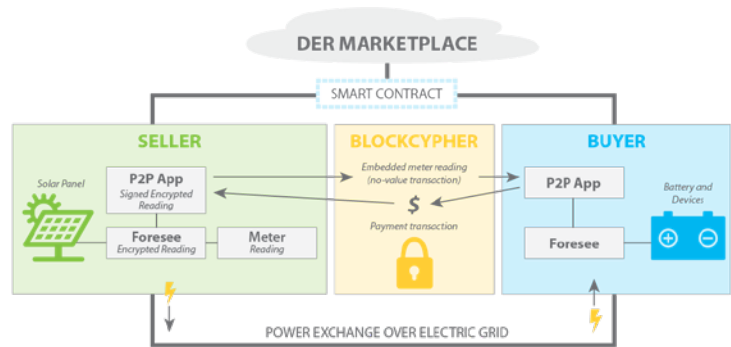




NREL + BlockCypher

BlockCypher has teamed with the National Renewable Energy Laboratory (NREL) to demonstrate secure peer-to-peer energy transactions—taking place in real time and without a centralized arbitrator—forming the basis for a distributed energy marketplace. The transactions use blockchain technology for features such as instantaneous settlement times and low transaction costs and for enabling trust among participants without the need for a third party. Blockchain technology is an innovative solution to managing grid security, enabling distributed energy markets, and the proliferation of distributed energy resources while opening new value streams for customers and utilities.



BlockCypher will manage secure peer-to-peer energy transactions between simulated home energy systems at the ESIF.
Illustration by Brittany Conrad, NREL

R&D STRATEGY

NREL researchers staged the blockchain marketplace on two test homes within the Energy Systems Integration Facility's Systems Performance Laboratory. Each lab home was electrically identical to a real house, and simulated occupancy ensured that the appliances operate in a realistic manner. One home was configured to purchase excess energy from the other, as determined by a smart meter framework in each home, which was handled by the foresee™ home energy management system. Foresee™ makes optimized control decisions for user's needs and preferences, guided by cost savings, utility signals, and—in this demonstration—the option to purchase from the neighboring home.

A predetermined contract structured automatic energy transactions between homes, which are performed and recorded on the blockchain. BlockCypher facilitated the blockchain transactions, providing NREL with contract management tools and programming interfaces to query details about transactions.

IMPACT

Current energy markets lack an effective market interface for distributed energy resources, leading to reduced opportunities for vendors/manufacturers and the underutilization of assets. Blockchain technology offers a compelling framework for new market systems built around this emerging asset class. The emergence of such markets will enhance customer choice, and it will motivate an ecosystem of new products and services that will stand to mutually benefit grid operators, utilities, regulators, ratepayers, and technology providers.

Partner with NREL at the ESIF

User facility access to the ESIF is awarded through the review and approval of user proposals, depending on the scientific merit, suitability of the user facilities, and the appropriateness of the work to DOE objectives, and includes a signed user agreement for the facility.

For more information, please visit:
www.nrel.gov/esif/work-with-us.html
or contact:
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The Energy Systems Integration Facility (ESIF) at the National Renewable Energy Laboratory (NREL) provides the R&D capabilities needed for private industry, academia, government, and public entities to collaborate on utility-scale solutions for integrating renewable energy and other efficiency technologies into our energy systems.

To learn more about the ESIF, visit: www.nrel.gov/esif.

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