PRESS RELEASE

Fraunhofer ITWM at the E-world energy & water 2022

Using Energy Efficiently With Math

The topic of energy is more present than ever before: From sustainability and renewable energy to energy costs and saving measures – both industry and private households are facing new challenges. Researchers at the Fraunhofer Institute for Industrial Mathematics ITWM have been developing innovative methods and models for the energy sector for several years now – and have some exciting projects to share: While DESPRIMA and FlexEuro keep energy use flexible, the Amperix energy management system supports energy autonomy. From June 21 to 23, the researchers will present these and other energy projects at the leading trade fair E-world.

This is where energy supply is rethought: E-world energy & water is the meeting point of the European energy industry. Fraunhofer ITWM will also be present and will demonstrate with innovative projects how mathematical models can contribute to the energy transition. The researchers can be found at two booths, booth numbers 5-679 and 5-683.

Renewable energies such as wind power and photovoltaics are good for the environment, but are highly dependent on weather conditions. If it is cloudy and windless, there will be fluctuations in the power grid. Due to the expansion of alternative energies, it is therefore becoming increasingly important for companies to maintain a certain flexibility in the use of energy. The ITWM-projects DESPRIMA and FlexEuro help to achieve this goal.

Always Stay Flexible

DESPRIMA, a demand-side management system, allows electricity customers to flexibly influence their own consumption and thus compensate for fluctuating electricity generation from renewable energy plants at the request of the grid operator. Companies can react spontaneously and within a few seconds to fluctuations in power generation, for example by briefly shutting down parts of their production. If there is too little electricity, control energy, an energy reserve, is used, based on the normal frequency of 50 Hertz in the power grid. The researchers of the department »System Analysis, Prognosis and Control« support the consumers with DESPRIMA through a smart energy management to stabilize the power grid.

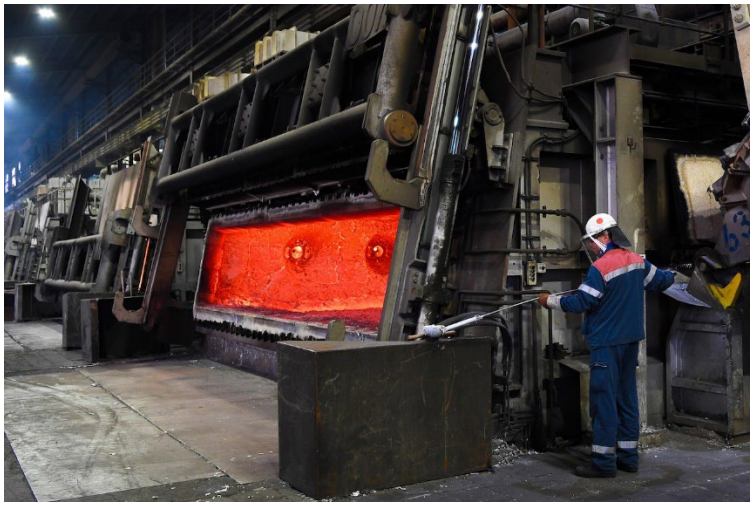
In addition, the scientists in the »Financial Mathematics« department are working on the optimal marketing of load flexibilities in various electricity markets in the project FlexEuro. When should electricity be used and when is it better to sell it? The goal of

the project is to develop methods and prototypes that support the industry in this decision through long as well as short term planning. FlexEuro's industrial partner is one of Germany's largest electricity consumers: aluminum producer TRIMET.

Energy Hub for Household, Commercial and Energy Communities

Especially in the summer months, households accumulate considerable surplus energy despite battery storage. This energy could be used, for example, to heat a hot water tank with a heat pump or to charge electric vehicles.
The manufacturer-independent Amperix energy management system from the »Green by IT« group of the »High Performance Computing« division enables this efficient use and optimizes the control of battery storage systems, heat pumps and charging stations for e-vehicles. In the process, Amperix records all energy flows in the household, for example the energy generated by photovoltaic systems, and uses this as a basis for decision-making. But Amperix is not only used to control storage systems in private households: In the commercial sector, the reliable energy management system has already established itself for removing load peaks by means of storage, lowering or load reduction of charging infrastructure.

Visuals



The large melting furnaces of the TRIMET company have an enormous energy consumption.
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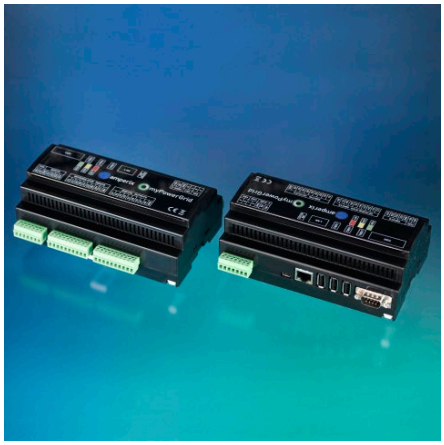

The high-performance energy manager Amperix. © Fraunhofer ITWM

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About the Fraunhofer Institute for Industrial Mathematics ITWM

The Fraunhofer Institute for Industrial Mathematics ITWM in Kaiserslautern is one of the largest research institutes for industrial mathematics worldwide. We see our task in further developing mathematics as a key technology and providing innovative impetus. Our focus is on the implementation of mathematical methods and technology in application projects and their further development in research projects. The close cooperation with partners from industry guarantees the high practical relevance of our work.

Their integral components are consulting, implementation and support in the application of high-performance computer technology and the provision of tailor-made software solutions. Our various competencies address a wide range of customers: automotive industry, mechanical engineering, textile industry, energy and finance. This also benefits from our good networking, for example in the High performance center "Simulation- and software-based innovation".