UNDERSTANDING

24/7 CFE

MARKET NEEDS AND THE ROLE OF THE RENEWABLE ENERGY DEVELOPER

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SCOUT CLEAN ENERGY

WHAT EXACTLY IS 24/7 CARBON-FREE ENERGY (CFE)?

It's 12:04 PM Mountain Time. I am sitting at my computer in Steamboat Springs, Colorado. Electricity is powering my computer to write this white paper. That electricity is being generated from some power plant, probably coal from nearby towns Hayden or Craig, maybe natural gas, maybe solar, maybe wind. I need electricity generated now, or stored and discharged now, to continuing typing. I need electricity generated and connected to the Yampa Valley Electric Association's distribution lines to finish this sentence.

We need electricity generated at the same time is it consumed (time-matched). We need generation added to the grid in which it is consumed (local procurement). We need non-emitting generation (carbon-free). We need these components to meet increasingly bold corporate sustainability goals and the United States' goal of net-zero emissions by 2050. We need these components to keep our planet an amazing place to live.

All of these needs lead us to 24/7 carbon-free energy (CFE). Utilities and balancing authorities, who ensure system demand and supply are always balanced, have been living with the idea of time-matched and local electricity for their existence. They are balancing generation with load to ensure electricity is available at every minute it is needed. This idea of 24/7 CFE is focused on carbon-free energy and on the growing corporate and other organizational goals to meet GHG emissions reductions targets, primarily focused on Scope 2 emissions reductions.[1] Even the federal government, the nation's largest energy consumer, seeks to transition to 100% CFE by 2030, with half of that supply meeting local 24/7 CFE goals.

LET'S BREAK IT DOWN.

24/7

means that the hourly electricity consumption is matched with hourly generation 24 hours a day, 7 days a week.

CARBON-FREE ENERGY

means that the generation is inclusive of technologies that do not directly emit carbon dioxide: solar, wind, battery storage, hydro electric, geothermal and others.

In addition, many organizations also include these items in the 24/7 CFE umbrella:[2]

LOCAL[3]

The generation is located on the same local/regional grid where electricity consumption occurs. For many, this goes beyond the current market boundaries assumed for renewable electricity procurement to meet sustainability goals. In the United States, the same local/regional grid could be the same independent system operator (ISO) or regional transmission organization (RTO).

NEW

The generation must be a new carbon-free electricity facility versus an existing facility.

SYSTEM IMPACT

The generation should address the dirtiest hours of electricity consumption where the most fossil fuel is used for generation.

It's important to note that some organizations are considering a 24/7 CFE approach for their renewable energy goals while others are focused on locational system impact. Specifically, some organizations want to procure carbon-free energy from projects that are built in locations where the clean energy would replace the dirtiest generators on the grid. This has also been referred to as "emissionality." The idea is that if a clean energy project is built and operating, what generation would it be displacing? In New York state, 53% of the electricity generated is from nuclear, hydroelectric or other renewables. The levelized long-run marginal emission rates for New York were about 70 kg of CO_2e/MWh[4]. In comparison, 75% of Kentucky's electricity is generated from coal, resulting in a levelized long-run marginal emission rate for Kentucky of about 350 kg of CO_2e/MWh. The higher emissions rate means the carbon-free energy is displacing more carbon dioxide equivalent per MWh generated.

Who can meet this need? We can! Renewable energy developers, like Scout Clean Energy, can develop new renewable energy projects in locations across the United States where locational marginal emissions are highest.

2 The 24/7 Carbon-Free Energy Compact includes these items in its principles. 24/7 Carbon-Free Energy: Methods, Impact & Benefits (gocarbonfree247.com)

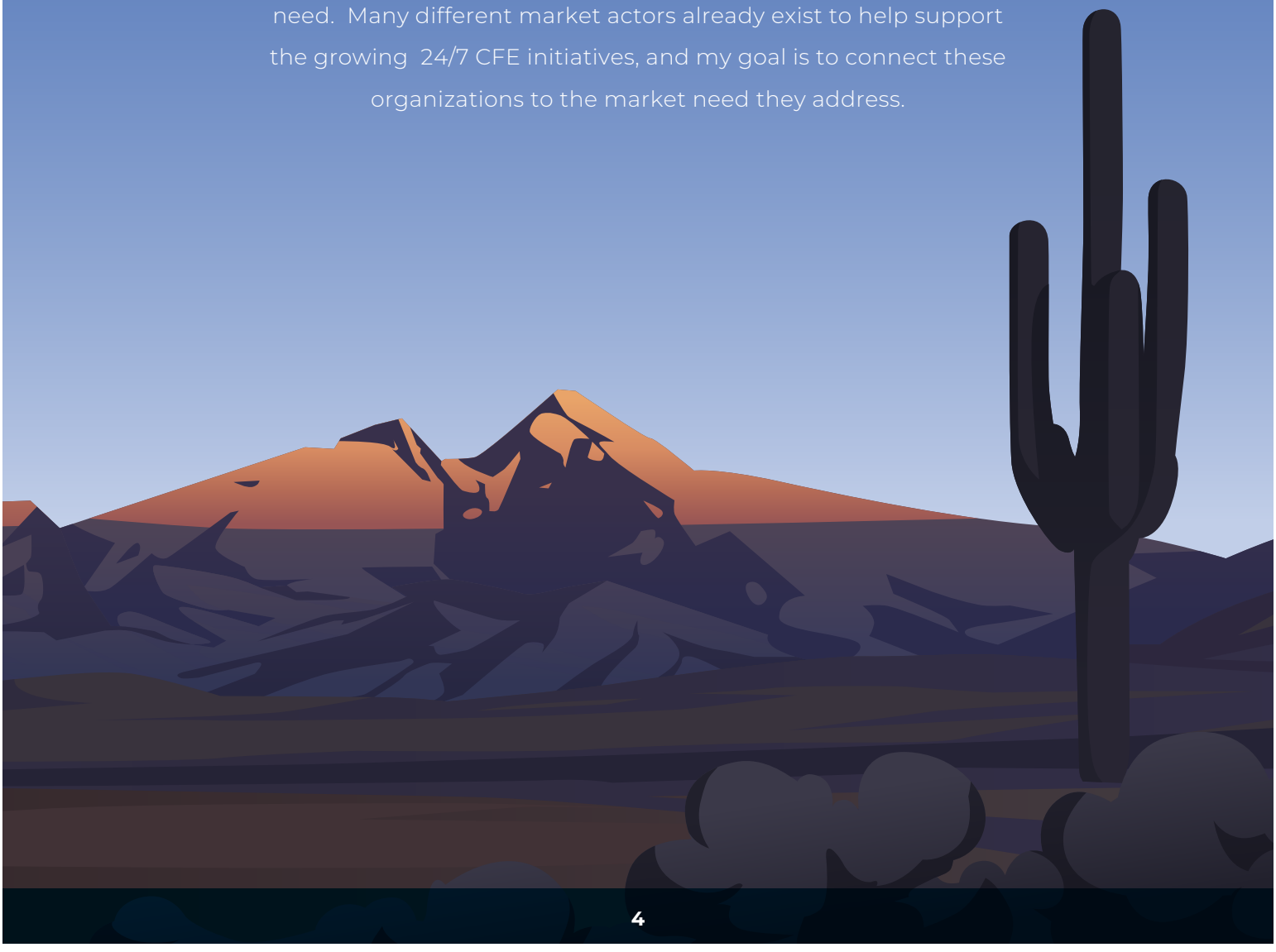
3 For example, RE 100 defines a single market between the United States and Canada and procuring renewables in any state or province can be used to account for Scope 2 emissions in any state or province.

4 Levelized Long-run Marginal Emission Rates (Annual); Unit: kg of CO_2e/MWh at the busbar

WHAT

DOES THE MARKET NEED TO SUPPORT 24/7 CFE INITIATIVES?

In my view, there are nine core market needs to make 24/7 CFE a broader reality for organizations with 24/7 CFE goals. I'm going to use a pretend organization called "**SustainaThrive**" throughout this section. SustainaThrive has 24/7 CFE goals and has many needs to meet those goals. I'll also share some ideas for who can meet each need. Many different market actors already exist to help support the growing 24/7 CFE initiatives, and my goal is to connect these organizations to the market need they address.



MARKET NEED NO. 1

CLEAR GUIDANCE TO ORGANIZATIONS

SustainaThrive needs a consistent set of guidance and standards that align with the protocol they follow and their organizations' goals.

WHO CAN MEET THIS NEED? Organizations follow the Greenhouse Gas Protocol to measure and manage emissions. More than 9 out of 10 Fortune 500 companies reporting to CDP use the GHG Protocol. The GHG Protocol is undergoing updates of its various guidance documents. A draft of the revised Scope 2 guidance is expected in 2025 and final Scope 2 guidance is expected in 2026. Many organizations then report their progress through the CDP, an organization that runs the global disclosure system for investors, companies, cities, states and regions to manage their environmental impact. Over 5,100 North American companies disclosed through CDP on climate change, forests and water security. Two hundred and ten North American cities, states, and regions disclosed environmental information through CDP. RE100, an initiative comprised of businesses committed to 100% renewable energy, also provides technical guidance to its members.

MARKET NEED NO. 2

HOURLY CONSUMPTION DATA

SustainaThrive needs to know how much electricity they consume and when they consume that electricity. SustainaThrive may be able to get this information through their utility or competitive power provider. In the United States, about 72% of total utility electric meters in the United States were smart meters (or advanced metering infrastructure, AMI) that track hourly consumption. If data through a smart meter is not available, facilities may have an energy management system (EMS) that tracks hourly consumption. Otherwise, organizations likely won't have access to their hourly consumption data. However, even for those that possess this data, it can be very challenging to access for all of their facilities, making this one of the most difficult pieces of the 24/7 CFE puzzle.

WHO CAN MEET THIS NEED? SustainaThrive will need to meet this need by compiling their hourly consumption data. Companies like Google are already integrating 24/7 CFE in their renewable energy procurement strategy and tracking their hourly consumption to do so. For other companies, as previously noted, this can be challenging. Some organizations (e.g., fast food restaurants, retail) have small facilities all over the world and compiling all their hourly consumption data at each facility is a huge undertaking. SustainaThrive will need to evaluate the obstacles it potentially faces collecting this data and navigate them accordingly.

MARKET NEED NO.3

CARBON-FREE ELECTRICITY GENERATION

Once SustainaThrive knows how much electricity they consume, they need to procure clean electricity from carbon-free technologies like wind, solar, and others. This means more carbon-free electricity development to meet this need. Developing all types of carbon-free energy will be important: solar, wind, hydro, geothermal, and others combined with energy storage will be critical. Data from the American Clean Power Association notes that the U.S. now generates 16% of its electricity from wind and solar. In 2023, nearly 20 GW of utility-scale solar was installed, 6.4 GW of land-based and offshore win d, and 8 GW of battery storage. A mix of technologies will be important to meet this market need, showing that continued support of wind in the U.S. is critical.

WHO CAN MEET THIS NEED? We can! Scout Clean Energy and other renewable energy developers will be crucial to meet this need. Scout is committed to developing its 19 GW pipeline of wind, solar, and storage to help support the demand for available renewable electricity at a variety of hours of the day.

MARKET NEED NO.4

TIME-BASED ENERGY ATTRIBUTE CERTIFICATES (T-EACs)

SustainaThrive also needs a time-based energy attribute certificate (EAC[6]), or time-based renewable energy certificate (REC) in the United States, to match their hourly consumption with hourly generation. The industry will need to move from monthly, quarterly, or annual tracking of EACs to hourly tracking of EACs. Currently, hourly EACs in the U.S. are still in their early stages or are available in select markets.

WHO CAN MEET THIS NEED? EnergyTag has developed granular certificate standards. PJM and M-RETS have or are working to offer hourly certificates for projects. LevelTen's GC Trading Alliance is working to develop a platform to trade and manage granular certificates. Powerledger's TraceX is a digital marketplace to efficiently handle the trading of EACs. The work of these organizations will allow SustainaThrive to match their hourly consumption with hourly RECs.

6 EACs is the broad term, these are known as renewable energy certificates (RECs) in the United States, guarantees of origin (GOs) in Europe, and i-RECs in other locations in the world.

MARKET NEED NO.5

LOCAL GENERATION

SustainaThrive wants to procure carbon-free energy in the same region as their consumption. For SustainaThrive, they have defined region at the RTO/ISO level. The idea of local generation is heavily tied to Market Need #2. Knowing where you consume electricity allows you to assess if the clean energy is generated in the same region. The idea of "local" or "same region" can have different definitions for different corporates or organizations and can be more regional than the guidance provided by RE100 or the GHG Protocol.

WHO CAN MEET THIS NEED? We can! Renewable energy developers, like Scout Clean Energy, can develop new renewable energy projects in locations across the United States to ensure broad geographic diversification of renewable generation. Renewable energy developers can also aim to develop projects in regions where loads are projected to increase, based on utility Integrated Resource Plans. As we also see load growth based on AI, data centers, and large manufacturing loads, developers can partner with these entities to provide generation to these new large loads. For example, SustainaThrive can work with Scout Clean Energy to procure renewable energy from our projects located in regions where they have consumption. If SustainaThrive has consumption in PJM, they could look to procure renewables from a project also located in PJM. Siting renewable energy generation in specific locations also comes with its challenges around permitting, land opportunities, interconnection, and resource availability.

MARKET NEED NO.6

TIME-BASED SYSTEM IMPACT

SustainaThrive needs to know the emissions impact from the renewable electricity they are procuring. This emissions impact varies based on the location of the renewable energy project and the time when the project was generating electricity.

WHO CAN MEET THIS NEED? Organizations like REsurety provide locational marginal emissions[7] data to help compare project siting and selection based on locational marginal emissions. NREL's Cambium Data Sets include long-run marginal emissions rates to help estimate emissionality. The Emissions First Partnership is a group of companies following principles that focus on maximizing GHG reduction impacts. WattTime provides data and technical assistance around timing, location, and emissions of electricity use.

7 Defined by Resurety as "a metric that measures the tons of carbon emissions displaced by 1 MWh of clean energy injected to the grid at a specific location and a specific point in time"

MARKET NEED NO.7

24/7 CFE CALCULATIONS AND TRACKING

Now that SustainaThrive has their hourly consumption data and hourly generation data, they need a way to track the data and assess their progress towards reaching 24/7 CFE goals. This includes calculating a 24/7 CFE score to track their alignment between consumption (corporates buying hourly EACs to fill a gap) and generation (renewable energy generators selling hourly EACs). SustainaThrive could decide to perform these calculations and tracking in-house or they could partner with an organization to manage their progress.

WHO CAN MEET THIS NEED? Google has shared their methodologies and metrics around 24/7 CFE. LevelTen's GC Trading Alliance is working to develop a platform to trade and manage granular certificates. Flexidao, Cleartrace, and Powerledger offer software solutions to manage a clean energy portfolio and report progress.

MARKET NEED NO.8

CFE MANAGER

Google termed the idea of a CFE manager. SustainaThrive may also partner with a 24/7 CFE manager to help coordinate Market Need #2-7. These organizations will partner with all necessary parties to provide the data, portfolio of CFE projects, contract structures, and tracking to meet 24/7 CFE goals.

WHO CAN MEET THIS NEED? Organizations like Silicon Valley Clean Energy, Gridmatic Retail, Constellation, NRG, and Shell Energy.

MARKET NEED NO.9

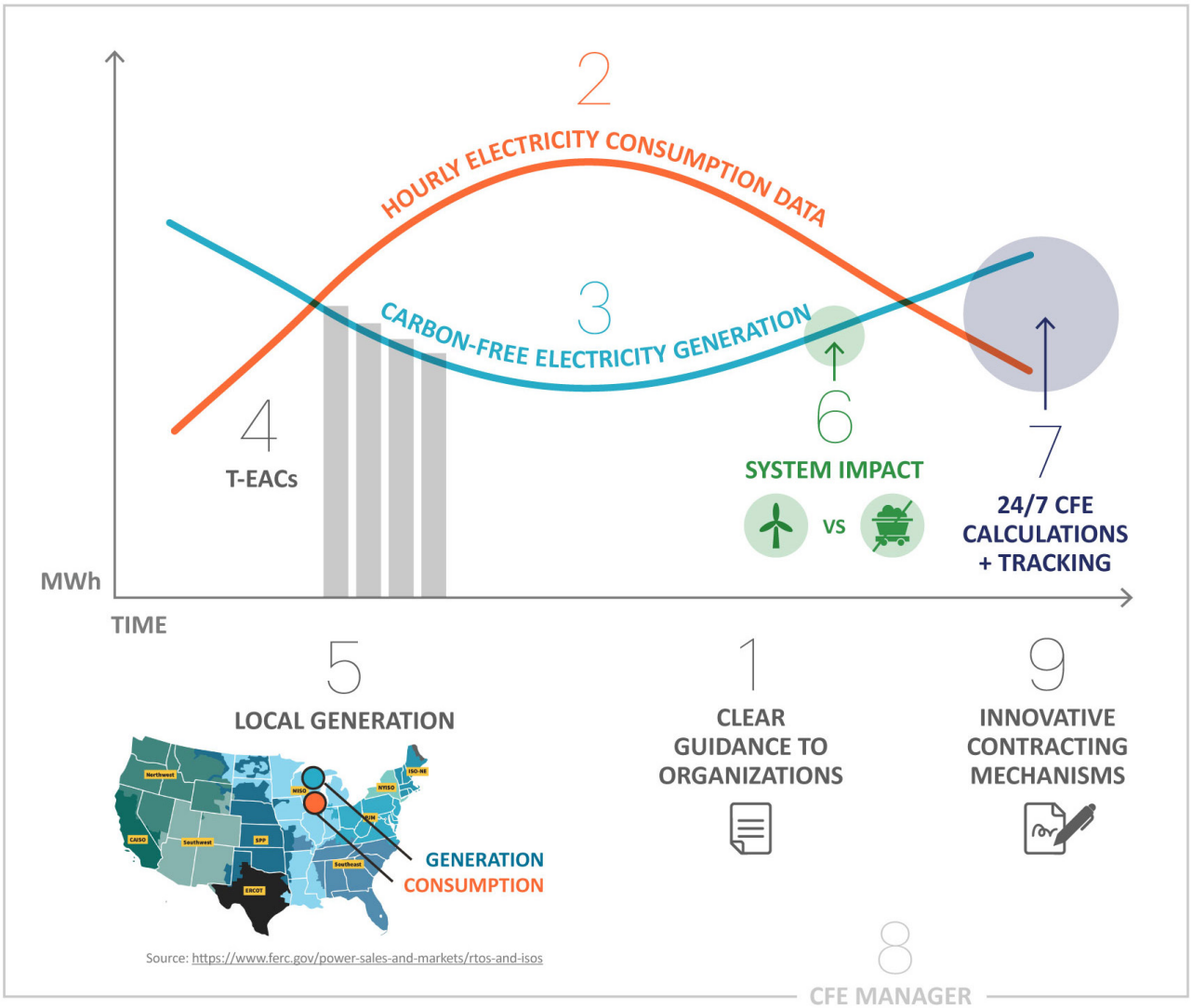
INNOVATIVE CONTRACTING MECHANISMS

SustainaThrive may also need innovative contracting mechanisms to meet its 24/7 CFE goals. An example of a small change is updating PPA terms to include language that specifies the use of T-EACs. An example of a larger change is the new idea of a 24/7 CFE Transition Tariff or a Clean Transition Tariff. This idea has been summarized by the Regulatory Assistance Project and has been proposed by NV Energy through a partnership with Google and Duke Energy. Clean Transition Tariffs have been created to push "clean firm capacity", termed by Google for technologies that can deliver clean power whenever it is needed or technologies that are otherwise not getting developed.

WHO CAN MEET THIS NEED? We can! Creative corporates and other end users, utilities, and developers working together on creative solutions can meet this need.

MARKET NEEDS

TO SUPPORT 24/7 CFE INITIATIVES



Source: https://www.ferc.gov/power-sales-and-markets/rtos-and-isos

SCOUT CLEAN ENERGY IS PROUD TO SUPPORT 24/7 CFE INITIATIVES

Scout Clean Energy showed our support for the GC Trading Alliance in June 2024 and the 24/7 Carbon-Free Energy Compact in July 2024. We want to be part of the 24/7 CFE solution. We want to get creative with the industry on tracking, structuring, and supplying clean electrons when and where they are needed.

It's now 12:45 PM MT. In my next 24/7 CFE update, I hope to report that here in my hometown of Steamboat Springs, Colorado, clean energy is powering my computer for most, if not all, of my working hours.

HOW WE CAN HELP

Scout Clean Energy is developing a pipeline of 19,000 MW of wind, solar, and storage projected across the United States aimed at providing diversified offtake options. We are excited for innovative partnerships to help make organizations' 24/7 CFE goals a reality. Those partnerships may be early-stage project development partnerships to develop and build projects tailored to a certain offtakers needs or co-creating innovative contracting mechanisms for our projects to help supply 24/7 CFE.

If you have a 24/7 CFE goal, let's connect!

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Please note: Our goal was to be as inclusive as possible in this article because that's what it takes to meet this challenge. Any omission of key market actors was unintended. The renewable energy and 24/7 CFE initiatives are fast moving markets. If you have an update to any of the material contained in this white paper, reach out! We'd love to hear from you.