



*The Edison Foundation*

INSTITUTE for  
ELECTRIC INNOVATION

## Issue Brief

# 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.

## Introduction

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.

Customer interest in solutions to match electricity demand with CFE on an hourly basis—24/7 CFE solutions—has grown in recent years, but the market for 24/7 CFE solutions is still nascent. To date, purchases of CFE to cover a percentage of hourly load by corporate customers have involved transactions between an individual customer and an electric company or an electricity supplier (see [WRI report](#) for examples). However, to scale these solutions to a wider segment of the market, broader electric company solutions that are available to customers are needed.

While a few large corporate customers have announced specific 24/7 CFE goals and are actively pursuing them today, other customers are exploring 24/7 CFE on a longer timeline. Many customers are just beginning to consider the relevance of 24/7 CFE to their sustainability goals. Some customers are interested in having wider availability of 24/7 CFE offerings before setting specific goals for hourly matching.

Because of increased interest in 24/7 CFE solutions, the Institute for Electric Innovation (IEI) and the World Resources Institute (WRI) initiated a project to explore potential new electric company solutions for supplying 24/7 CFE to a broader group of customers and to better understand corporate customer needs and preferences. In the first half of 2022, IEI and WRI convened a series of four 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 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.
- The attributes of CFE solutions that matter most to customers including the role of cost, new versus existing resources, preferred technologies, demand-side solutions, and other factors.
- 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 solutions.

IEI and WRI also issued a questionnaire to participating customers and electric companies to better understand their preferences for offerings, tradeoffs, and challenges in developing solutions. The workshops and questionnaire revealed that corporate customers have a variety of needs when considering 24/7 CFE. Price of the product, timeline of emission reduction goals,

availability of specific carbon-free resources, and the availability of data are all important factors for corporate customers. This paper provides a more detailed discussion of the input from both large customers and electric companies on how electric companies could offer and scale 24/7 CFE solutions to a broader set of corporate customers based on the workshops and responses to the questionnaire.

## **Elements of Designing 24/7 CFE Products**

The process of designing 24/7 CFE products requires consideration of the availability of CFE resources in the resource portfolio mix, the percentage of hours that need to be covered by CFE resources; the correlation of customer load to CFE resources, and the additionality requirements of the subscribing customers. The participants of the workshops explored these issues and provided feedback on what is most valuable to each of them when deciding between a menu of products. Supply-side options, demand-side options, and joint-ownership options are all relevant to the design of 24/7 CFE solutions and also were discussed.

### ***Supply mix for 24/7 CFE solutions.***

24/7 CFE solutions offer a CFE supply mix that matches customer electricity load on an hourly basis. This can be done through offering a portfolio of resources that can generate at different hours of the day, or incorporating storage with CFE sources, such as wind and solar, to dispatch their output to meet customer loads. Transactions to date in the marketplace have often included a blend of wind, solar, storage, and small-scale hydropower. Cost-effective generation mixes vary regionally.

For example, in November 2021 [Microsoft](#) announced a 15-year agreement with AES to purchase 576 megawatts (MW) of around-the-clock carbon-free energy for its Virginia data centers from a mix of wind, solar, and battery storage. [Google announced](#) a similar deal earlier in 2021 under a 10-year agreement with AES for more than 500 MW of CFE from wind, solar, hydro, and batteries to match 90 percent of hourly usage at three of its Virginia data centers.

Customers also expressed willingness to have the amount of hourly matching increase over time in a product offering. Customers expressed willingness to incorporate existing CFE generation currently operating on the energy grid in 24/7 offerings. Ultimately, however, customers want to drive clean energy that is above and beyond what is already being built. For some customers, it is not just about meeting goals, but also ensuring the grid mix becomes cleaner for all customers. Customers also recognize the need to rely on existing energy grid infrastructure and all existing CFE resources, but they noted the importance of bringing in a broad set of technologies and resources including new technologies.

The concept of additionality is evolving with the shift toward more CFE in the overall grid mix as electric companies and states meet their CFE goals and it could increasingly include a broader set of resources that move the grid toward more CFE (e.g., repowering/relicensing a CFE facility or new technology to enable the shift to CFE). Customers are interested in supporting incremental improvements above the CFE already being planned for the energy grid mix and they are very interested in understanding what that future generation portfolio might look like.

For example, if an electric company is at 75 percent CFE, customers are interested in additional cost-effective CFE beyond the 75 percent. Incrementally increasing hourly matching is likely to have an impact on efforts to reduce carbon emissions across the energy grid more quickly overall, particularly if it helps drive new dispatchable CFE generation sources and improves CFE integration.

### ***New technologies and sharing arrangements***

In general, there was interest on the part of corporate customers and electric companies in exploring opportunities for incorporating new CFE technologies into products as well as considering shared solutions, such as operating storage to serve 24/7 CFE solutions and provide other grid services. Clean dispatchable technologies are needed to fill the gaps and while economics matter, some customers indicated that they might be willing to pay a premium for some CFE technologies that are higher cost but advance efforts toward achieving 100 percent CFE. Electric companies noted that quick-start resources are becoming more important as their generation mixes meet technological and regional limitations. Resource availability varies by region and there was no consensus on specific new technologies of interest on the part of customers and electric companies. There was recognition that there may be more need to incorporate new technologies, such as dispatchable CFE technologies or new forms of storage in energy grids approaching 100 percent CFE.

In some CFE transactions to date, grid-scale storage has been shared by electric companies and customers to meet customer 24/7 CFE goals and to meet peak demand in certain hours of the day. For example, NV Energy and Google partnered on a solar and storage solution that provides 350 MW of solar energy and 280 MW of battery energy storage to supply CFE to the data center for a minimum of 70 percent of the hours annually. The agreement included a capacity-sharing mechanism in which the cost of the battery resources is shared between NV Energy and Google. In return, NV Energy can dispatch the battery power as a system resource for all customers during peak summer evening hours. There is general openness to mutually beneficial sharing of assets to meet customer and electric company goals to shift toward a cleaner grid. As another example, Georgia Power, a subsidiary of workshop participant Southern Company, described a proposed 24/7 product that would offer blocks of hourly energy from solar and storage and enable the electric company to take advantage of the benefits of the storage assets as well.

### ***Offerings for multiple customers with different load profiles.***

One of the challenges in scaling 24/7 CFE products is designing solutions for multiple customers that have different hourly load profiles, rather than serving an individual customer with a specific load. Further, some customer load profiles may be more challenging or expensive to serve than others, depending on the alignment with CFE generation.

One idea that was raised was to develop products for certain types of customers with similar load profiles (e.g., a product for customers with retail stores). However, there were concerns about gaining regulatory approval and the difficulty in developing multiple product offerings. In general, there was interest in broader product offerings to multiple types of customers even if

they have different loads. There was also strong interest in developing “off-the-shelf “solutions to enable a broader set of customers to participate.

### ***Management of demand-side resources***

Customers and electric companies agree that demand-side resources are an important component of the portfolio. Customers are interested in the ability to make their loads more flexible to align with contracted CFE supply, though it should be noted that many corporate customers are already very efficient and participate in demand response programs. Also, customers have different limitations on their ability to control demand, depending on their business and operational needs. For example, hotels and retailers have different ability to shift demand, different business margins to afford premium solutions, and different requirements to meet the needs of their customers relative to a data center operator. Therefore, incorporating demand-side solutions for multiple customers in a single offering may pose implementation challenges. Some customers expressed interest in controlling the demand side themselves. Managing their load on an hourly basis is a sophisticated undertaking and customers would likely need hourly energy-use data to understand times that are preferable to use energy.

Electric companies noted that demand-side resources will become critical for reducing the variability of customer loads and increasing grid flexibility. The capability to dial up and back demand-side resources will be important to increase CFE capacity utilization. The share of non-firm CFE supply is growing so demand-side resources are critical to increase the flexibility of the energy grid and utilize carbon-free resources more effectively.

Both customers and electric companies recognize the importance of demand-side resources and some type of partnership between electric companies and corporate customers is likely needed for effective management of demand-side resources.

### ***Verification of hourly matching***

Customers generally want verification of their CFE purchases to support any public claims and reporting related to their clean energy investments and the impact on carbon emissions. With hourly matching, customers need additional verification beyond what is typically provided for annual CFE purchases. Historically, for green tariffs or other renewable energy products, electric companies retired renewable energy certificates (RECs) equivalent to the amount of renewable generation supplied to the customer annually, typically using REC tracking systems. Verification of 24/7 CFE products would require data to verify customer hourly loads and the hourly operation of the generation mix. Hourly CFE certificates, often referred to as time-based energy attribute certificates (T-EACS), are being developed in some regions and could be used in the future to verify CFE products, but they are not widely available today.

Another issue is who would provide the verification of an hourly CFE matching product. Verification could be provided through either the electric company or a third-party provider in the form of an attestation based on data to support hourly matching. There was openness to having either electric companies or third parties provide verification of hourly matching. Customers are primarily interested in having some form of verification of the hourly matching to support their



claims. It is likely that there will be a cost for hourly verification and the value of hourly verification, and the approach, should be considered against the benefits.

## **Customer Preferences for CFE Solutions and Design Considerations**

At the conclusion of the dialogues, IEI and WRI conducted a brief questionnaire with the small group of participating corporate customers.<sup>1</sup> Some of these customers have established 24/7 CFE goals, while others do not have goals. 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 questionnaire, some customers expressed interest in moving toward hourly matching of their electricity consumption with CFE, but the cost of participating was raised as the most significant concern for other customers, followed by the ability of the CFE offering to cost effectively meet the corporate customer's goals, and the 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 24/7 more rapidly, and whether the offering is incremental to an electric company's existing plans for reducing carbon emissions were of interest but less important to customers. However, for the customers in the workshop that have industry-leading 24/7 hourly matching goals, the ability of the offering to move the grid to 24/7 CFE more rapidly was more important than for customers that didn't have those goals.

Customers also indicated interest in CFE offerings that increase annual matching over time. For customers participating in the workshops, robust third-party verification of hourly matching was one of the least important elements. This makes sense since these types of offerings are just getting started in the market.

When asked to make specific trade-offs:

- Customers preferred a CFE solution that matched a lower percentage of hours at today's cost over a solution that matched a much higher percentage of hours at a cost premium.
- Customers also strongly preferred a CFE solution that used all existing CFE grid resources that matched a higher percentage of hours over a solution using only new grid resources that matched a much lower percentage of hours.

These tradeoff questions demonstrate that customer respondents are extremely sensitive to costs and that they understand that utilizing all available CFE resources may help retain those CFE resources on the grid and can help them meet their carbon reduction goals.

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<sup>1</sup> Workshop participants that provided responses to the questionnaire number less than 10 and are not statistically or fully representative of the entire customer population.

## ***Design considerations***

Regarding subscriptions to or participation in CFE programs offered by electric companies, customers voiced concerns about restrictive qualifying criteria such as eligibility being dependent on a specific amount of load, new versus existing loads, load shape, and the length of a subscription. Briefly, customers value flexibility and want flexible terms for participation in CFE programs. When designing CFE programs, gathering customer input is a critical step to ensuring the program's success. Florida Power & Light's SolarTogether program (though not a 24/7 CFE program, per se) is an excellent example of a program that incorporated corporate customer input into its design process. As a result, the program includes many features that make it flexible for customers (e.g., no long-term contract and the ability to subscribe to different percentages of load).

From an electric company perspective, when designing CFE programs, alignment on subscription length and terms is necessary to balance the risks inherent in long-term ownership of new resources. In addition, program terms and viability to meet customer demand will vary by electric company based on where they are in meeting their own CFE goals.

In addition to supply-side CFE resources, customers also are interested in the ability to make their loads more flexible during certain times of the day and noted that dialing up or back demand-side resources will become critical to reducing load volatility and in utilizing CFE resources more effectively. Related to this is the availability of supply- and demand-side data on a real- (or near real-) time basis and visibility into the associated carbon content of delivered electricity on an hourly basis. This type of data is becoming increasingly important to customers.

## **Illustrative 100 Percent CFE Solutions with Hourly Matching**

Today, electric companies are in the initial stages of developing 100 percent CFE solutions on an hourly basis. One example is an Around the Clock (ATC) CFE subscription program that Georgia Power Company filed in its 2022 integrated resource plan (IRP). In total, the IRP includes a request to procure 2,100 MW of new CFE resources to supply a variety of subscription offerings to customers. The ATC program would include up to 650 MW of solar resources paired with appropriately sized battery energy storage systems designed to offer a subscription up to a 100-MW block of CFE. Customers that subscribe to the ATC program could receive CFE for 75 to 90 percent of all hours in the year, but pricing has not yet been announced, as of November 2022. As proposed, existing or new commercial and industrial (C&I) customers with a minimum annual peak demand of 25 MW will be eligible to subscribe.

The program design and supporting tariff details have yet to be filed with the Georgia Public Service Commission, but the initial plan is for subscription levels (in MW) to be fixed for the term of the agreement and for a minimum contract length to be required. Program charges will include a fixed program cost per kilowatt-hour (kWh). In return, customers will receive an hourly credit per kWh for the value of the energy to the grid and a capacity credit for the value of the battery to the grid. RECs will be retired on behalf of customer.

A unique element of Georgia Power's ATC program is the option for customers to subscribe to a fixed or optimal dispatch schedule related to the battery energy storage systems. A fixed schedule means dispatching the battery on a set schedule each day. An optimal schedule means using the battery resource for both customer and system needs (e.g., dispatch the battery resource from 7 to 10 p.m. for customer needs and reserve one hour of dispatch for system needs the following morning when load is increasing).

The ATC program is just one example of what a CFE solution that provides a high percentage of hourly matching might look like and it includes many design elements that we expect other electric companies to incorporate as they design tariff-based, regulated offerings for corporate customers.

## **Data Needs for Implementing 24/7 CFE Solutions**

Data availability and standardization is one of the most important considerations for corporate customers looking to better understand whether they can advance their 24/7 CFE goals. The workshop focused on data needs and addressed what is most important to customers, what concerns customers had about current data availability, and the complications that electric companies encounter when improving data access. In general, customers want access to granular, high-quality, standardized, secure, near real-time load and generation mix data to be able to accelerate carbon emissions reductions.

24/7 CFE solutions might entail procurement of new energy resources and/or demand shifting to minimize the load. Either way, corporate customers need access to accurate, hourly load data so they can model potential scenarios and costs.

Workshop participants identified several key types of data needed for 24/7 CFE solutions:

- Customers' current and projected hourly electricity consumption and load.
- Current and projected hourly CFE generated in the electric company resource mix and the associated carbon emissions profile of the delivered electricity.
- Data on the hourly generation mix and carbon emissions profile of a specific 24/7 CFE product delivered to customers to meet their demand.

### ***Hourly customer consumption data***

Data access and quality are key components of developing 24/7 CFE solutions. Customers can easily track their annual electricity consumption through the data that is typically included on their billing statements. Electric companies collect consumption data at the hourly level, and often in even shorter time intervals, but often do not provide that level of granularity to customers. For customers to make informed decisions about transitioning to 24/7 CFE, they need access to their hourly consumption data. During the workshops, participants noted that advanced metering infrastructure (AMI) is an important enabler of providing hourly data and,

although AMI is not in place in every electric company service area, it already is available to 78 percent of customers in the United States.<sup>2</sup>

Because most large energy customers have many electricity meters, the volume of hourly data poses challenges with respect to the effort involved in accessing and managing the data. There are costs associated with collecting, aggregating, and processing meter level data, and computing hourly consumption. Customers and electric companies may each want to play a role in accessing and managing the data to implement 24/7 CFE solutions. In some cases, electric companies already make this data available to corporate customers, sometimes at a fee. Electric companies noted that some regulatory commissions want customers to pay for access to more detailed hourly load data. Implementation of automated solutions can reduce the costs of providing this type of information.

Given that 24/7 CFE solutions may be provided over multiple years into the future, projections of customer consumption data also may be needed. Customers are best positioned to understand how their hourly loads may change in future years and they would need to play an active role in predicting their future hourly electricity loads when considering multi-year hourly CFE solutions.

### ***Hourly CFE delivered to customers***

For CFE solutions that offer hourly matching, the electric company or supplier would need to determine the hourly generation profile of the CFE supply mix delivered to the customer over the duration of the product offering. Alternatively, an electric company could offer CFE in hourly increments and let customers determine how much hourly CFE they need to purchase at different times to match their consumption. In products offered to date, electricity suppliers, such as AES, determine the hourly generation of the 24/7 CFE product in future years by modeling the output of the generation sources (e.g., wind, solar, storage, hydro) to estimate hourly generation profiles of resources that can vary daily, seasonally, and annually.

### ***Hourly energy grid data***

Customers are interested in the total CFE generated and delivered to all customers in the electric company service area (or balancing area) on an hourly basis in the current year and in future years. This type of data, at minimum, would help customers understand the hourly carbon embedded in their current consumption, provide input into decisions about managing future consumption, and help customers make decisions about subscribing to additional CFE resources. A small number of customers with industry-leading goals also expressed an interest in access to data to make marginal decisions on their operations (e.g., hourly, day-ahead data for making energy management decisions).

However, in many areas, there is a lack of data on the hourly delivered electricity mix (or long lags in data availability). Also, there is a lack of transparency and standardization in

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<sup>2</sup> Institute for Electric Innovation. Smart Meters at a Glance. April 2022.  
[https://www.edisonfoundation.net/-/media/Files/IEI/publications/IEI-Smart-Meters-Infographic\\_2022.pdf](https://www.edisonfoundation.net/-/media/Files/IEI/publications/IEI-Smart-Meters-Infographic_2022.pdf)

methodologies for assessing how to assign and account for CFE that may be sold to other electric companies or sold to buyers through direct contracts.

An electric company in a vertically integrated market that offers real-time pricing to corporate customers may be able to provide data on hourly electricity delivered by source and the associated carbon emissions more easily. For companies in regional transmission organizations (RTOs), data availability is different and depends on specific locations of the customer's facilities.

Today, electric companies report annual, but not hourly, carbon emissions intensity rates accounting for RECs of delivered electricity to the Edison Electric Institute (EEI). Corporate customers and other stakeholders can utilize EEI's annual carbon emissions database to access the annual resource mix and annual carbon emissions intensity rates for delivered electricity by operating company by state.<sup>3</sup> However, reporting is voluntary and reporting methods vary.

A final key piece of data is a forecast of the future energy mix including CFE resources for electricity delivered to customers. Projecting carbon emissions profiles of electricity to be delivered in the future is a difficult undertaking due to the uncertainty in future procurement of resources, the operation of the fleet, and the need to consider multiple scenarios of the future generation mix. However, despite this uncertainty, it is important for electric companies to consider providing some type of forecast of the future generation mix (perhaps 2-5 years) and the associated carbon profile to customers on an hourly basis.

As hourly tracking of the energy mix of delivered electricity and the associated carbon profile becomes more mainstream, there is a need to develop a standard set of tools, definitions, technical specifications, and methodologies so that tracking and reporting is consistent.

## **Regulatory Considerations**

As more customers are focused on reducing their carbon footprints and seeking CFE solutions, U.S. electric companies have offered such solutions to their customers via green tariffs or custom deals.

Most green tariff programs require a lengthy regulatory process to gain approval and, once approved, the number of MW available in these programs typically does not meet all customer demand for clean energy. Some corporate customers in the workshops also expressed concern that the terms and conditions of some green tariffs were not attractive to corporate customers.

To accelerate regulatory approval and provide more CFE options to customers, it may make sense to streamline the process by identifying a set of minimum criteria that a CFE offering should satisfy and a stakeholder review process. Criteria could include the terms of the subscription or offering, types of data that should be available, as well as consumer protection. Once the criteria are either approved by state regulatory commissions or incorporated into a

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<sup>3</sup> See Edison Electric Institute. Electric Company Carbon Emissions and Electricity Mix Database. June 2022. <https://www.eei.org/issues-and-policy/national-corporate-customers/co2-emission>

policy statement that provides clear guidance for electric companies, then CFE offerings that satisfy the criteria, and are responsive to stakeholder input and review, can be offered to customers more rapidly.

Developing and agreeing to a set of criteria and a stakeholder engagement process at the outset rather than making different determinations when evaluating individual CFE program filings, per se, could serve a few purposes:

- It could reduce the time required to get regulatory approval for CFE offerings.
- It could enable companies to more easily design products to meet regulator expectations and customer demand.
- It could allow electric companies to design more flexible offerings.

Regulators can also support electric company investments in software solutions that have the ability to provide customers with access to their energy usage, the system resource mix, and the associated carbon emissions on an hourly basis. This would help speed the implementation of 24/7 CFE solutions.

As corporate customer demand for CFE offerings continues to grow and the “attributes” and needs of these offerings change, it is critical for regulators to understand customers’ needs and to allow electric companies the flexibility to offer CFE solutions that can meet the goals of corporate customers in a timelier fashion.

## **Summary and Conclusions**

While markets for 24/7 CFE purchasing are still nascent, the number of transactions and supply side offerings are growing. New solutions are needed to meet growing customer demand for CFE options.

Providing 24/7 CFE solutions represents an opportunity for electric companies, that can develop offerings to meet corporate customer 24/7 CFE goals while helping to meet their own goals for grid reliability and for accelerating the transition to CFE. Shared storage solutions are one such possibility that may help increase grid reliability while enabling more CFE. Inclusion of new dispatchable clean energy technologies is another opportunity that could benefit both customers and electric companies. There is substantial opportunity for innovation and to expand the types of CFE offerings to meet corporate customer needs.

A near-term need to enable 24/7 CFE solutions is to increase customer access to hourly electricity consumption and supply mix data. Customers need improved data access to implement 24/7 CFE solutions and to understand how their hourly electricity consumption compares to the CFE they are purchasing. For electric companies, provision of this data can also be beneficial in that it can support the expansion of other types of customer-facing programs, such as demand response programs and dynamic rates, that can enhance grid flexibility. Solutions to automate and to increase the transparency and frequency of access to hourly load and generation mix data for 24/7 CFE solutions also can help electric companies develop other customer-facing programs that can provide both grid and customer benefits.

While differentiated customer CFE solutions are not “new” and build on existing green tariff and green pricing programs that have been offered for decades, matching CFE to hourly energy usage is more complex. Having regulatory expectations explained early and the regulatory flexibility to offer and experiment with these solutions is critical to meeting the needs of corporate customers.

## 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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