24/7 carbon-free energy

As a business leader driving the transition to a carbon-free future, you have held yourself to a higher sustainability standard. Thanks to your efforts so far, your business has either met or is approaching your 100% renewable energy target. Yet, there is significant work still to be done. So, what's next?

A carbon-free future demands continued innovation and engagement by business leaders like you. Now, the next frontier in sustainability is here. The new leadership standard in building our climate future is 24/7 carbon-free energy. With 24/7 carbon-free energy you can power your business with a customized renewable energy portfolio that powers your facilities when and where you have load with 100% carbon-free energy—24 hours a day, 7 days a week.

How is 24/7 carbon-free energy better for your business and sustainability goals?

Reduces complexity and market risk so you can focus on what matters most to your business

24/7 carbon-free energy is a more effective, higher-impact electricity procurement model where you only procure the renewable energy that you need, matched on an hourly basis.

Establishes the new leading standard in sustainability that your stakeholders will expect

24/7 carbon-free energy gives your customers the confidence that when they choose to use your product or visit your office, their decision is supporting a clean energy future.

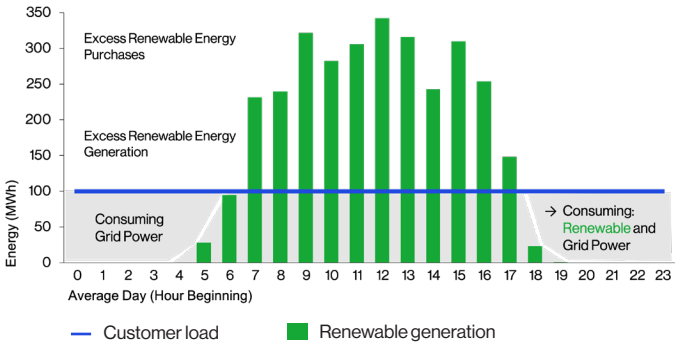
Improves the grid and our climate-future

What the grid needs is not simply to add more renewables, but to have a mechanism to deliver renewable generation at the right time and place – that's where 24/7 carbon-free energy comes in.

Why does the world need 24/7 carbon-free energy?

Today, hundreds of companies worldwide have committed to the admirable goal of procuring 100% of their electricity needs from renewable sources. This is typically achieved by purchasing enough renewable energy certificates (RECs) (either directly, through suppliers, or bundled with energy through a power purchase agreement) to cover their total electricity usage measured on an annual basis. RECs typically represent one megawatt-hour (MWh) of electricity generated from a renewable resource.

These annually matched goals play an important role in accelerating decarbonization and bringing new renewables onto the grid, but in order to achieve a truly 100% carbon-free grid, load and carbon-free generation must be matched on an hourly basis.



Consider the graph above for a hypothetical facility with a flat, around-the-clock load of 100-megawatts (MW) being supplied by a 346 MW solar farm. Over the course of the year, the solar farm will generate 876,000 RECs, which matches the 876,000 MWh consumed by the facility.

However, even though the facility procured enough renewable energy to meet 100% of its annual energy needs, only about 40% of the facility's actual hourly electricity needs are met with carbon-free energy.

This is because the load of the facility does not perfectly correlate to the solar generation profile. When the energy demands and load profile of the solar plant don't match, the solar facility is either over-generating (and the excess renewable energy is supplied to the grid) or under-generating (and the facility is utilizing power from the grid, including from carbon-based sources).

Why does 24/7 carbon-free energy matter?

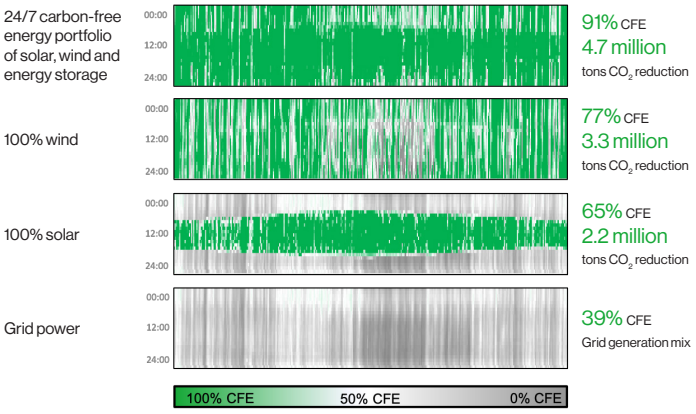
Procuring renewable energy on an hourly basis achieves two key objectives. First, it helps the grid operator manage a grid with increasing penetration of renewables by incentivizing the suitable types of renewable and storage assets to meet hourly load profiles.

In the absence of this, local grids would typically contract with non-renewable power plants to serve hours with less sun or wind generation and, to prevent grid instability, may need to physically prevent or curtail renewable energy from entering the grid.

Second, hourly matching can significantly increase the amount of carbon displaced by renewable generation because it tends to incentivize renewable generation in hours of the day that are typically served by non-renewable forms of generation.

100% renewable energy targets are beneficial, but 24/7 carbon-free energy is transformational.

Take a look at the difference toward a 100% carbon-free energy supply as we increasingly add different renewable technologies tailored to a customer's energy needs.



Assumptions: PJM grid. Flat 100 MW load profile. 100% solar portfolio is 346 MW and 100% wind portfolio is 246 MW. Carbon-free energy is hourly average and CO_2 reduction is cumulative over a 10-year period.

If a customer took no clean energy action of their own and relied solely on the available grid power to meet their energy needs, they would run on clean power about 39% of the time. Creating a 100% solar or wind portfolio increases the amount of time the customer is powered by clean energy, but it's an imperfect solution. Because solar is an intermittent resource and cannot produce power when the sun isn't shining, the 100% solar portfolio will still lead to consuming solar power 65% of the time and relying on the grid's carbon-based power for the remaining 35%. Wind is also an intermittent resource, so the 100% wind portfolio will have a similar outcome, running on clean power 77% of the time.

> When we combine renewable energy portfolio of wind, solar, and energy storage, we create a generation profile that results in 90+% time-matched carbon-free energy.

24/7 carbon-free energy can avoid materially more carbon emissions in the grid compared to single-technology renewable energy.

Google and AES partner on a first-of-its-kind 24/7 carbon-free energy solution.

In September 2020, Google announced its industry-leading goal to operate on 24/7 carbon-free energy by 2030. Google knew that matching its load during every hour of every day with carbon-free energy generated in the same hour would require new solutions, new technologies and a different type of partner. In April 2021, AES and Google partnered together to launch a first-of-its-kind 24/7 carbon-free energy solution, and AES will ensure Google's Virginia data centers will be 90% powered by carbon-free energy on an hourly basis.

Through the partnership, Google is getting time-matched carbon-free energy while also reducing market exposure and time spend on the energy procurement process.

This solution is not just better for Google; it's also better for the grid. Instead of adding an excess of solar energy to the grid during high solar-production times of the day, and pulling clean energy from the grid at night, AES has provided Google with a fixed-price, reliable solution that supports a more balanced grid by ensuring carbon-free power is delivered at the time and at the right place.

Through this partnership, AES and Google set a new standard for corporate sustainability and created a roadmap for other organizations to accelerate the transition to a 100% 24/7 carbon-free energy future.

To learn more about how 24/7 carbon-free energy can help meet your business goals and accelerate the future of energy, visit www.aes.com/247.