy drinks factory 'the blender', People's Choice Award winner 2021

1. Lowering energy consumption:

A beverage processing facility cannot do without heating or cooling. Since heat is energy, it is important to assess the need for it at each processing step. By working hand in hand GEA experts succeeded in minimizing the need for heating and cooling in many areas.

2. Reusing energy: GEA identified how energy used at certain points in the process can be recycled in order to minimize heat losses.

3. Upcycling energy: GEA heat pumps are the heroes of this story. With their help, the energy used in juice production – specifically the waste heat from the cooling system – can be recirculated in a closed loop. In this project the extracted heat is reused and upcycled with two sets of heat pumps to useful temperatures of 2300 kW at 65°C and 2500 kW at 90°C.

4. Independent green energy generation: The blender will be self-sufficient: innocent generates its own energy using solar panels and large wind turbines.

Environmental relevance

innocent wants to inspire wider change with their carbon neutral-factory design: a successful business can also help people and the planet live well! A 'traditional factory' typically use fossil fuels for their heating applications. A reduction of between 12,000 to 16,000 tones CO² /year is estimated compared to a similar facility powered with gas. These CO² savings have an equivalent of 2,600 to 3,480 passenger vehicles driven for one year!



Technical Details

After the design team had reduced the energy demand and applied the use of efficient heat exchangers to re-use as much energy as possible it was important to find an effective way to take excess low-grade heat and to upcycle it using heat pumps into two tiers of temperature (65 °C and 90 °C). These are the energy reservoir temperatures for the main process applications: pasteurization and CIP systems using 90 °C heat and general cleaning and heating systems fed from 65 °C heat.

Combined heating and cooling plant

Refrigerant	NH3
Compressor types	All are piston compressors
Glycol Cooling	-3°C; 5000 kW process users (pasteurizers, heat exchangers, tanks), cold stores
Cold Water	10°C; 2500 kW conditioning filling & packing hall, other HVAC
Warm Water	65°C; 2300+2200 kW process users (juice melters), HVAC + feed for 90°C heat pump
Hot Water	90°C; 2500 kW process users (pasteurizers), CIP



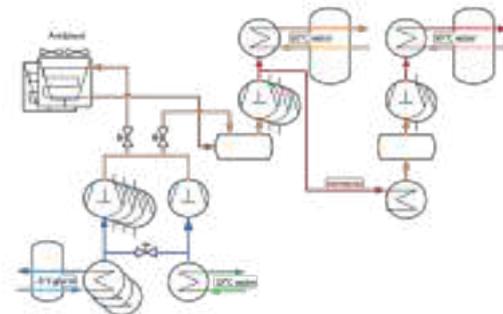
Location: Rotterdam, The Netherlands
Project start date: Q1 2020
Funding of the project: Private funding
Project website:



gea.com



innocentdrinks.co.uk



Graphical representation of combined heating and cooling plant

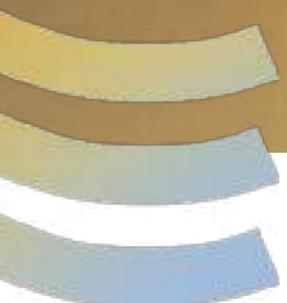


Exterior of the Blender, Innocent, The earth's favourite little healthy drinks factory 'the blender', People's Choice Award winner 2021



Refrigeration plant & heat pump plant at start of installation (GEA) The earth's favourite little healthy drinks factory 'the blender', People's Choice Award winner 2021





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