METRO TRANSIT AND XCEL ENERGY: BUILDING A BLUEPRINT FOR CLEAN TRANSPORTATION

CASE STUDY
MINNESOTA

THIS METRO-WIDE BUS SERVICE TAKES A LONG VIEW WITH ITS SUSTAINABILITY VISION.

"These are the workhorse vehicles of the Metro Transit fleet that cover most of our routes."

Carrie Desmond,
Manager of Electric Bus Infrastructure for Metro Transit

It's been proven that when an aspirational idea is put in writing, it has a much better chance of success. And this holds true for Metro Transit of the Twin Cities area in Minnesota. Nearly 25 years ago, they committed to providing environmentally sustainable transportation opportunities for the communities they serve. And that promise has become ingrained in their forward-looking strategy and planning.

Starting a sequential plan to cleaner transit

In 2002, Metro Transit started to explore bus emission reductions by testing the use of hybrid buses. This provided real-world experience implementing a new electrified propulsion technology. Plus, Metro Transit could focus on routes to best serve communities that would most benefit from reductions in localized air pollution.

In 2007, Metro Transit introduced diesel particulate filters into the bus fleet, which nearly eliminates particulate matter emissions. By 2010 diesel exhaust fluid was introduced, significantly reducing nitrous oxide emissions. Then, in 2012 solar and renewable energy sources were established to contribute power to the organization's buildings and facilities.

The hybrid bus effort grew to include 10% of the working bus fleet. It was a valuable learning experience and a prudent first step into the complexities of more extensive vehicle clean energy options.

The all-electric, cold weather challenge

By 2019, battery and charging technologies were beginning to show promise for bus fleets. By 2021, Xcel Energy worked with Metro Transit on mapping out a transition plan for the fleet. Together, they developed a unique pilot program to test and compare diesel and electric buses operating side-by-side during everyday conditions and cold weather. Metro Transit operates six New Flyer diesel buses and eight New Flyer electric buses on the METRO C Line. These 60-foot electric buses are supported by Siemens charging equipment and Xcel Energy technical support and power infrastructure.

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Pilot program overview:

- New Flyer electric buses were Minnesota-made in St. Cloud.and qualified as Buy-America Compliant, which helped secure Federal Grant money.
- Buses operate on a 8.5-mile bus rapid transit service, the METRO C Line, between downtown Minneapolis and Brooklyn Center.
- All the electric buses and charging equipment were delivered as low serial number equipment – meaning it was one of the first brought to market.
- The electric buses are charged overnight at the Heywood garage in Minneapolis. An additional 10 to 15-minute charging session is completed on-route at the end of each round trip at their Brooklyn Center Transit Center to extend vehicle range in support of daily operations.
- Unlike diesel buses, all-electric buses require two technicians working in tandem as a safety process when working on high voltage systems. Also, New Flyer placed a full-time technician on-site to assist with training and troubleshooting.

Pilot performance:

- Passengers often noted the quieter, cleaner experience.
- Best- and worst-case estimates for electric bus ranges were proven out with a cold weather loss of roughly 33%.
- Diesel heaters were used for supplemental warming on diesel and electric buses to maintain rider comfort in extremely cold conditions.
- Unstable fuel and electric prices require a more extensive examination of side-by-side operating cost comparison.

Key takeaways

The pilot provided a deep learning experience for Metro Transit and Xcel Energy. As Carrie Desmond, Manager of Electric Bus Infrastructure for Metro Transit, points out, "We learned that the technical viability must be a good fit with your use case. In other words, you can't force new technology; it must find its logical place to perform. We also realized we couldn't apply equitable and environmental goals without delivering service reliability. This is public transportation, and offering consistent service is paramount."

From blueprint to scaling up — more green buses on the way

The data and insights from the pilot have provided a solid framework for the next stage of fleet electrification. Metro Transit is scaling up with 40-foot electric buses with larger batteries and a focus on depot charging. At least 20% of 40-foot bus purchases are planned to be electric through 2027.

Public input and census data were used to create heat maps of the equity and environmental justice priorities for local communities, informing where these buses are used in the region. "These are the workhorse vehicles of the Metro Transit fleet that cover most of our routes," adds Desmond. "It's a complex task, and we're integrating software tools for scheduling, telematics, and battery load monitoring. From the hybrids to where we're at and where this all is going; we've been prudent and patient in our transition. It's a marathon, not a sprint."

Industry knowledge worth sharing

If you represent or work with the community on transit or sustainable programs, connect with the American Public Transportation Association and explore the Zero Emission Fleet Committee. Nearly 700 municipal and business organizations share ideas and strategies for clean transportation on this platform.

FINANCIAL SNAPSHOT	
Project Detail	8 electric buses and 10 chargers
Total Project Cost	$14,300,000
Xcel Energy Infrastructure Support	$550,000

For more information about Xcel Energy's electric vehicle programs and incentives for residential, multi-family, business or community applications, visit **xcelenergy.com/EV**.

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