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Amtrak Metuchen Traction Power Facility

Amtrak powers toward its next-generation vision with Siemens static frequency converter technology.

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Situated in Central New Jersey, Amtrak's Metuchen traction power facility supplies electricity for rail operations along the Northeast Corridor (NEC). Taking advantage of Siemens rail electrification technology and expertise, the facility—which has been in service since 1933—upgraded its aging power infrastructure. With new, modern components, Amtrak's Metuchen facility helps ensure a more reliable and efficient power supply for growing railway traffic.

Client Objectives

Amtrak's NEC is an engine of the U.S. economy. It offers a vital link connecting five major metropolitan regions, from Washington, D.C. to Boston. More than 260 million passenger trips are made on the NEC each year.

In 2012, the U.S. Department of Transportation (USDOT) earmarked funds for Amtrak to upgrade its rail infrastructure between New York and Washington. Upgrading the traction power infrastructure at the facility in Metuchen was a top priority. The rotary technology at the Metuchen facility had been in operation for over 80 years; the older equipment was less efficient and put Amtrak's service reliability at risk.

Amtrak needed a modern solution to augment the outdated rotary technology at Metuchen. However, any new technology had to meet exacting specifications. For example, it had to be able to stand up to the extreme weather the region experiences in the winter months in order to maintain service in an emergency. Moreover, the upgraded infrastructure needed to efficiently support the additional power needs of a growing rail service. Amtrak had to find a trusted partner with the right equipment and know-how to usher in an era of safer, faster, and more reliable rail travel in the NEC.

Sitras SFC Plus converters reduce power loss by almost 50 percent compared to older technology.

Siemens Solutions

In order to supply consistent, scalable, and cost-effective energy to power rail operations in the NEC, Amtrak tapped Siemens Mobility Division. The Siemens team and Amtrak worked closely to design, build, deliver, and install two new static frequency converters within the limited confines at Metuchen. The Siemens Sitras SFC Plus converters augment the existing technology at the facility by coupling the 230 kV 60 Hz power supply with a 25 Hz generator bus bar, modernizing the aging infrastructure while leveraging existing assets to save on costs.

The Metuchen project was executed by Siemens Mobility Division with no delays and came in under budget. Capitalizing on its vast experience and advanced technology, Siemens helped Amtrak save \$18 million compared to the initial cost the transit agency had budgeted for the upgrades at the Metuchen facility.

The frequency converters supplied by Siemens transform 60 Hz power into functional, reliable 25 Hz electricity. The converted electricity is then transferred from Metuchen to the various systems that power NEC rail lines. This new converter technology

at Metuchen enables increased power output, more than doubling the facility's capacity from 25 MW to 85 MW. With these improvements, Amtrak has the ability to run more trains with faster speeds.

Power-generation reliability has also improved thanks to the Sitras SFC Plus converters. Trains are now ensured the energy they need in emergency situations so that riders get home safely. The converters can also operate in "black start" mode, meaning they can ramp up quickly in the rare case of an outage.

The Metuchen traction facility directly benefits from the state-of-the-art electronics onboard the Sitras converters—which make the units simpler to maintain. Additionally, an improved control system allows dispatchers to manage the system remotely.

Customer Benefits

Since the installation, Amtrak and its riders have enjoyed more reliable rail travel. In May 2017, a fire at Amtrak's Sunnyside New York City converter station took one of the converter units offline permanently. The other converters in the station had to be

cleaned prior to going back online. During this time, an unrelated problem at the Metuchen facility took its old rotary converter offline.

As a result, the only power source north of Philadelphia powering the Amtrak route between Washington, D.C. and New York City was the Sitras SFC Plus converters at Metuchen. These state-of-the-art devices kept the power flowing to trains along the popular route—avoiding possible delays or shutdowns.

The new converters also provide greater efficiency for Amtrak. Their innovative design allows the new converters to operate at a higher voltage. In addition, it also eliminates many of the components from the older generation of converters. This reduces power loss by almost 50 percent.

Looking ahead to the future, Siemens Sitras SFC Plus converters will enable Amtrak to reduce trip time between major cities for the 140 Amtrak trains that use the NEC each day. Riders will also enjoy more frequent departures, and the converters will soon support new high-speed rail options.



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