

Marin Clean Energy Building Energy Optimization: Software for Distributed Energy Resource Program & Procurement Planning



Project Summary

Marin Clean Energy's (MCE) Building Energy Optimization (BEO) project, which launched in November 2017 and completed in December 2020, helps Community Choice Aggregators (CCAs) design distributed energy resource (DER) programs. This project used customer data to develop NavigaDER, a software tool to create impactful customer programs and plans for purchasing power. NavigaDER helps CCAs identify customers that are the best fit for specific programs and allows tailoring of those programs to fit their needs. In addition to the software tool, a wiki-like guide was created that includes a NavigaDER user manual, researched and documented program ideas, and case studies that will reduce the time needed to make new programs available to customers.

This project supports SB 350 (De León, Chapter 547, Statutes of 2015) goals of reaching 60 percent renewable energy in California by 2030 and meeting the state's goal to double energy efficiency. The BEO project delivers a cost-effective approach for optimizing building efficiencies across communities. This replicable solution establishes the CCA as the most effective entity that can target, aggregate, and leverage building resources within a community to achieve specific local and state (SB 350 and the Existing Buildings Energy Efficiency Action Plan) climate action plan goals, lower greenhouse gas (GHG) emissions broadly, and reduce net load on the electrical system.

Utilizing this tool will allow CCAs to more easily meet state renewable and carbon-free energy procurement targets by increasing adoption of programs that reduce GHG emissions. This project helps CCAs achieve these goals by optimizing customer programs and enabling CCAs to better coordinate across agencies.

NavigaDER was developed to help craft better programs for customers by addressing the challenges of aligning CCA power purchasing and program plans. NavigaDER allows CCA teams to better integrate resource planning with program goals such as reductions

in energy consumption from battery storage, or increases in energy usage from electric vehicle adoption.

While implementing the demonstration projects, MCE learned that although NavigaDER can help identify ideal DER strategies for CCAs, there are other key factors outside of the CCA's control that have a strong impact on project success, including a site owner's willingness to implement recommendations, and funding availability. Using NavigaDER in combination with on-site technical support and additional funding will likely yield the best outcomes.

The project developed NavigaDER, a publicly available software tool that helps CCAs evaluate program options for customers. The tool allows CCAs to plug in various program scenarios to assess the impacts on customers and power purchasing. Program implementers can now ask, "What is the Benefit/Cost to promote a Quantity of DERs to a Customer Segment in a CCA's Territory/Location over the span of Time Frame?"

For example, "What is the financial and GHG benefit to promote battery storage to solar customers in MCE's service area for use during the evening peak?"

By adjusting the underlined variables, users can assess program options and implement those that provide the most value to CCAs and their customers. NavigaDER can currently model programs for battery storage, solar photovoltaics, electric vehicle (EV) charging, and heat pump water heaters, and better equip the 23 California CCAs to address the complexities of delivering these programs.

Lead Agency and Partnerships

- Lead Agency and Project Manager: [MCE](#)
- Software and User Manual Development: [TerraVerde Energy](#)
- Policy Analysis and Outreach: [The Climate Center](#)
- Demonstration Project Support: [Association for Energy Affordability](#) and O'Rear Consulting

Engagement Process

Customer programs staff and power purchasing staff from all CCAs were the primary target of the outreach. Early on, an advisory board of representatives from 12 CCAs was formed, selected with the intent of providing a diverse selection of CCA experience from across the state. The advisory board offered insights on program planning and provided feedback on the software user experience on both the guide and the software tool, helping improve the overall project for future users. The goals of this engagement were to ensure the project met the needs of all CCAs, and to provide training on how to use the software once available.

Climate Impact Area

NavigaDER helps CCAs create impactful programs for customers that reduce GHG emissions. The tool uses customer data to compare GHGs before and after

implementation of a new program. In one demonstration, MCE used NavigaDER to target solar customers for a battery storage program, which would store excess solar energy produced during the day to be used in the evening hours. This reduced GHG emissions by reducing the need for fossil fuel energy in the evenings.

The figure below shows simulated load results before and after theoretical battery storage installation.

Simulation Results



The red line represents the original electric usage of 428 low-income residential solar customers. The blue line indicates simulated load after installation of a 10-kW battery that discharged energy in the evening instead of pulling electricity from the grid. The gray areas represent the difference between the original load and the simulated load after the proposed battery installation. The results correlate to an estimated annual reduction of 130 metric tons of CO₂ and about \$30,000 in CCA energy purchasing expenses.

NavigaDER can also be used to compare groups of customers under different DER program options, helping maximize GHG reductions and customer participation.

Funding Source

The project was funded with \$1.7 million of American Recovery and Reinvestment of 2009 (ARRA) funds through the California Energy Commission's Local Government Challenge grant program. This 3-year grant enabled MCE to work with partners to develop NavigaDER, which can be used by CCAs across the state. The monies allowed

MCE to contract with TerraVerde to provide technical expertise when developing the tool, and to work with other CCAs to test, enhance, and expand use of the tool. The Climate Center supported outreach initiatives.

Outcomes

MCE presented information and demonstrated the tool at several industry conferences and three dedicated webinars with 300+ attendees. Three blog posts, listed below, were published to describe the purpose and use of the tool. An additional article on this topic is expected to be published in California Energy Markets in January 2021. MCE will roll out software to CCAs in January 2021. Data on program uptake, usage, and DER impacts results are expected in early 2022.

Replicability

The software is intended for California CCAs, and the resources and code are open source, enabling replication of the project in other areas.

Additional Resources

- <https://navigader.com>
- [MCE Introduces NavigaDER: Software for Designing DER Programs](#)
- [NavigaDER: Using the Tool to Calculate Customer Distribution Energy Resource Impacts for CCAs](#)
- [What CCAs Are Saying About NavigaDER](#)

Further Information

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