Optimizing Hybrid Systems with REopt Lite

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reopt.nrel.gov/tool

Will RE + Storage Work for Your Site?

RE Resource

Technology Costs & Incentives

Resilience Goals

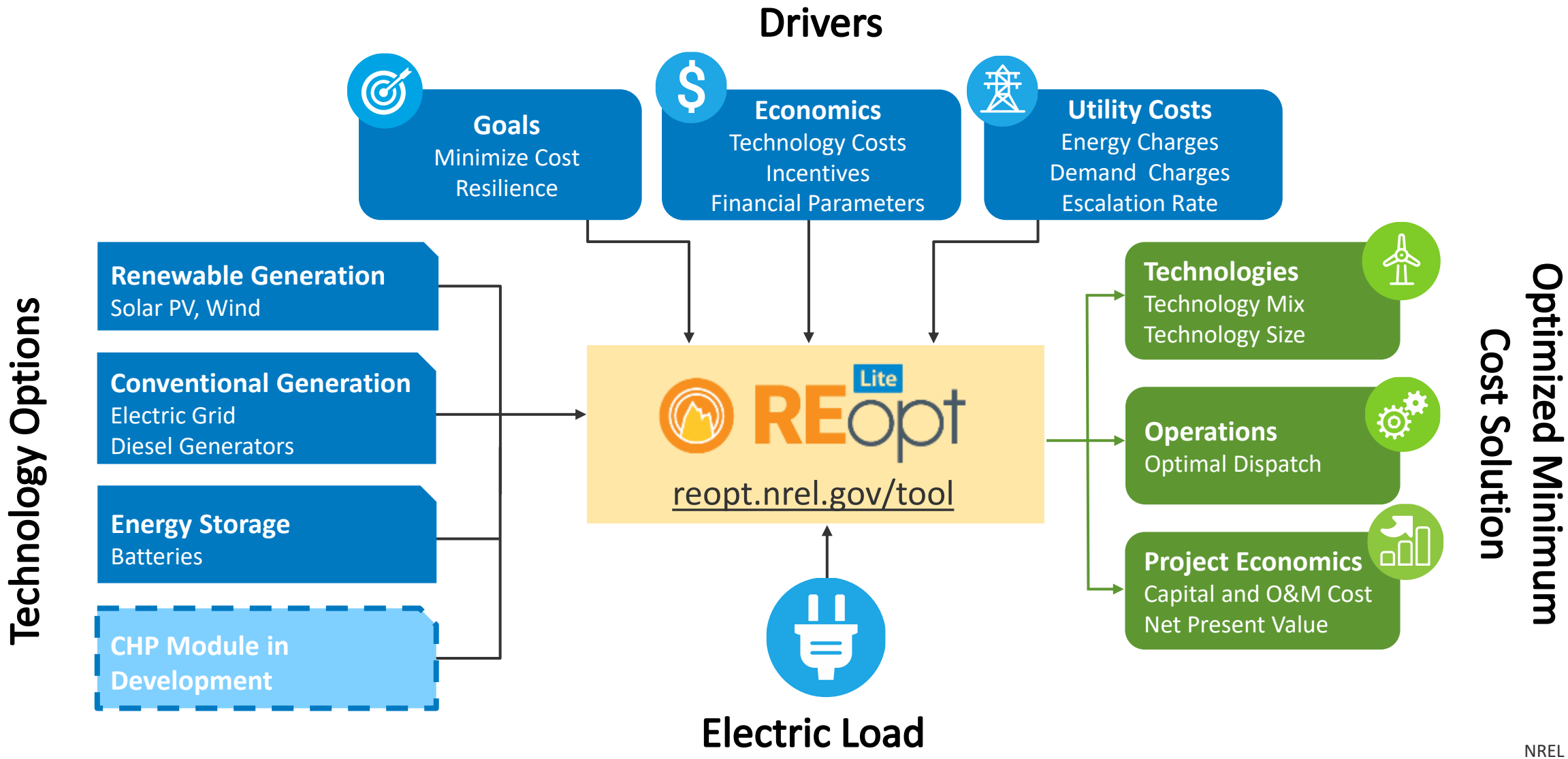
Utility Cost & Consumption

Financial Parameters

Many factors affect whether distributed energy technologies can provide cost savings and resilience to your site, and they must be evaluated concurrently.

REopt Lite: Free Web Tool to Optimize Economic and Resilient DERs

Formulated as a mixed integer linear program, REopt Lite provides an integrated cost-optimal energy solution.



REopt Lite Provides Solutions for a Range of Users

Researchers, developers, building owners, utilities, and industry use the tool to answer different questions.

What is the optimal size of DERs to minimize my cost of energy?

How do I optimize system control across multiple value streams to maximize project value?

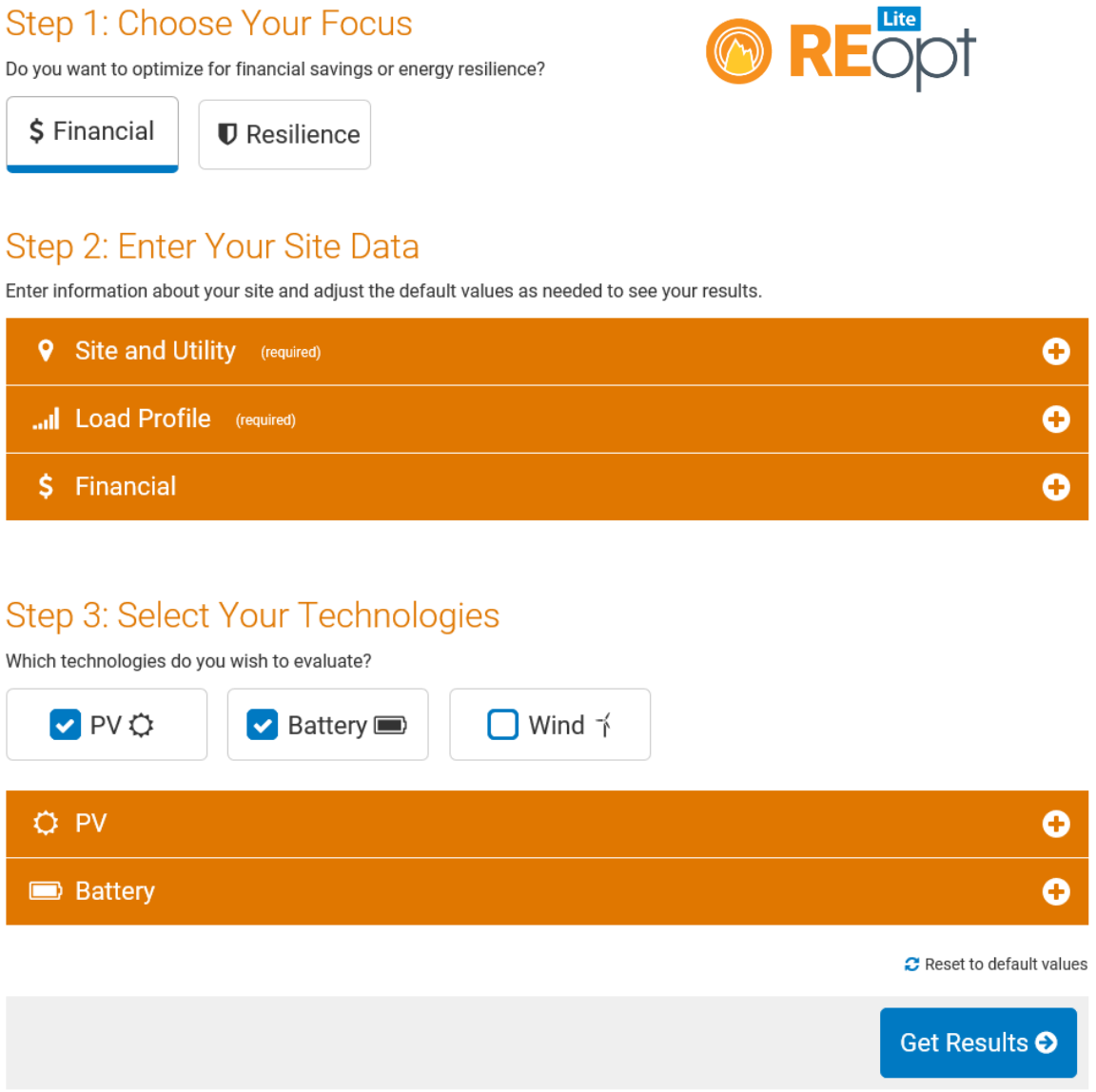
Where do market opportunities for DERs exist? Now and in the future?

What will it cost to meet a sustainability or on-site generation goal?

What is the most cost-effective way to survive a grid outage spanning 1 day? What about 9 days?

Accessing REopt Lite

- Web tool: reopt.nrel.gov/tool
- API: https://developer.nrel.gov/docs/energy-optimization/reopt-v1/
- Open Source code: https://github.com/NREL/REopt_Lite_API



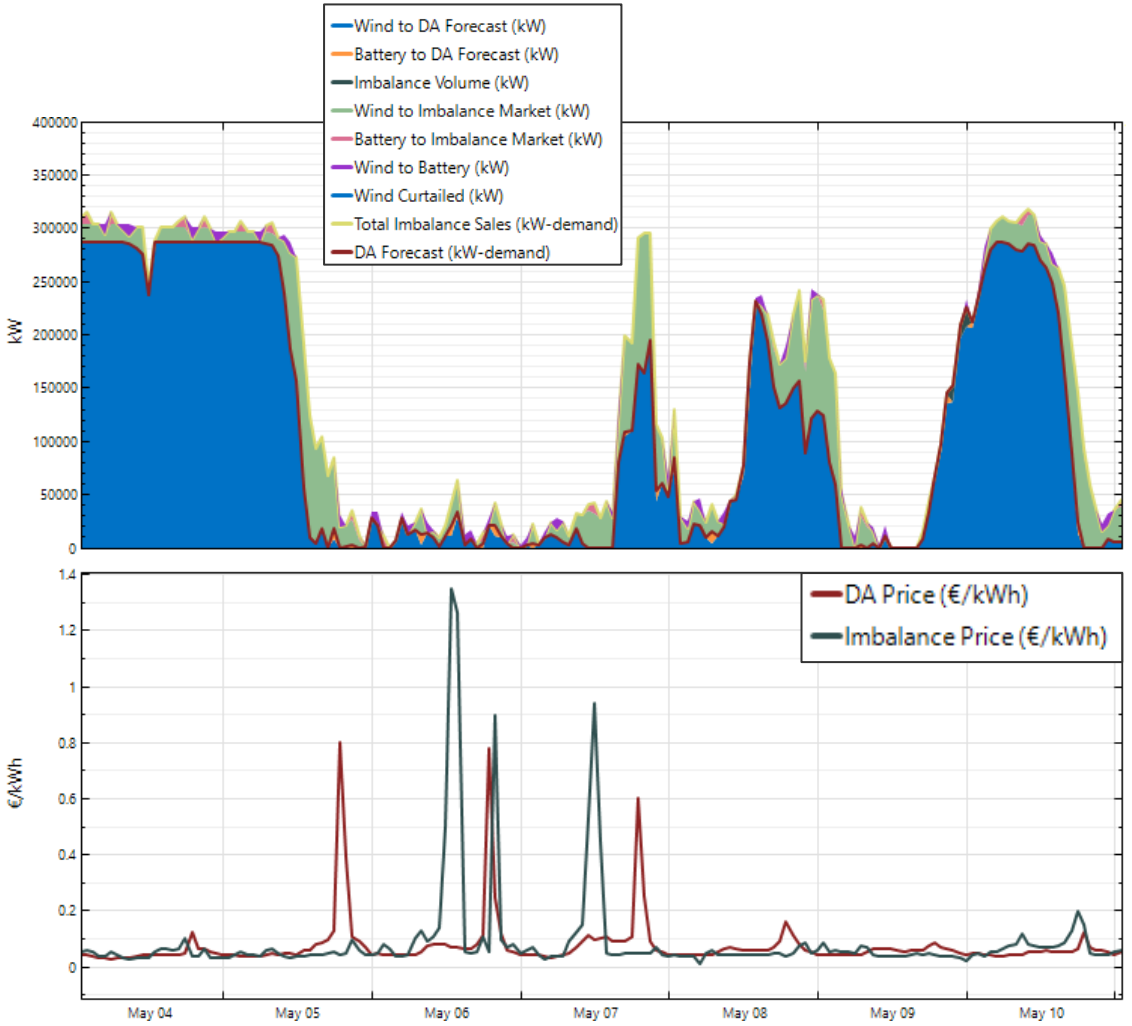
Evaluating Grid-Scale Battery Storage at an Offshore Windfarm in the UK

Description: NREL assessed value streams for a grid-scale battery energy storage system (BESS) co-located at an offshore windfarm in UK markets:

- Energy arbitrage in day-ahead markets
- Mitigating forecast error penalties in imbalance markets
- Capacity markets
- Avoiding curtailment losses

Technologies: Grid-scale battery storage; offshore wind

Impact: Identified market values and conditions that would make a battery cost effective at an offshore windfarm in the UK to inform partner's investment decisions.



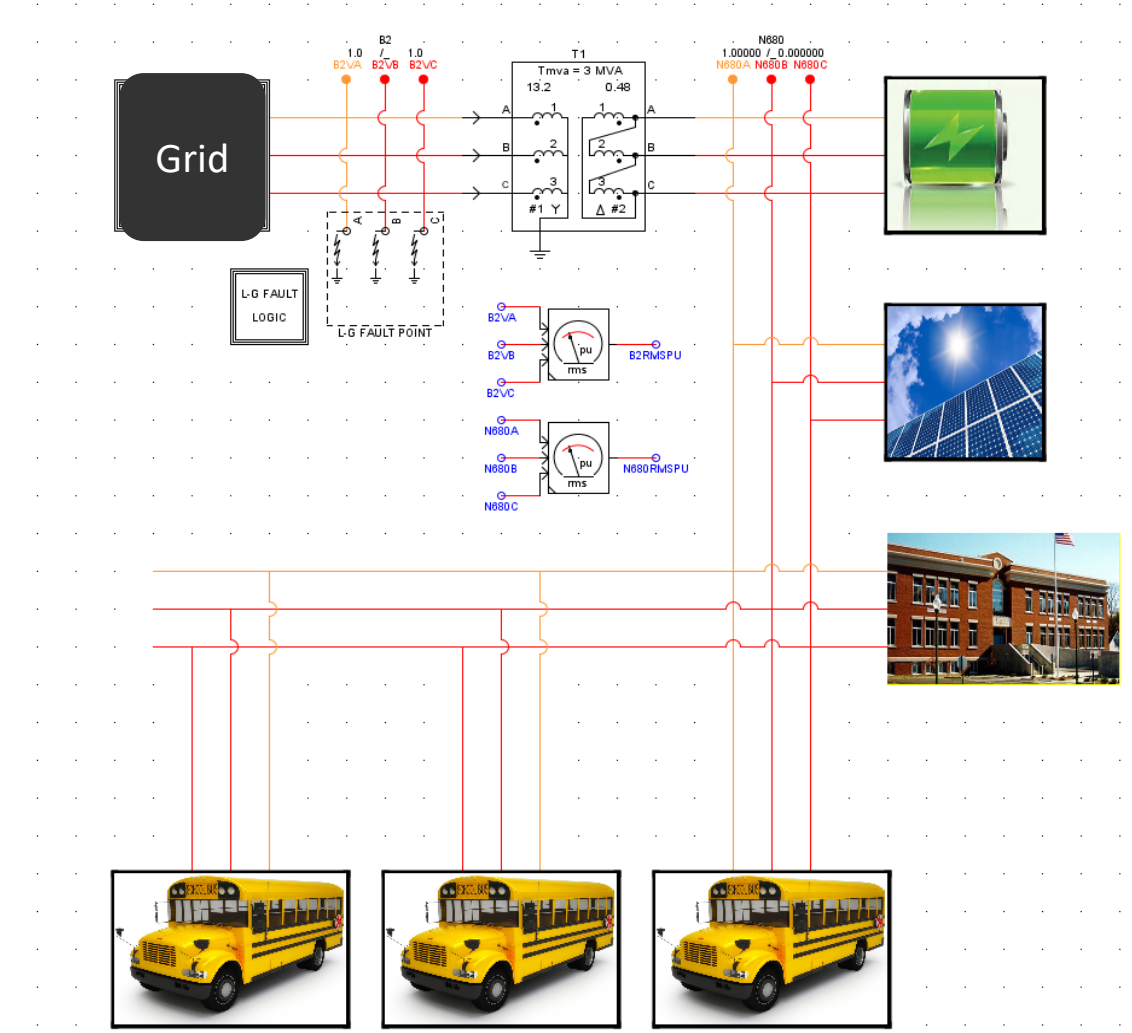
Integrating EV Fleets With DER and Grid

Description: NREL evaluated opportunities for synergistic integration and control of electrified transportation fleets with flexible buildings loads, RE, and stationary storage.

Technologies: Mobility, storage, buildings, solar, advanced system integration controls

Impact: Demonstrated optimal control of integrated RE, building loads, storage, and EV system in laboratory testing. Integrated system provided increased value to the site owner.

Partners: Eaton (funding partner), Holy Cross Energy, SDG&E, Duke Energy, UPS, EPRI



William Becker et al. *Cost Reduction of School Bus Fleet Electrification With Optimized Charging and Distributed Energy Resources*. Wichita, KS: North American Power Symposium. October 13–15, 2019. https://www.nrel.gov/docs/fy20osti/74187.pdf.

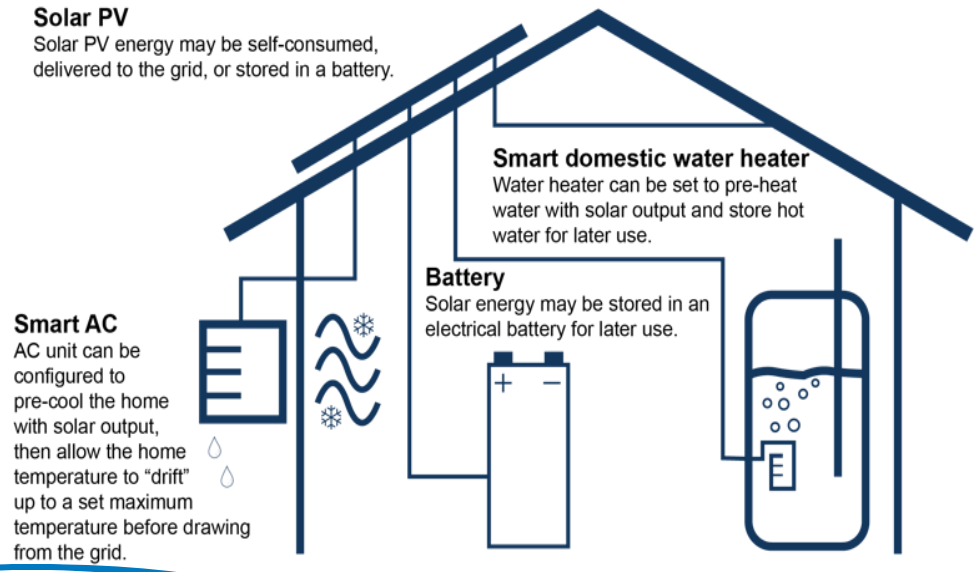
Aligning Generation and Load With Storage and Demand Flexibility

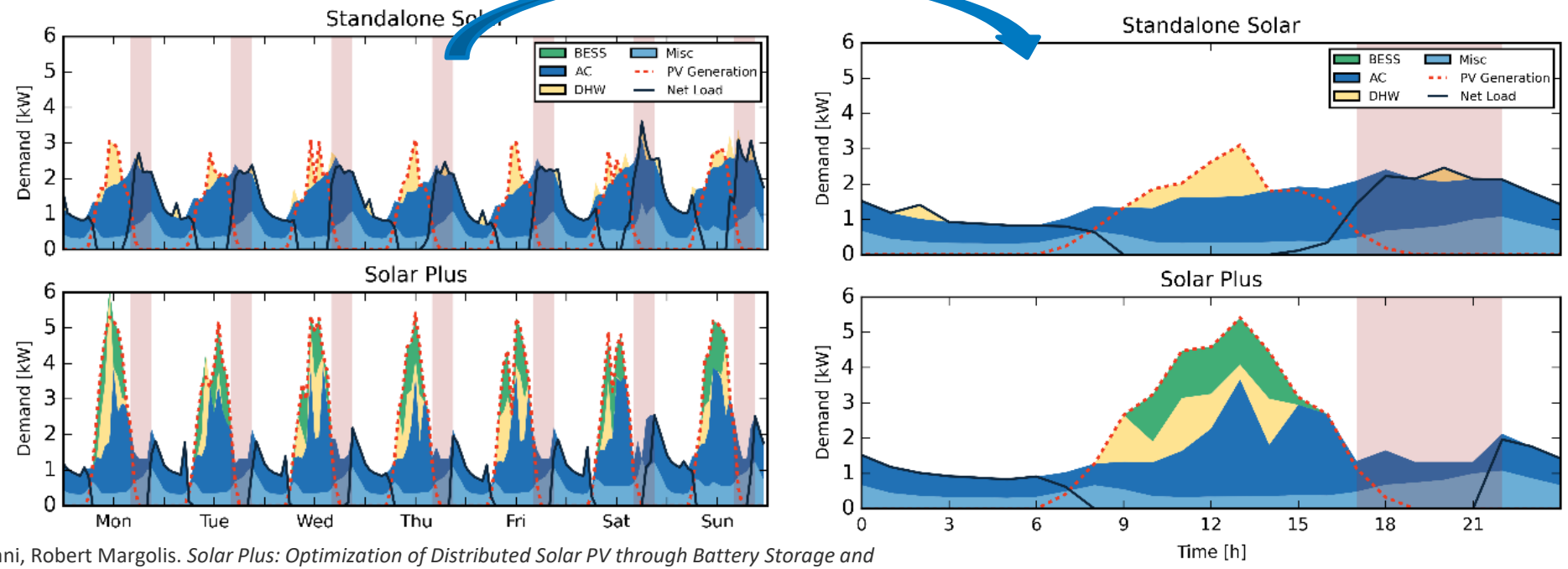
Description: NREL evaluated controllable load and storage options to improve customer economics of solar under post-net metering utility tariffs.

Technology: Solar, storage, buildings

Impact: Flexible loads increase the value of solar by aligning generation to load to maximize value.

Partner: DOE Solar





O'Shaughnessy, Eric, Dylan Cutler, Kristen Ardani, Robert Margolis. *Solar Plus: Optimization of Distributed Solar PV through Battery Storage and Dispatchable Load in Residential Buildings*. United Kingdom: Applied Energy, March 2018. https://doi.org/10.1016/j.apenergy.2017.12.118.

REopt Renewable Energy Integration and Optimization

REopt website (analysis services and case studies): reopt.nrel.gov

Tool feedback and questions: reopt@nrel.gov

www.nrel.gov

NREL/PR-7A40-76700

This work was authored by the National Renewable Energy Laboratory, operated by Alliance for Sustainable Energy, LLC, for the U.S. Department of Energy (DOE) under Contract No. DE-AC36-08GO28308. Funding provided by the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy Federal Energy Management Program. The views expressed in the article do not necessarily represent the views of the DOE or the U.S. Government. The U.S. Government retains and the publisher, by accepting the article for publication, acknowledges that the U.S. Government retains a nonexclusive, paid-up, irrevocable, worldwide license to publish or reproduce the published form of this work, or allow others to do so, for U.S. Government purposes.

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