

How Construction Sites Can Utilize Clean Energy

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The 2022 Global Status Report for Building and Construction reports that the buildings and construction industry represents an estimated 37% of global operational energy and process-related carbon dioxide (CO₂) emissions.

As a construction business owner, it's important to recognize the growing need in the industry to reduce carbon emissions and minimize environmental impact. One of the most effective ways to achieve this goal is through integrating clean energy solutions at construction sites. Renewable energy plays an integral role in cost reduction, environmental protection, and creating a sustainable future.

In Wisconsin, renewable energy was used to support the construction of a 210,000-square-foot cheese production factory, powering job trailers, site lighting, engine block heaters, and power tools. How did this organization, a forward-thinking North American dairy leader, benefit from integrating clean energy into the construction process? What are the advantages of utilizing off-grid energy to power a construction jobsite?

ENERGY SOLUTIONS THAT MEET INDUSTRY ENERGY GOALS

The first step in implementing clean energy on a construction project is to understand the energy requirements through an energy assessment. Complex project jobsites like this require significant electrical power to support work being completed



by contractors and trade partners. A determining factor in the renewable energy use on this build was the organization's significant environmental, social, and governance (ESG) goals, including working toward a U.S. dairy industrywide goal to achieve net-zero emissions by 2050 or sooner.

DISTRIBUTED ENERGY RESOURCES

Understanding how much energy a jobsite requires to power the work that will take place over the lifetime of the construction project is critical to determining the best distributed energy resources (DERs) to use. Some common examples of DERs include solar, wind, battery storage, and generators. If the goal is to be as close to net-zero as possible, as was the case with this organization, finding a DER solution

that enables the achievement of that goal is paramount. Depending on the DERs used, the jobsite can be entirely off-grid or connected to the utility grid, used in tandem with utility power. For this project, the energy solutions were completely off-grid, which helped the customer meet their project deadlines due to the quick implementation of the resources.

USING A MICROGRID TO POWER A CONSTRUCTION SITE

Microgrids can combine the use of traditional power generation (e.g. fossil-fuel generators) and fully renewable power generation (e.g. solar). On this construction site, two microgrids were installed by a Wisconsin-based clean energy solutions provider that harvested 40 kilowatts (kW) of solar power paired with 176 kilowatt-hours (kWh) of battery storage. The system was backed up by a 35kW propane-fueled generator. The entire system operated off-grid and powered two jobsite trailers, temporary lighting for the wastewater treatment plant, and charging of power tools and engine block heaters to keep the construction vehicles operational throughout the frigid Wisconsin winter.

A microgrid, like the one used on this project, is similar to a small power plant because it produces renewable energy onsite. Traditional electricity sources for jobsites, such as connecting to the utility or solely using generators, lack the benefits that microgrid technology can provide.

Microgrids can:

- » Create an uninterruptible power supply.
- » Save money on overall energy costs.
- » Minimize greenhouse gas emissions into the environment.
- » Provide reliable and rapid access to power.
- » Offer real-time energy performance monitoring.

On this construction jobsite, utilizing microgrid technology prevented nearly 77,500 pounds of CO₂ from being released into the atmosphere. That is equal to the amount of carbon captured by about 43 acres of forests.

AHEAD OF SCHEDULE

While this client wanted the construction of its new facility to be as sustainable as possible to work toward its net-zero goals, there were other benefits to utilizing clean energy on this site as well. The jobsite could have been connected to

the traditional power grid with the use of a temporary power connection; however, a connection of that size was not readily available and would have delayed the project by at least six months. Instead, the microgrid units were rapidly deployed and installed in under two weeks, keeping the project on schedule. Another benefit of using renewable energy with battery storage to power this microgrid was that it was reliable and eliminated power outage concerns.

REAL-TIME MONITORING

The jobsite's microgrid was equipped with real-time monitoring software, enabling the construction manager to view the amount of available solar power and battery capacity via a remote monitoring system. This also allowed the clean energy solutions provider to remotely calibrate the system for optimal energy use when and where needed throughout the duration of the project.


Some of the key benefits of real-time microgrid power monitoring at a jobsite include:

- » **Remote monitoring and control** – Remote monitoring of your jobsite energy enables the ability to make adjustments and monitor usage from anywhere at any time.
- » **Real-time monitoring capabilities** – With easy-to-use software, a microgrid can be precisely monitored for how much energy is being produced, how much is feeding the load, and how much is being stored in the microgrid's battery system.
- » **Predictability** – The microgrid provides analytics and data that will help track performance over time and plan for future energy needs.

NOW IS THE TIME

The integration of clean energy solutions at construction sites can bring multiple advantages to the industry. This clean energy construction site project exemplifies how incorporating sustainable solutions can help construction companies thrive through significant cost savings, energy reliability, and reduced environmental impact, boosting their reputation and securing more projects.

The construction industry stands at an exciting crossroads where innovation and sustainability intersect. This project highlights not only the practicality of renewable energy

microgrids in construction but also its economic and environmental benefits. As the industry continues to evolve, clean energy solutions like microgrids are no longer a futuristic concept but a present-day reality. By embracing this trend, construction businesses can significantly reduce their carbon footprint and save money, while also appealing to clients that prioritize sustainability. The continued growth of construction companies that make renewable energy an integral part of their energy equation paves the way for a greener and more sustainable future for all. 



About the Author

As a project development manager at [EnTech Solutions](#), Michael Voigt works with customers to support various types of clean energy projects. This includes solutions that involve metering, efficiency improvements, energy generation, and energy storage, determining which mix of solutions will provide the most value to customers. Voigt has a strong passion for renewable energy, electric vehicles, microgrids, and science.

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