

Press Release

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At Fraunhofer ISE's SmartEnergyLab Digital Agents Work for the Electricity Grid

Hybrid Storage Offers Great Potential

Fraunhofer ISE has successfully tested a new concept called "hybrid storage." In an agent-based operating system (ABOS), thousands of batteries and heat storage systems are aggregated to a virtual storage system. As decentralized control systems the agents coordinate the individual local storage operation. The storage capacity is aggregated for an integrated distribution grid operation. The agent-based operation-system has been developed and tested within the SmartEnergyLab at Fraunhofer ISE.

"The agents perform a majority of the control tasks directly with their neighbors, thereby reducing the workload of the centralized structures," explains Prof. Dr. Christof Wittwer, Head of the Department of Intelligent Energy Systems at Fraunhofer ISE. The "Renewable Energy Model – Germany (REMod-D)," developed at Fraunhofer ISE, emphasizes that small batteries and heat storage systems, connected to the grid, can provide 340 GWh to the German energy system in 2050. This is more than five times the capacity anticipated for pump storage (60 GWh).

At the SmartEnergyLab at Fraunhofer ISE, any type of energy conversion and storage device can be tested and optimized for integration into the Smart Grid. Also in the lab, components in a real distribution network can be managed in a test situation. For example, agent-based controllers in Fraunhofer ISE's SmartEnergyLab manage a co-generation plant including water storage, a heat pump with phase change storage and a Li-ion battery system. All units merge in a real-time power distribution network simulator where they communicate with numerous other units. In this way,

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decentralized intelligence supports the realization of a decentralized energy system and security of supply.

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The SmartEnergyLab of Fraunhofer ISE: The digital agents are located in the three yellow cabinets. ©Fraunhofer ISE