HydroHub-Fenne to become a Real-World Laboratory

Economics Minister Altmaier: The STEAG power plant site in the Saarland is a future building block for the successful energy revolution in Germany

Essen. HydroHub-Fenne is to become a real-world laboratory of the energy revolution. The project outline, which STEAG designed together with the project partners Siemens AG, the Institute for Future Energy and Material Flow Systems (IZES gGmbH) and the German Research Center for Artificial Intelligence (DFKI GmbH) and submitted to the competition of the Federal Ministry of Economics and Technology (BMWi), has been selected from 90 entries and evaluated as eligible for funding. In Berlin today, Economics Minister Peter Altmaier (CDU) emphasised the fact that HydroHub-Fenne is an important future building block for a successful energy revolution in Germany.

A total of 20 projects were called upon by Peter Altmaier to submit the official funding application at a press conference. "This is a great success for the project community and underlines our strategy: STEAG is making significant contributions to the energy revolution at power plant sites in Saarland and North Rhine-Westphalia", explains Dr. Wolfgang Cieslik, who is a Member of the Management Board of STEAG GmbH and responsible for the Market and Technology segment. The Federal Ministry will fund the selected projects with a total of 100 million euros annually up to 2025. The start is planned for the coming year.

With the "HydroHub-Fenne" project outline, the project partners took part in the "Real-World Laboratory of the Energy Revolution" ideas competition of the BMWi. With the selected projects, the Federal Government wants to accelerate the expansion of hydrogen technologies and the establishment of sector coupling and bring them to market maturity. "With this innovative hydrogen infrastructure project, we want to point the way to the necessary further development of the energy system transformation and work out recommendations on how the regulatory framework conditions for the economic construction and operation of such CO_2-free plants should be designed," says Prof. Dr.

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Thomas Thiemann, head of the Energy Transition Technologies Team at project partner Siemens Gas&Power.

With the phase-out of nuclear power production in 2022 and the planned end to coal-fired power generation in 2038, one thing is certain: in Germany, wind and solar energy are to be the main pillars of the electricity supply of the future. However, both renewable energy sources are subject to weather-related fluctuations. As an energy carrier, hydrogen is able to make up for these fluctuations. At the STEAG power plant in Völklingen-Fenne, this will be the case at an energy hub where the power grid, district heating network and a gas pipeline come together. "The term sector coupling, which has so far been cited theoretically as the key to a successful energy turnaround, is a reality at our location," says Wolfgang Cieslik.

The HydroHub-Fenne in detail:

And this is the form that the project outline will take: At the site of the STEAG power plant, the project partners produce hydrogen with the help of an electrolyser when there is an oversupply of wind and solar energy. This energy source is then used in a variety of ways, by combining the electricity and gas networks, industry and transport: The hydrogen is supplied to nearby steel companies that need it for industrial processes. It is fed into the regional gas grid and also supplies public hydrogen filling stations for fuel cell vehicles in the Saarland. Furthermore, the hydrogen can later be converted back into electricity. The heat generated during the production of hydrogen is decoupled into the network of the Saar district heating network (FVS) of STEAG.

Electricity-based hydrogen (electrolysis) is then to be produced on an industrial scale on the basis of renewable energies. Electricity from wind and sun is then used to split water into oxygen and so-called "green hydrogen" in the electrolysis process. The hydrogen can then be used as a replacement for fossil fuels, making power generation CO_2-free. For energy-intensive industries such as the steel and chemical industries, the use of hydrogen can represent a decisive step towards better environmental compatibility and climate neutrality. With the HydroHub-Fenne, the four project partners are creating a prototype that can also be implemented at other locations throughout Germany. In addition to reducing CO_2 emissions, this will also create new jobs. They estimate an investment volume in the mid double-digit million range.

At Völklingen-Fenne, the four partners are breaking new ground as the interaction of various components and systems is being tested there for the first time on an industrial scale. A new electrolyser, a large hydrogen storage tank and a new high-temperature heat pump will be linked to an existing large-battery system, a mine gas engine co-generation plant and an electrode boiler at the energy hub. As a result, all connections to electricity, heat and gas networks will be available and usable. Moreover, STEAG is considering the construction of a gas and steam power plant at the Fenne site, in which hydrogen can be re-circulated on a large scale in a gas turbine.

The Project Partners and their Skills

STEAG GmbH

STEAG is one of the leading energy producers in Germany and is shaping the energy turnaround at six power plant sites in the country. For over 80 years, STEAG has stood nationally and internationally for efficient and secure power generation. STEAG plans, develops, implements, operates and markets highly efficient power plants and storage facilities. As an experienced partner, STEAG provides extensive support to its customers, offering tailor-made solutions in the field of electricity and heat supplies, as well as a wide range of energy services.

Siemens AG

Siemens AG is an international technology group and one of the leading providers of efficient power generation and transmission solutions, a pioneer in infrastructure solutions as well as automation, drive and software solutions for industry as a whole. The company is also one of the largest manufacturers of energy-efficient resource-conserving technologies. This also includes electrolysis technology and heat pumps. Siemens has been involved in the electrochemical energy conversion of hydrogen for four decades.

IZES gGmbH

IZES (Institut für ZukunftsEnergie- und Stoffstromsysteme) gGmbH was established in November 1999 at the Saarland University of Applied Sciences and deals with five interdisciplinary fields: energy markets, material flows, infrastructure & community development, environmental psychology and technical innovations. The aim is to promote science and environmental protection through application-oriented research and development. The approach of IZES gGmbH combines practical topics with scientific issues.

DFKI

Deutsches Forschungszentrum für Künstliche Intelligenz (DFKI) GmbH is Germany's leading business-oriented research institute in the field of innovative software technologies. In the international scientific community, DFKI is one of the world's most important "Centers of Excellence". Founded in 1988, DFKI has acquired a national and international reputation as a competent and reliable partner for innovations in business as a result of its proactive and demand-oriented project work.