15-05-2023

News about SPH heat pump projects

SPH has a central role in many exiting projects with high temperature industrial heat pumps!

This Newsletter is dedicated to a number of ground-breaking energy projects aiming at decarbonising industrial processes. All the projects use the ThermBooster™ as the key technology for the reduction of costs and CO_2 emissions related to the use of industrial heat. The ThermBooster™ is the industrial high temperature heat pump developed and produced by SPH Sustainable Process Heat GmbH. Studio Caramelli S.r.l. is the market promotor for this machine in Italy and Southern Switzerland.

1. UBQ Project

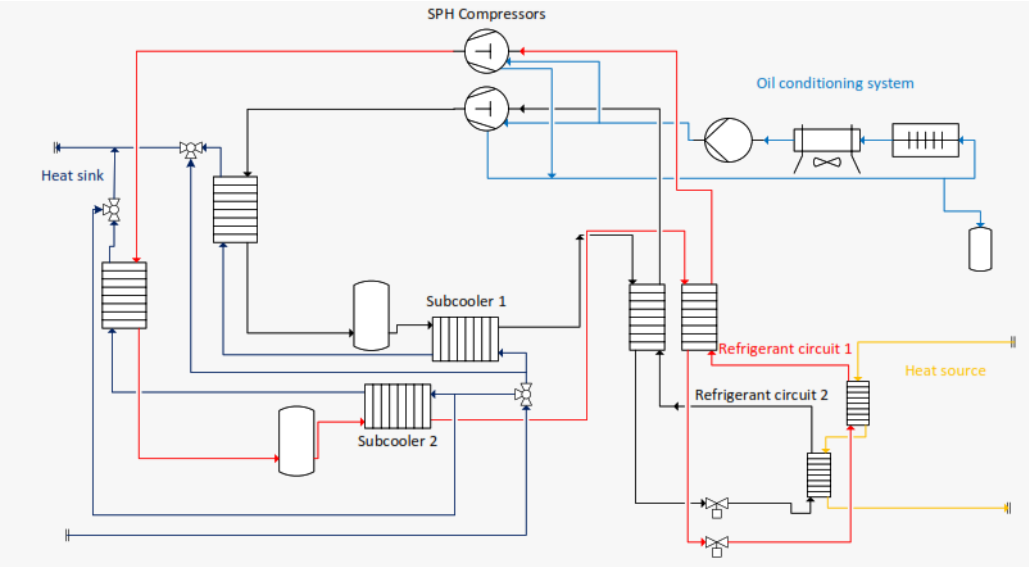
At the end of April 2023 two ThermBooster™ have been delivered to the new establishment of UBQ Materials (https://www.ubqmaterials.com/) in Bergen op Zoom, in the Netherlands. This project is caried out in collaboration with Technotrans SE (Germany) and includes the installation of two heat pumps to be used for the 24/7 delivery of heat for drying processes.

The two compressor ThermBooster™ heat pump delivered to UBQ

News from SPH Sustainable Process Heat GmbH 15-05-2023

Each machine has two compressors. Together they will deliver about 1,5 MW of hot water at 130 °C. The waste heat is recuperated at 75 °C and the expected COP is 4,4 . The total heat delivery capacity is circa 2 MW, but normally, only three compressors will be used for meeting the load of 1,5 MW and one compressor is kept for redundancy. So, even if one compressor should fail for whatever reason, UBQ's operation can continue without interruption.

The total yearly heat output is expected to be circa 39 TJ. In case the heat pumps are powered with carbon free electricity, e.g. from the North Sea, circa 2400 t of CO_2 emissions will be avoided each year.



Scheme of the two compressor version of the ThermBooster™

Mr. Gil Felus, Chief Operation Officer at UBQ Materials has commented as follows: "*In December 2021 we completed a funding round of $170 million with a leading group of international impact investors to fuel our global expansion. As we move forward with our new upscaled factory in the Netherlands, we have made it a priority to partner with efficient energy solutions companies to further optimize the environmental impact of our production process. The equipment and solutions delivered by Technotrans GmbH and SPH Sustainable Process Heat GmbH play an important role in making this happen*".

2. Gelatine Project

In this project the ThermBooster™ is used in the food industry in Germany, for the production of low pressure, saturated steam. The heat is recuperated from the cooling water of an ICE[1] co-generator. The steam produced is fed into the existing steam network in the factory. The heat pump has one compressor and the condensation of the refrigerant takes place directly inside the steam generator. In this way an additional heat transfer circuit and the accompanying temperature losses are avoided. In this manner the best possible heat pump performance is assured.

ThermBooster™ with steam generator used in the Gelatine Project

The project is carried out with 2G Energy AG, the manufacturer of the co-generator.

About 0,8 t/h of 2 bar steam will be delivered and the expected COP is 4,4 . As a result of this energy saving measure about 550 t of CO_2 emissions will be avoided each year.

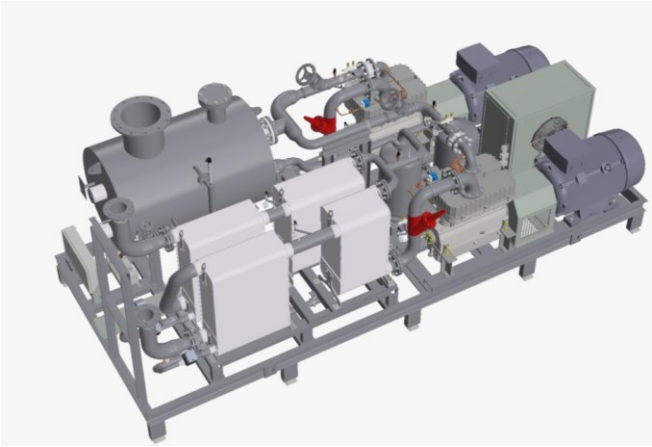
The machine has been extensively tested in the test facility of SPH and the delivery is planned before the end of Q2 in 2023.

3. Industrial bakery project

Also in this project, which is located in the South of Germany, the cooling water of an ICE co-generator is used as heat source. The project is carried out in collaboration with 2G Energy AG.

In this case the ThermBooster™ is equipped with two compressors but uses one single, steam generating, condenser. About 2 t/h of steam will produced at 1,5 bar and the COP is 5,5 .

[1] Internal Combustion Engine



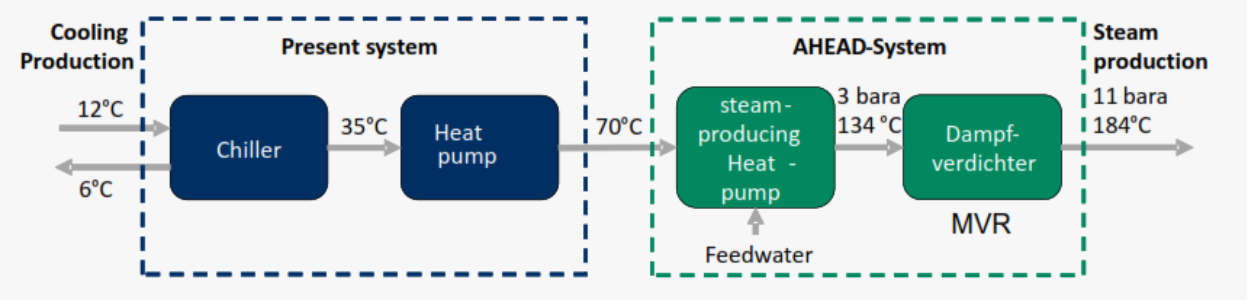
The two compressor Thermbooster™ for the bakery project

Each year circa 1700 t of CO_2 emissions will be avoided when compared to systems using natural gas.

4. AHEAD Advanced heat pump demonstrator

In this research project a steam generating heat pump is combined with a mechanical vapour recompressing system (MVR) for the production of high pressure steam in a pharmaceutical industrial plant from Tekada in Austria. The advantage of this solution is that the heat pump does what it does best: the production of low pressure steam (3 bar). The MVR unit is used in a second stage after the heat pump in order to bring the steam at the required temperature by increasing its pressure to circa 11 bar (184 °C).

The heat source is the heat rejected by a large refrigeration plant. This heat is upgraded by an existing ammonia heat pump up to 70 °C. The schematic lay-out of the system is shown in the figure below:



Schematic view of the modified steam generating system in the Takeda pharmaceutical plant in Austria

Only natural refrigerants are used in this project. The ThermBooster™ will use Butane as refrigerant. The heat production will be circa 1,7 MW and the installation is planned for summer 2024. Extensive monitoring is planned for.

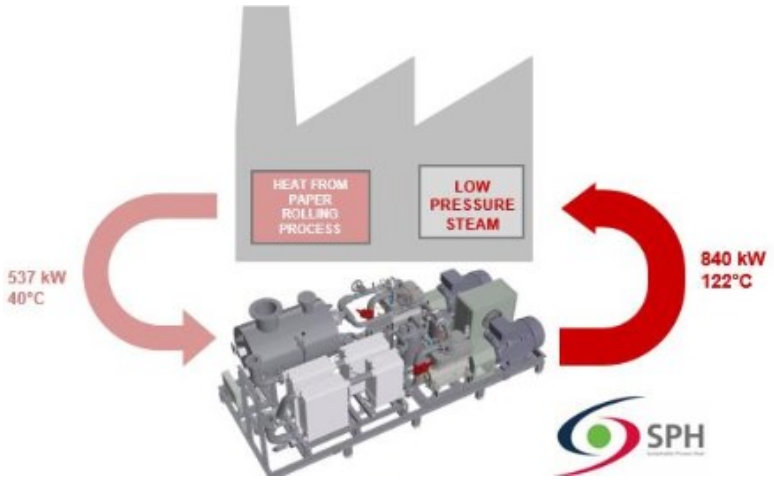
It is estimated that on a yearly basis the CO_2 emissions will be reduced by circa 90 %.

This project is co-financed by the Austrian Government and the other participants in the are:

Dieses Projekt wird aus Mitteln des Klima- und Energiefonds gefördert und im Rahmen der FTI-Initiative „Vorzeigeregion Energie" durchgeführt.

5. Push2Heat Project

SPH was selected to provide a piston compressor heat pump for the EU Push2Heat Project*. This EU-funded project aims at addressing the technical, economic, and regulatory barriers that prevent heat pump technologies to be widely deployed. It will do so by scaling up four different heat upgrading technologies (whose supply temperatures range from 90 °C to 160 °C) to optimise their efficiency and economic performance.



The re-use of waste heat from a paper dryer

In this project the ThermBooster™ will be used for upgrading the heat recuperated from a dryer in a paper factory. The energy from the warm and humid exhaust air from the paper drying machine, is recuperated through a water/glycol circuit at 30 - 50 °C and then used as heat source for the heat pump for the production of low pressure steam 1,8 – 2,2 bar (117 – 123 °C). The steam produced by the heat pump is again used for the drying process and so the need for fossil generated heat is reduced.

News from SPH Sustainable Process Heat GmbH 15-05-2023

The project will be realized in the establishment of the Felix Shöller Group in Weissenborn (Germany).

The establishment of the Felix Shöller Group in Weissenborn (Germany).

The thermal output of the system will be about 840 kW and the expected COP is 2,3 – 2,6 .

* This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101069689 (PUSH2HEAT).

For more information:

Requests for further information or quotations can be send to: dolf.vanhattem@studiocaramelli.com

See also:

https://www.spheat.de/2022/02/15/2_orders/?lang=en

https://studiocaramelli.eu/en/

https://www.youtube.com/watch?v=Ho0JvLEKuls

https://lnkd.in/d9q3pEWX

https://lnkd.in/dCWnQ9uQ

Studio Caramelli S.r.l.

SPH Sustainable Process Heat

NEWS

28-09-2022

Steam generation with commercially available heat pumps is a reality now!

The ThermBooster™ produced low pressure steam in test run.

SPH Sustainable Process Heat GmbH is proud and pleased to announce that the first tests for the production of steam with the ThermBooster™ heat pump, have been successful. A constant flow of low pressure steam was produced for several hours.

The pictures below show the steam generating version of the ThermBooster™.

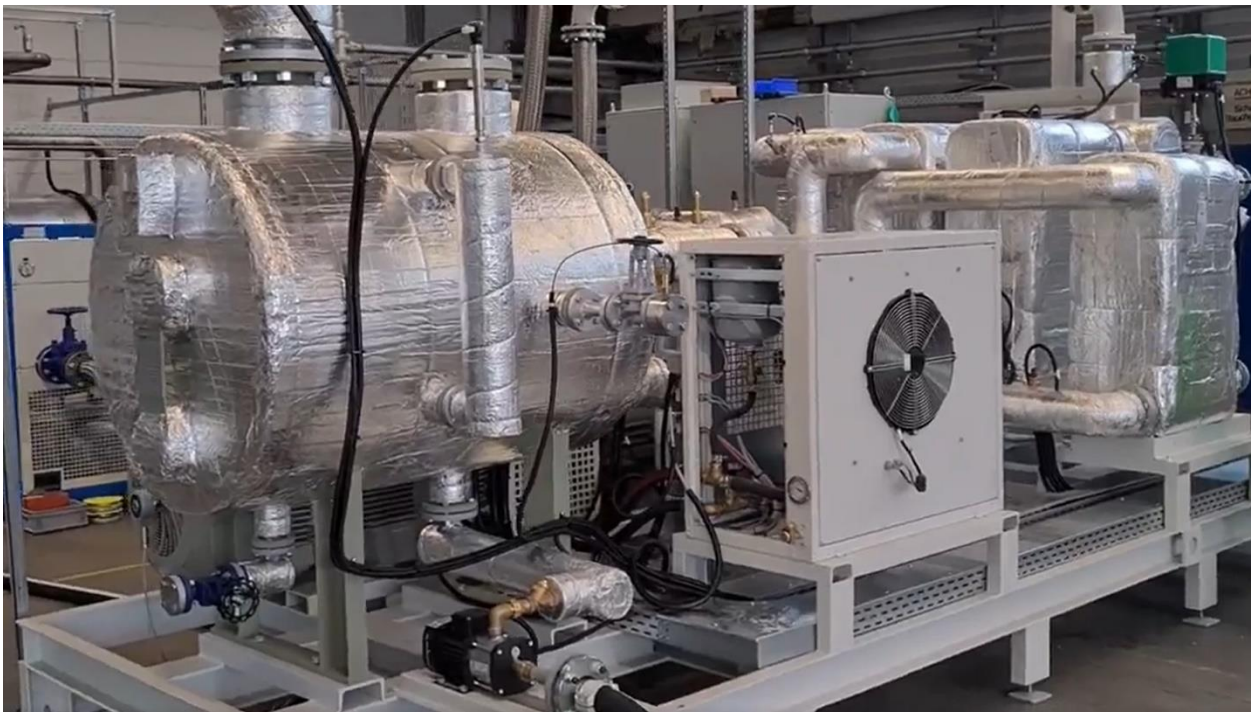


Figure 1 — The steam generating version of the ThermBooster™.

The machine is now installed in the test facility of SPH Sustainable Process Heat GmbH and will be subjected to a very rigorous program of measurements and performance assessments. Afterwards, probably in October this year, it will be shipped for installation at the production site of the first customer.

Figure 2 — The four cylinder piston compressor.

Figure 3 — Compressor and motor arrangement.

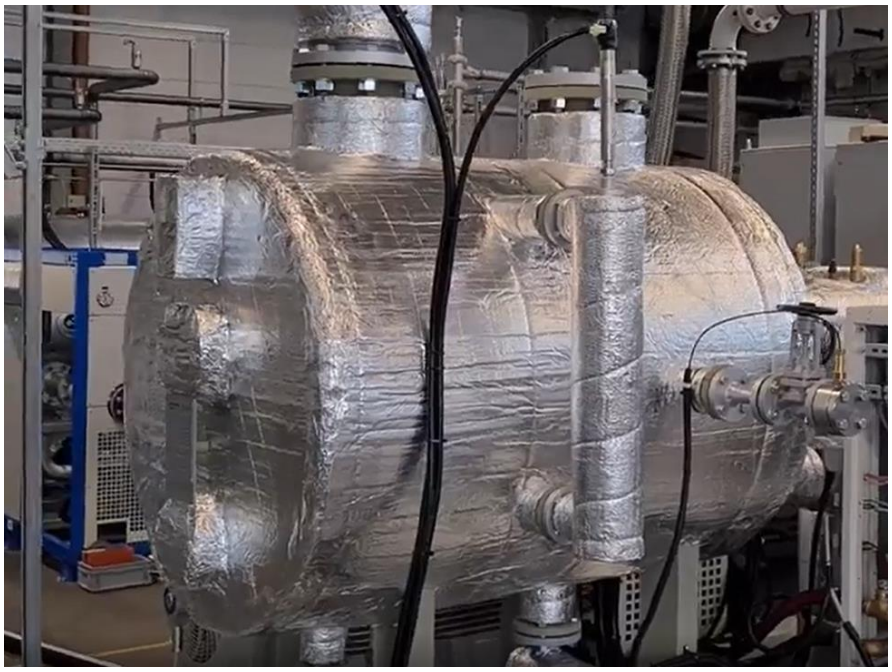


Figure 4 — The steam generator.

Interesting feature of the steam generating version of the ThermBooster™ is the possibility to have a full integration of the condenser with the steam generator. Thanks to this design no extra heat transfer medium is needed between the heat pump and the steam generator. This means, higher steam temperatures and less piping and pumps.

In the current tests the heat pump is running with R-1233zd, which enables the production of steam up to 145-150 degrees °C.

The tests will continue in the coming weeks and more information will be published as soon as it becomes available.

Figure 5 — Installation for the performance testing of the ThermBooster™ in the laboratories of SPH Sustainable Process heat in Germany.

The commercialisation of the ThermBooster™ has already started. Both standard models and custom made solutions are available, with condenser temperatures up to 165 °C.

Requests for information or quotations should be send to: dolf.vanhattem@studiocaramelli.com

N.B. SPH Sustainable Process heat will be present at Chillventa fair in Nürnberg from October 11th to 13th, 2022. Please come visit us in Hall 4A / Stand 4A – 405 to learn more!

For more information:

https://www.spheat.de/2022/02/15/2_orders/?lang=en

https://www.linkedin.com/posts/spheat_we-produce-steam-activity-6980113739345768448-A1VF/?utm_source=share&utm_medium=member_desktop

https://studiocaramelli.eu/en/

NEWS

18-02-2022

two orders signed for delivery in 2022!

SPH Sustainable Process Heat GmbH is proud to announce that we have recently signed two contracts – for the delivery of 3 ThermBooster™ units in 2022.

The first unit will be installed in the Food & Beverage industry, at a customer site located around 2 hours from our premises in Germany. The unit will be installed in August 2022. The second delivery will be at a thermoplastics company in the Netherlands. The installation will take place in October 2022.

“Both projects are very exciting, and we’re proud to be part of them” says Dr. Tim Hamacher, Managing Director of SPH Sustainable Process Heat GmbH. “In the first project we will produce steam at 2 bar absolute (120°C) and deliver around 800 kg of steam per hour. This is a very important demo project for us, and we can’t wait to get our product out into the field.”

first delivery in summer

Tim continues: “The second contract is perhaps even more exciting. In this project, our ThermBooster™ heat pump will deliver continuous heat to a critical drying process, and our delivery consists of two heat

pumps with 2 compressors each. Since our compressors operate independently in a 2-cycle configuration, we will always deliver a surplus capacity and thereby also redundancies. Even if one compressor should fail for whatever reason, the operation can continue 24/7”.

https://studiocaramelli.eu/it/2022/02/two-orders-signed-for-delivery-in-2022/

https://www.spheat.de/2022/02/15/2_orders/?lang=en