

Terrafame will recover excess energy of its hydrogen plants - technology is used in a new way

Terrafame starts to produce process steam by utilizing excess energy streams of its hydrogen plants. In the past, the similar technology has been utilized, for example in power plants, but it is new in hydrogen plants. Energy and water company Adven is responsible for the project and operates the solution in future. The project receives investment support for the new energy technology from the Ministry of Employment and the Economy.

The solution will significantly reduce the share of energy produced by fossil fuels as the waste energy from the hydrogen plants is recovered. Terrafame's energy efficiency will improve and emissions are reduced.

"We are constantly looking for ways to improve energy efficiency and reduce our carbon footprint. This is a significant amount of energy loss that can now be recovered", says Kristian Granit, Chief Refining Office at Terrafame Battery Chemicals Factory.

"The urge to recover excess energy at industrial plants is clearly increasing. The underlying aim is to reduce emissions and, on the other hand, to save on energy production costs. Capturing energy from the existing processes can either cover the growing energy needs or replace current energy production, often done with fossil fuels", says Juha Elo, Sales Director at Adven.

Terrafame is currently building one of the largest battery chemical production lines in the world. At the launch of the battery chemical plant in 2021, Terrafame's current main product, nickel-cobalt sulphide, will be further processed into nickel and cobalt sulphates, raw materials for electric vehicle batteries. The carbon footprint of Terrafame's bio-leaching based production is clearly smaller than that of conventional ore enrichment processes.

Power plant technology for the hydrogen plant

Terrafame's heat recovery solution utilizes vacuum tube heat exchanger. The same technology has been used in power plants in the past, but it is new in hydrogen plants.

The amount of heat to be recovered depends on how much the two hydrogen plants are used: the more hydrogen plants are used, the more excess energy is generated. At best, recovery corresponds to about five megawatts of energy generation.

"We also thought about implementing the heat recovery ourselves, but realized it was simpler that the steam production and distribution in the entire Terrafame area is optimized by one player, Adven. This allows us to focus our resources on our core business of producing metals and, in the future, battery chemicals", Granit says.

"We have a good flow in doing things with Terrafame. This project will benefit both the customer and the environment when efficiency is improved and emissions reduced", says Arto Liikanen, Account and Sales Manager at Adven.

The cooperation in heat recovery is a continuation of the previous cooperation between Terrafame and Adven. Adven is currently implementing a 10 megawatt solid fuel energy plant for Terrafame. The plant will use renewable fuel in producing steam and heat for the future battery chemical plant and other industrial uses. Adven is also developing energy production infrastructure and energy efficiency for the site and building energy transmission lines.

Implementation of heat recovery

- Heat recovery is done with a vacuum tube heat exchanger (heat pipe).
- The tubes in the heat pipe exchanger contain heat transfer liquid (often water), which evaporates at hot side and condenses on the cold side releasing the heat.
- Technology has been widely used in power plants, but not in hydrogen plants.
- At hydrogen plants, a tube heat exchanger is most commonly used for heat recovery.
- The project will receive new technology support from the Ministry of Economic Affairs and Employment.

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[Adven is implementing a renewable energy-based power plant for Terrafame's new battery chemicals plant](#) (18 June 2019)

Adven

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Adven is the leading provider of energy and water services across the Nordic and Baltic countries. For industries Adven produces industrial steam, heat and cold as well as provides utility and processing solutions to improve energy, water and material efficiency. For real estate segment Adven produces heating and cooling based on district heating or property-specific solutions applying for instance bio- and geenergy. Our business model is based on full service and long-term partnership.

Our annual turnover is over €200m, and our total balance sheet is €800m. We have almost 40 years of experience, and we employ over 400 specialists. We operate more than 300 sites with total capacity of 1900 MW. www.adven.com

Terrafame

Terrafame Ltd is a Finnish multi-metal company producing nickel, zinc, cobalt and copper at its mine and metals production plant located in Sotkamo, Finland. With the battery chemicals plant currently being built, our main product, nickel-cobalt sulfide, can be processed into nickel and cobalt sulphates that are suitable for electric vehicle batteries. Our aim is to conduct environmentally sustainable, safe and profitable operations. www.terrafame.com