OHIO'S ELECTRIC COOPERATIVES
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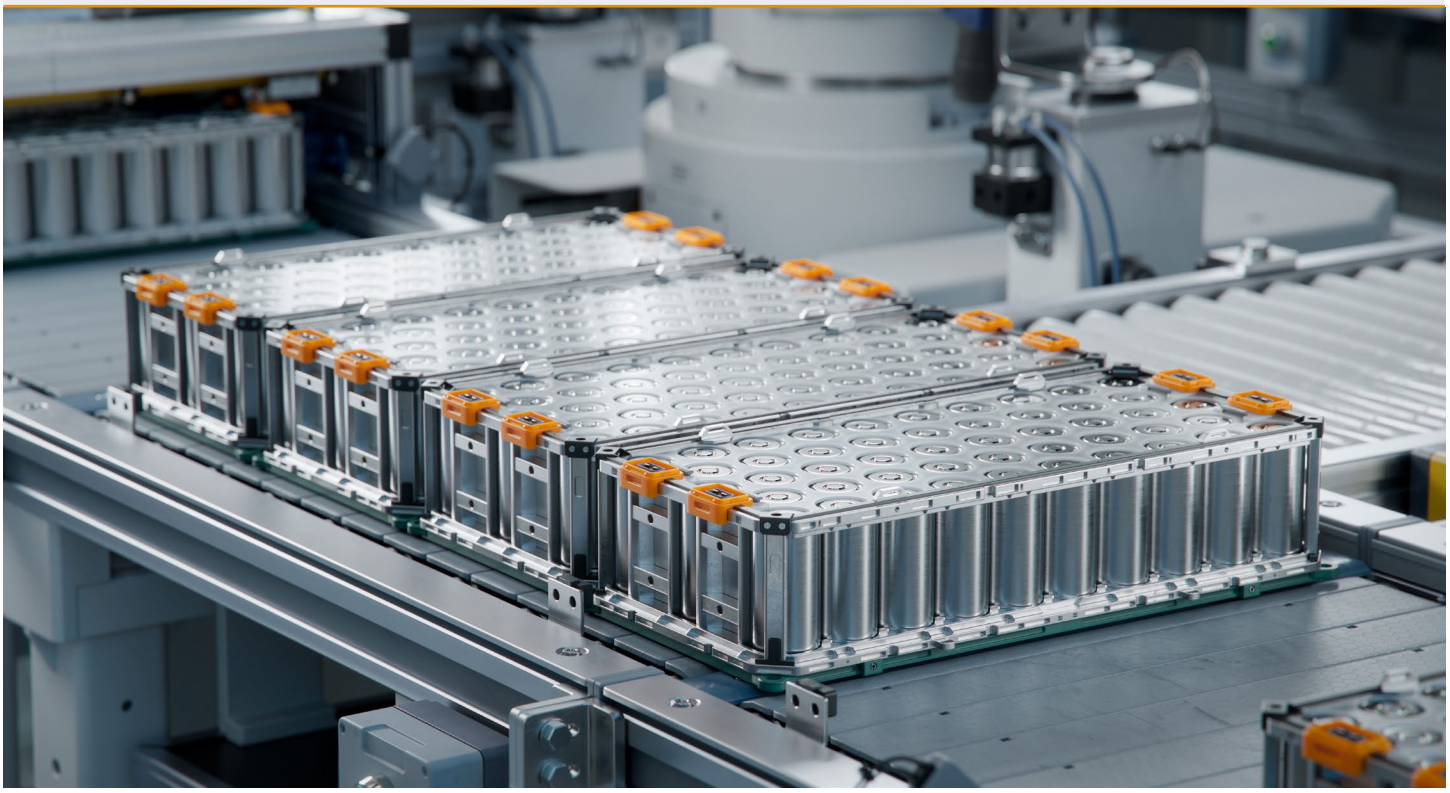
OHIO'S ELECTRIC COOPERATIVES CURRENT



EV Battery Manufacturing, Recycling Accelerating in Ohio

The enormous growth of data centers and the incentives to speed adoption of electric battery-powered vehicles are two factors having a significant impact on site selection for manufacturing facilities, as both sectors compete for electric system capacity.

Consumers and businesses are expected to generate twice as much data in the next five years as all the data created over the past 10 years.

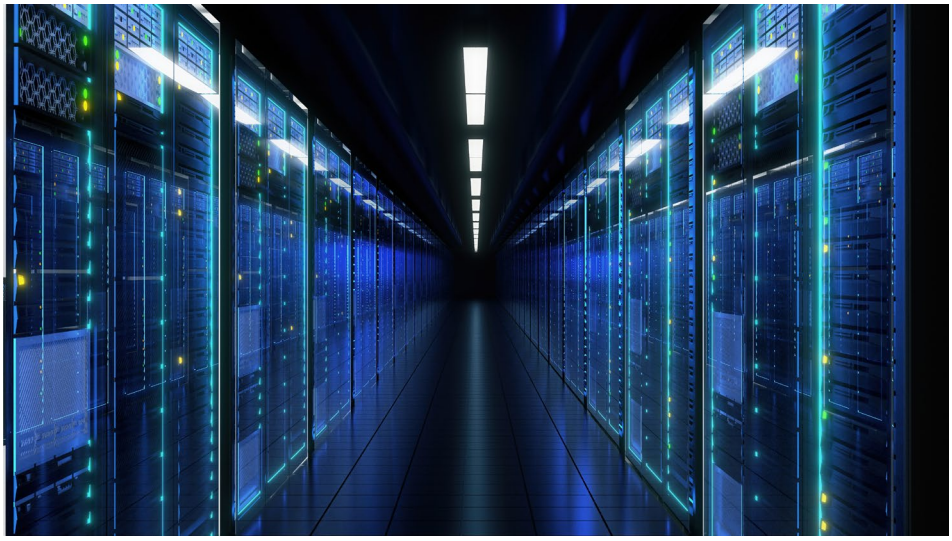
— 2024 Global Data Center Outlook published by Data Center Frontier, Feb 7, 2024

In this article we'll explore the impacts of the demand factors, share strategies for site evaluation with the new reality of constrained electric transmission capacity, and offer insights from experts working with large power users—including an EV battery recycler.

Accelerating data center and EV manufacturing demands are piling up on the U.S. electrical grid.

The explosive growth of high-speed streaming, artificial intelligence (AI), cloud-based technologies, and remote work are fueling a data center building boom that is expected to continue expanding by at least 10% per year throughout this decade.

- A single new data center load typically exceeds 100 megawatts (MW).
- The U.S. has over 5,393 data centers according to Cloudscene.com.



More than 1.4 million electric vehicles (EVs) were sold in the U.S. in 2023, bringing the total EVs on the road to more than four million.

- EVs represented about 9% of total vehicle sales in 2023, a 50% increase in one year.
- EV market share is projected to jump to as high as fourfold by 2030, according to auto industry forecasters.

EV battery recycling is a critical part of a sustainable battery supply chain

With an average battery lifespan of 10 years or more, the number of batteries reaching end-of-life will grow exponentially in the coming decade.

Although more than 15 new lithium-ion battery gigafactories or expansions have been announced since 2021 in the U.S. 'Battery Belt' as reported by Montrose Group, existing recycling capacity in the U.S. is limited.

Cirba Solutions plays a critical role in expanding key domestic capabilities for a sustainable battery supply chain.

Cirba Solutions' central Ohio location was the first battery recycler to receive a federal grant of $85 million through the Infrastructure Investment and Jobs Act (IIJA).

- The Inflation Reduction Act (IRA) qualifies any material recycled in the U.S. as being sourced in the U.S., so demand for battery recycling is growing.
- Since few minerals needed to manufacture batteries can be mined in North America, recycled battery metals are essential to meet IRA sourcing requirements.
- Lithium, cobalt and nickel are the primary materials in EV batteries, and they can be recycled repeatedly.

"The strategic intent of the IRA legislation is to expand investment in the Clean Energy sector in the United States (U.S.) and incentivize the use of responsibly sourced and processed critical materials domestically. Recycling batteries will strengthen the U.S. supply chain, accelerate battery production to meet increased demand, and secure the nation's economic competitiveness, energy independence, and national security," says Danielle Spalding, VP of communications and public affairs for Cirba Solutions.

In addition to Cirba Solutions' expansion, the Columbus region is home to the $3.5 billion, two-million-square-foot Honda-LG Energy Solution EV battery plant which will employ 2,200 workers when completed in 2025.

CIRBA SOLUTIONS, the most comprehensive battery management and materials processor in the industry, recently announced an over $200 million expansion of its lithium-ion processing facility in Lancaster, Ohio. This will be one of the largest commercial-scale battery recycling facilities operating in North America.

The expansion is aided in part by an $85 million Department of Energy (DOE) grant, which is slated to support the circular battery supply chain and further the advancement of cost-effective lithium-ion battery processing and critical materials supply.

Cirba Solutions is the most experienced lithium-ion recycler in North America, with over 30 years in the industry, and became the first company to officially receive funding under the DOE's Office of Manufacturing and Energy Supply Chains (MESC) grant program as part the Bipartisan Infrastructure Law. This funding highlights the first phase of more than $7 billion in total funding provided through the new bill, which will help enhance the United States' domestic lithium-ion battery supply chain for the EV market and create a sustainable supply of the critical minerals used to make batteries.

This site expansion adds advanced hydrometallurgical processing, removing the need for high temperatures and producing further emissions compared to conventional solutions. This state-of-the-art proven process facilitates the purification of recovered materials to pure metals for incorporation back into the battery manufacturing supply chain. They also prioritize responsible management of the by-products and residual waste materials created.

Cirba Solutions estimates it will produce enough battery-grade raw materials from recycled batteries to power more than 200,000 new EVs annually from the Lancaster facility alone.

Site selection advisors and asset managers can benefit from understanding the underlying constraints to power delivery—and where power is available sooner.

The electrification of everything coupled with soaring power demand by data centers and new manufacturing facilities means site selectors are wrestling with rapidly shifting power capacity and timing of availability.

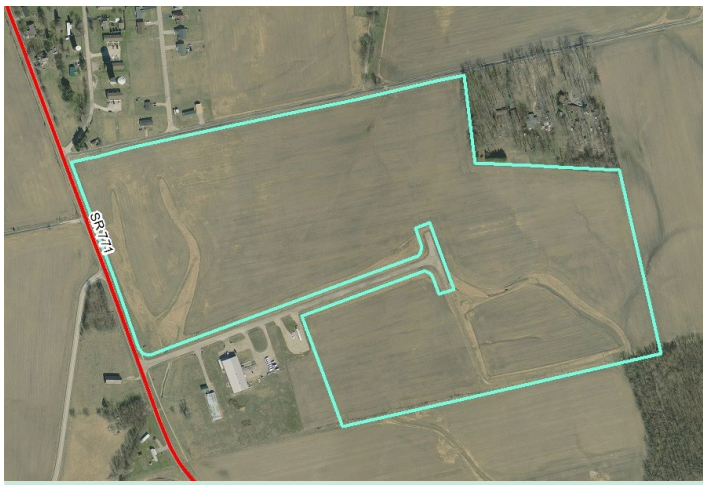
Capacity is available for manufacturing users within existing electric cooperative systems.

Despite Ohio being an epicenter of new EV manufacturing, battery recycling, and data center construction, Ohio's local electric cooperatives have a robust inventory of authenticated sites with ample capacity for new manufacturing loads that can be served without requiring a new transmission-level delivery point.

- "If we're looking to serve 5MW, sometimes even up to 20MW, we can do that from existing capacity on our system," says David Glass, business development manager for South Central Power Company.
- Capacity for larger users is on a site-by-site basis, so site selectors are encouraged to work closely with local cooperatives to evaluate capacity.

"The message to site selectors is to find your opportunity within territory served by Ohio's electric cooperatives," says Glass. "Cooperative-served sites are generally further outside metro areas and well positioned for manufacturing."

Manufacturing sites served by South Central Power Company include:



Leesburg Industrial Park
Highland County, Ohio

Rock Mill Industrial Park
Lancaster, Ohio

Growth is welcome in cooperative-served areas, and most new loads can be served quickly.

"In Ohio, our cooperatives are enthusiastic about the growth we are experiencing," says Ben Wilson, director of power delivery engineering at Ohio's Electric Cooperatives. "This growth helps ensure that rates stay low for everyone."

There's still enormous interest in central Ohio for building small industrial and warehouse projects, Wilson notes. "Local cooperatives provide great service to these more typical commercial and industrial projects. As far as development goes, the vibe is very positive."

Rest assured that power generation is sufficient—it's the transmission network that's constrained.

Businesses and consumers can be assured that power generation capacity is adequate to meet Ohio's needs. The system constraints are at the transmission level—the towers, poles and lines that deliver significant loads directly to major users or to substations for distribution to smaller users.

Much of central Ohio's new transmission-level capacity for the next 5-7 years has been committed to data centers, Intel, and other large manufacturers.

"The further outside of the central Ohio metro area, the better it would look in terms of available transmission-level power in a shorter timeframe," says Glass.

The change to longer transmission-level power lead times happened quickly.

After struggling through supply chain issues for several years, transmission-level power lead times have lengthened rapidly in the past year.

- Pre-2020, 18-24-months was a typical lead time for full electric service installation.
- Post-2020, timelines for materials stretched to 3 years, and even longer for the upline transmission line components.
- By June 2023, the projected timeline for transmission-level service was 3-5 yrs. By August 2023, it was 4-6 years. Now it's 5-7 years.

The backlog for new approvals through the Ohio Power Siting Board helped drive central Ohio to a projected 5–7-year timeline for transmission-level service. This scenario impacts large metro areas throughout Ohio.

Timing transmission system construction is extremely challenging.

"Construction work on the electric transmission system can only happen in short windows of mild weather when demand is low," says Wilson. "These facilities are high capacity and have a huge impact when they're taken out of service, so we have to be careful when sequencing transmission system expansion work."

Central Ohio demand is amplified by exceptional regional assets.

South Central Power Company serves residential, commercial, and industrial customers in 24 Ohio counties. “We serve significant manufacturing loads, including a good bit of EV battery components,” says Glass. “What’s driving development here is all the things that central Ohio is known for: workforce, proximity to customers, regional transportation assets, and a one-day drive to half of the U.S. population.”

- The Columbus Region’s extensive regional transportation assets, including Rickenbacker International Airport, intermodal facilities, highways, and logistics management help businesses reach customers, suppliers, and research partners faster.
- Central Ohio is centrally located to more than 70% of the current North American auto OEM assembly plants.
- Ohio has the second largest workforce in the nation for motor vehicle and parts manufacturing.
- Ohio is the #1 producer of engines and the #2 producer of transmissions in the U.S.
- As a leader in electrified mobility, companies in Ohio are designing, building, testing and deploying next-generation ground and air transportation.
- The Honda Battery Cell Research and Demonstration Center at The Ohio State University will connect industry and academia across chemical and physical sciences, engineering, and business to collaborate on emerging battery technology when the Center opens in 2025.

Stephanie Bosco, economic development director for Lancaster, Ohio, where Cirba Solutions’ soon-to-be-expanded battery recycling facility is located, says, “There’s always an advantage to having an industry cluster. Then you’ll have a surplus of skilled help.” Bosco notes that Lancaster has a 50-acre JobsOhio Certified Site that is being actively marketed to complementary manufacturing users.

Look for Us:

Site Selectors Guild Annual Conference
April 3-5, 2024
Nashville, Tennessee

Industrial Asset Management Council (IAMC) Spring Forum
April 6-10, 2024
Greenville, South Carolina

Buckeye Power and Ohio's Electric Cooperatives can help with:

- Comprehensive site and building portfolios
- Preliminary site studies
- Site search tours
- Assistance in identifying financial incentives
- Electric rate analyses
- Community profiles
- State and local government contacts
- Contractor introductions

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