

PRESS RELEASE

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Optimizing Electricity Costs with Fraunhofer ITWM Dynamic Electricity Prices and Flexibility Marketing for the Floating Energy Community Schoonschip

News from the Dutch Schoonschip: Since January, the floating energy community of 30 houses has been connected to the energy and flexibility markets. The innovative solution from the Fraunhofer Institute for Industrial Mathematics ITWM for the real-time prognosis of consumption and local generation and price optimization enables the community to buy and sell electricity at the best possible prices on the day-ahead energy market. In addition, the 30 batteries are marketed by a trader on the imbalance market. This allows the community to further increase its flexibility and reduces energy costs for its members.

The Schoonschip energy community is an association of 30 floating houses with photovoltaic systems, heat pumps and battery storage units in a side arm of the IJ canal, north of Amsterdam. What makes it special is the innovative technologies that enable the members to manage their energy supply collectively. Since 2018, for example, they have been able to maximize the use of their own energy generation by integrating the [Amperix energy management system](#) developed at the Fraunhofer ITWM and thus jointly reduce the amount of energy they still need to purchase.

The houses are networked with each other, but also have a connection to the municipal power grid – one for the entire residential project. The energy management system developed by Fraunhofer ITWM also uses battery storage to reduce grid peaks and thus reduce grid usage fees. Researchers at the Fraunhofer ITWM have now made it possible to connect the energy community to various markets. The aim is to position the energy community as a flexible virtual power plant that is able to both supply and absorb energy.

Dynamic Electricity Prices on the Day-Ahead Market

Thanks to the technology of Fraunhofer ITWM, the Schoonschip community can take advantage of dynamic electricity prices. It is connected to the so-called day-ahead market, where hourly energy prices are negotiated one day in advance. Day-ahead prices can be highly volatile. This means that there may be phases with cheap and expensive prices. With sufficient flexibility and storage, price fluctuations can be used for the benefit of the energy community. This requires price-optimized control of battery storage systems and heat pumps. The Fraunhofer ITWM has developed such a price optimization for the energy community.

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Precise prognosis of the residual load or feed-in are a prerequisite. This involves forecasting the aggregated grid consumption or surplus of the energy community consisting of domestic consumers, local generation and the consumption of heat pumps. The forecast is the basis for the rolling price optimization of the battery storage applications - up to 35 hours in advance. In addition to the self-generated electricity from the photovoltaic systems, the storage units are filled with the cheapest possible purchased electricity according to the calculated schedules and discharged at expensive times. In contrast to Germany, discharging, i.e. selling energy to the grid, is also a permitted scenario in the Netherlands.

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Flexibility Marketing on the Imbalance Market

The community also participates with its batteries in the Dutch imbalance market, where prices vary every quarter of an hour. For this purpose, a trader connected to the energy community decides every quarter of an hour whether there is a marketing opportunity on the imbalance market, sometimes for just a few minutes. The connection to the two energy and flexibility markets makes it possible to make even better use of the flexibility and capacities of the energy community.

The energy management system must always keep an eye on both activities: the local grid connection limits of the energy community, which must not be exceeded in any particular phase.

Vision for the Future: Access for All

»Our vision is for the technology to become accessible not only within the Schoonschip community, but also for private households and businesses. Anyone who has a photovoltaic system, battery storage or other flexibilities such as a heat pump and electric vehicle should be able to connect and actively participate in a wide variety of energy and flexibility markets,« says Matthias Klein-SchlöBl, team leader of the »Green by IT« group at Fraunhofer ITWM.

With an intelligent energy management system that takes various energy and flexibility markets into account, it would also be possible to charge an electric car more cheaply, for example. The driver could specify at what time and with what range the vehicle is needed. The energy management system optimizes the charging process by charging the car either immediately or at a later time when prices are lower. This will not only lead to cost savings, but also promote the use of renewable energies and support the stability of the electricity grid.

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Presentation at e-world energy and water 2025

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Our researchers are represented at e-world (hall 4, stand 4J112). They will show how they make predictions, implement optimizations and realize trading on different markets. »We are looking forward to getting in touch with innovative energy supply companies, integrators of energy management systems and interested parties who are interested in the joint development of sustainable energy concepts,« says Matthias Klein-Schlöbl.



The Dutch energy community »Schoonschip« with 30 floating houses north of Amsterdam, which is integrated into the energy markets by an intelligent management system of the Fraunhofer ITWM. Innovative technologies optimize electricity consumption and the production of PV systems, battery storage and heat pumps, enabling the community to function as a flexible virtual power plant. © Isabel Nabuurs

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Visualization of battery activity on the day-ahead market: Positive powers show charging at low prices, while negative powers show discharging to avoid expensive grid purchases. © Fraunhofer ITWM



Visualization of battery activity on the imbalance market (no day-ahead trading in this section). © Fraunhofer ITWM

More Information online: <https://www.itwm.fraunhofer.de/schoonschip-2025-en>

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 applied mathematics in the world. We see it as our task to further develop mathematics as a key technology and to provide innovative impulses. 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 building blocks are consulting, implementation and support in the application of high-performance computing technology and the provision of customized software solutions. Our various areas of expertise address a wide range of customers: the automotive industry, mechanical engineering, the chemical

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industry, energy and the financial sector. This also benefits from our excellent networking, for example in the Simulation and Software-based Innovation Center.

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About the Fraunhofer-Gesellschaft

The Fraunhofer-Gesellschaft, based in Germany, is the world's leading organization for application-oriented research. With its focus on future-oriented key technologies and the utilization of results in business and industry, it plays a central role in the innovation process. As a guide and driving force for innovative developments and scientific excellence, it helps to shape our society and our future. Founded in 1949, the organization currently operates 76 institutes and research facilities in Germany. More than 30,000 employees, most of whom are trained in the natural sciences or engineering, work on the annual research volume of 2.9 billion euros. Contract research accounts for 2.5 billion euros of this total.

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