The Edison Foundation
INSTITUTE for
ELECTRIC INNOVATION

Executive Summary

Designing 100 Percent Carbon-free Energy Solutions: Preferences, Challenges, and Pathways Forward

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Electric Company Participants

- American Electric Power
- Arizona Public Service
- Dominion Energy
- Duke Energy
- Florida Power & Light
- Southern Company
- Xcel Energy

Corporate Customer Participants

- Cargill
- Google
- ITW
- Marriott
- Microsoft
- Walmart

World Resources Institute (WRI)

WRI is a global research organization that works with governments, businesses, multilateral institutions, and civil society groups to develop practical solutions that improve people's lives and ensure nature can thrive. WRI's Energy Program works with large energy buyers, utilities, policymakers, development institutions and urban leaders worldwide to accelerate the transition to clean, affordable energy.

Executive Summary

Until recently, most corporate customers with renewable energy goals as part of their climate strategies have executed on these goals by purchasing enough renewable energy to match a percentage or all of their electricity needs on an annual basis. Some customers who have achieved or are on track to meet their goals on an annual basis have sought to go further by more closely matching their purchases of carbon-free energy (CFE) with their hourly energy use to help support the reduction of carbon emissions across the energy grid.

In the first half of 2022, the Institute for Electric Innovation (IEI) and the World Resources Institute (WRI) convened a series of workshops with a select group of six corporate customers (selected to represent a range of industries and perspectives) and seven regulated electric utilities (hereafter referred to as electric companies) to explore how to scale 24/7 CFE offerings by electric companies, beyond the one-on-one transactions seen to date. The objective of the workshops was to develop a better understanding of the following:

- Customer demand for hourly 100 percent CFE solutions and the extent of hourly matching required in the near term.
- Attributes of these solutions that matter most to customers including the role of cost, new versus existing resources, preferred technologies, and demand-side solutions.
- Key challenges associated with scaling CFE solutions to a wider set of customers, given that offerings to date typically have been designed for individual large customers.
- Possible designs of CFE offerings that electric companies could provide to customers based on the resources available in their regions and the availability of technology.
- Data needed to design, evaluate, implement, and verify hourly CFE solutions.

At the end of the dialogues, IEI and WRI conducted a brief questionnaire with the small group of participating corporate customers. Some of these customers have established goals to match their electricity demand with CFE every hour of the day (i.e., 24/7 CFE goals) while others have not. The purpose of the questionnaire was to gauge which attributes of 100 percent CFE solutions were most important to participating corporate customers.

Based on the dialogues and customer responses to the questions, customers expressed interest in moving toward hourly matching of their electricity consumption with CFE, but cost was raised as the most significant concern for customers, followed by the ability of the CFE offering to cost effectively meet the corporate customer's goals, and ease of participating in the CFE offering. Factors such as the types of CFE resources in the offering, the ability of the offering to transition the grid to net-zero emissions more rapidly, and whether the offering is incremental to an electric company's existing plans for reducing carbon emissions were of interest but deemed less important to customers. Customers also indicated interest in the evolution of CFE offerings and in offerings that increased annual matching over time.

When asked to make specific trade-offs:

- Customers preferred a CFE solution that matched a lower percentage of hours at no premium over a solution that matched a much higher percentage of hours at a cost premium.
- Customers strongly preferred a CFE solution that matched a higher percentage of hours by using all existing carbon-free grid resources over a CFE solution that matched a much lower percentage of hours by using only new grid resources.
- Customers also preferred approaches that result in increasing the amount of carbon-free energy generation on the grid.

Based on the dialogues, electric companies are starting to develop hourly CFE solutions to offer to corporate customers. One type of offering for commercial customers is a product through which a customer can subscribe to a specific number of blocks of CFE during specific hours. This subscription offering has its roots in existing green tariff programs (such as Florida Power & Light Company's SolarTogether program), but it is different in that specific hours are matched with a mix of CFE sources. While tailored CFE solutions have already been provided to specific customers in some regions to date, a key objective of these dialogues was to identify scalable CFE solutions that could be provided by electric companies. Corporate customers prefer solutions that meet the needs of multiple customers over tailored solutions in part because established subscription offerings increase the options available to a broader set of customers and increase the ease of participation.

To implement 24/7 CFE solutions, corporate customers are keenly interested in specific customer and grid data that will help them manage their energy usage and carbon emissions.

- At minimum, corporate customers want easy access to their real-time hourly load data.
- Customers also want to understand the grid resource mix hourly and the associated carbon emissions.
- Corporate customers want access to annual forecasts of the energy mix by electric companies since many electric companies have made commitments to reduce carbon emissions by specific dates.

Differentiated CFE solutions are not "new" and build on existing green tariff and green pricing programs that have been offered for more than two decades. However, matching CFE solutions to hourly energy usage is complex and developing solutions is challenging. Having the regulatory flexibility to offer and experiment with these solutions is critical to meeting the needs of corporate customers.

This issue brief provides more details on the discussion from the electric company and corporate customer dialogues in the following areas:

- Elements of designing 24/7 CFE products.
- Customer preferences for CFE solutions and design considerations.
- Illustrative 100 percent CFE solution with hourly matching.
- Data needs for implementing 24/7 CFE solutions.
- Regulatory considerations.

About the Institute for Electric Innovation

The Institute for Electric Innovation focuses on advancing the adoption and application of new technologies that will strengthen and transform the energy grid. IEI's members are the investor-owned electric companies that represent about 70 percent of the U.S. electric power industry. The membership is committed to an affordable, reliable, secure, and clean energy future.

IEI promotes the sharing of information, ideas, and experiences among regulators, policymakers, technology companies, thought leaders, and the electric power industry. IEI also identifies policies that support the business case for the adoption of cost-effective technologies.

IEI is governed by a Management Committee of electric industry Chief Executive Officers. In addition, IEI has a select group of technology companies on its Technology Partner Roundtable.

About the Edison Foundation

The Edison Foundation is a 501(c)(3) charitable organization dedicated to bringing the benefits of electricity to families, businesses, and industries worldwide. Furthering Thomas Alva Edison's spirit of invention, the Foundation works to encourage a greater understanding of the production, delivery, and use of electric power to foster economic progress; to ensure a safe and clean environment; and to improve the quality of life for all people. The Edison Foundation provides knowledge, insight, and leadership to achieve its goals through research, conferences, grants, and other outreach activities.

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