

PRESS RELEASE

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Fraunhofer IWU Presents “ESiP Analyzer”: How Factories Can Properly Plan Energy Storage Systems

The Chemnitz Research Institute presents the ESiP Analyzer – an analysis tool for energy storage applications in production (ESiP). The tool enables technical and economic evaluation of potential uses for energy storage systems in factories. Its goal is to identify energy storage opportunities with minimal effort and to simplify the design and integration of storage solutions. The ESiP Analyzer focuses on two key areas: reducing power peaks at both the machine and factory levels, and enabling intermediate storage of renewable energy..

Research Focus on Energy Storage in Production: Challenges and Opportunities

The manufacturing industry faces the challenge of optimizing energy consumption while driving the integration of renewable energy sources. Frequent acceleration and braking operations in production machines cause high, short-term power peaks, which require mighty electrical infrastructure and lead to losses in partial load conditions. Energy storage systems offer tremendous potential here: they enable demand-optimized use of renewable energy directly at the production site and create valuable temporal decoupling between energy generation and consumption. However, there has been a lack of intuitive and comprehensive tools to assist planners in designing and sizing such complex systems.

Diverse Applications for ESiP Analyzer Focus: From Peak-Shaving to PV Storage

In addition to classic peak shaving, the new design and simulation tool enables precise modeling of other use cases. These include, for example, the recovery of braking energy from drives in the DC link and the implementation of uninterruptible power supply for critical production processes. The tool takes into account common energy storage technologies and various integration approaches, always incorporating the extensive expertise of Fraunhofer IWU in both energy storage and production engineering.

Comprehensive Approach: Design and Operational Management in Focus

Proposing specific design procedures for different application scenarios is a core feature of the tool. In addition, simulations include operational management factors such as

Contact

Andreas Hemmerle | Fraunhofer IWU | Phone +49 371 5397-1372 |
Reichenhainer Straße 88 | 09126 Chemnitz | Germany | www.iwu.fraunhofer.de | andreas.hemmerle@iwu.fraunhofer.de |

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system efficiency and specific production parameters. The goal is to support companies in selecting the appropriate storage technology and defining optimal operational strategies for long-term efficient and economical use.

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ESiP Analyzer at a Glance

The tool supports companies in analyzing potential, planning, and integrating energy storage systems in manufacturing:

- **ESiP Factory Analyzer:** An initial assessment to identify potential applications of energy storage at the factory level;
- **ESiP Machine Analyzer:** Evaluation of potential use cases at the machine level;
- **ESiP System Simulation:** A detailed, in-depth analysis of applications to optimize system efficiency under various operating conditions – from transient phenomena to long-term operation. The software allows for evaluation of different topologies (AC/DC, passive DC, active DC) and the development of tailored energy management strategies.

This makes the ESiP Analyzer an ideal tool for conducting a well-founded comparison and selecting the most technically and economically viable storage solution for a specific manufacturing application.

Fraunhofer IWU at “The Smarter E Europe” in Munich

“The Smarter E Europe” combines four leading trade fairs: Intersolar Europe, ees Europe, Power2Drive Europe, and EM-Power Europe. Manufacturing companies are warmly invited to visit Fraunhofer IWU at the Saxony Economic Development Corporation’s joint booth and experience the future of energy efficiency in production firsthand. The ESiP Analyzer provides an opportunity to make industrial manufacturing more flexible and energy efficient. Visitors can look forward to:

- **One-on-one discussions:** the chance to talk with experts about individual energy challenges and collaboratively develop tailored solutions;
 - **Live demos:** the IWU team will showcase the prototype of its innovative design and simulation tool using real-world application examples;
 - **Comprehensive support:** from initial concept development to successful implementation of energy storage systems, IWU offers guidance and collaboration throughout the entire project lifecycle.
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Fig. 1 Designing energy storage systems across technologies for machines and facilities in industrial production: The user-friendly software tool from Fraunhofer IWU can accommodate all usual energy storage technologies.
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Fig. 2 Lithium-ion Storage System at Fraunhofer IWU.
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The **Fraunhofer Institute for Machine Tools and Forming Technology IWU** is an innovation-driven partner for research and development in production engineering. Around 670 highly qualified employees work at our locations in Chemnitz, Cottbus, Dresden, Leipzig, Wolfsburg, and Zittau. We unlock potential for competitive manufacturing, across industries like automotive, aerospace, electrical engineering, and precision engineering. Our research and contract research encompass the entire manufacturing ecosystem, from individual components to processes, methods, complex machine systems and human interaction. As one of the leading institutes for resource-efficient manufacturing, we bank on highly flexible, scalable cognitive production systems using nature as an example. We take a holistic approach to the entire process chain, aligning with circular economy principles. We develop technologies and intelligent production plants and optimize forming, cutting, and joining manufacturing steps. Our services include innovative lightweight structures and technologies for processing new materials, functional transfer to assembly groups, and the latest technologies of additive manufacturing (3D printing). We provide solutions for climate-neutral factory operations and large-scale production of hydrogen systems, thus paving the way for the transition to renewable energies.