

SIEMENS



INVESTING IN NORTH AMERICAN RAIL

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Built with pride.

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Meeting the need for smart mobility solutions

Society's demand for mobility never ceases. Powerful, reliable and environmentally friendly transportation systems are essential for a functioning society and economy, and rail traffic is an important part of this picture. Simply getting quickly and efficiently from A to B is already taken for granted. Passengers expect more, and cities, operators and industry must respond to meet these demands. As a single source supplier and system integrator, Siemens Mobility bundles the necessary expertise to meet these passenger requirements with innovations, and to allow transportation system providers to optimally deploy infrastructure and vehicles.

Rolling Stock

Siemens Mobility is committed to delivering safe, reliable and efficient rail vehicles built in the United States. As a global leader, Siemens Mobility combines all the expertise necessary to provide rolling stock and sustainable solutions in all areas of rail transportation. The rolling stock portfolio covers the full spectrum of vehicles – including light rail vehicles, streetcars, coaches, locomotives and high-speed rail – to meet any demand for local, long-distance, logistical transport to provide sustainable rail solutions.

40 Years of Light Rail and Streetcars

Mobility for Cities on the Move

As the market leader in the U.S. and Canada, Siemens Mobility has delivered more than 1,900 light rail vehicles and streetcars to 19 cities over the past four decades. We have come a long way since the first light rail vehicle took its inaugural trip in San Diego in 1981. Almost 40 years later, Siemens Mobility manufactures modern high- and low-floor light rail vehicles at its Sacramento, California manufacturing facility powered by a 2MW solar installation. Our innovative rail designs include the first low-floor light-rail vehicles in North America introduced in 1996, and the new S700 light-rail vehicle design featuring 100% low-floor technology. These low-floor designs enhance operational efficiency and accommodates those with impaired mobility. Today's low- and high-floor light rail vehicles built by Siemens Mobility combine industry leading innovations with time-tested design to provide best-in-class service for cities across North America.

Locomotives for North America

Powering Intercity, Regional and Long-Distance Travel

The Siemens Mobility locomotives provide the latest energy efficiency and operational features and can incorporate customer specific requirements, positioning you to meet current and emerging demands. With a top speed of 125 mph each, Siemens Mobility ACS-64 and Charger locomotives are at the forefront of high-speed passenger train travel in North America. The electric ACS-64 locomotive, based on Siemens Mobility's successful Europrinter design, was originally adapted for Amtrak's service between Boston and Washington, DC. The Diesel-electric Charger locomotive is based on more than 130 years of comprehensive global expertise in the development, production, and maintenance of rolling stock. Siemens Mobility is known for its on-time delivery of both the ACS-64 and Charger locomotives. From start to finish, both locomotives are manufactured at the full-service Siemens Mobility manufacturing facility in Sacramento, California, in accordance with Buy-America regulations. Both boast the high reliability and high performance that keep North American passenger service on track.



Venture Trainsets for a New Era

Setting a New Standard for Intercity Train Travel

The latest Siemens Mobility design provides sophistication and efficiency and has redefined intercity rail travel in North America with the Venture trainset. The Venture trainset offers comfort without compromise from the moment passengers step on board. Combining innovation with attention to detail, we've upgraded standard elements and added a host of new amenities to offer a more engaging ride for all passengers.

While designed for tomorrow, the trainset is built on a tested and service-proven platform in use throughout North America. It delivers an unsurpassed passenger experience and raises the bar for efficiency and reliability. The coach car has a spacious interior and is easily configured into economy, business, cafe or cab cars to fit your specific needs. The trainset also features the safest rail car design on the market, with crash energy management (CEM) crumple zones at both ends. Powered by our market-leading Charger diesel-electric locomotive, it travels at speeds up to 125 mph. In short, the Venture is being embraced by passengers, operators, and agencies alike.

Passenger Coaches

A Safer Design That's Built to Last

Siemens Mobility has been designing and building passenger cars for more than 160 years. Our experience informs the Venture trainset, which stands the test of time for both form and function and is safer than existing vehicles in operation today. It has fewer potential hazards, more safety features, and innovations that extend its longevity. Carbodies have CEM on both ends and seat tracks meet current APTA requirements for strength and crashworthiness.

Coupled gangways and grab handles on aisle seats improve safe passage through and between cars. Not only does the innovative stainless steel carshell look sleek, it's corrosion-resistant and insulates interiors from heat loss or gain. The carbodies work well in all North American climates, provide a comfortable environment, and protect against slip/fall hazards and snow accumulation.

High-Speed Rail

For true high-speed segments, we offer the Velaro trainset. With references from around the globe and top speeds up to 220 mph, it is an ideal choice for next generation high-speed rail. Velaro trainsets feature a fuel consumption of nearly 700 mpg per passenger seat, making it one of the most environmentally friendly high-speed trains on the market today.

Selected References

- **Brightline:** Siemens Mobility built five trainsets that will operate on the new services from Miami to West Palm Beach, consisting of two diesel-electric locomotives, one on each end of four passenger coaches. The trains will be maintained and serviced in West Palm Beach by Siemens Mobility.
- **Calgary Transit:** Initial success and increased ridership prompted the city to expand their system by an additional 60 LRVs to include 28 miles of track and over 190 LRVs.
- **Minneapolis Metro Transit:** The new Metro Green Line connects residents via 59 Siemens Mobility vehicles especially designed for the cold climate with improved insulation and integrated front-end snowplow.
- **San Francisco Muni Metro:** Recently ordered 215 new S200 light rail vehicles, the largest LRV order in U.S. history.

Products

- Light rail vehicles (low-floor and high-floor)
- Streetcars
- Locomotives, diesel-electric and electric
- Passenger coaches
- High-speed trainsets
- Venture Trainsets

I Rail Automation

Siemens Mobility provides a comprehensive portfolio of signaling and control systems for the mass transit and freight and product markets. Beginning as a pioneer of railway signaling systems, we have become a world leader in rail automation, helping mass transit, regional, and industrial railways create the relevant conditions for enhanced safety, punctuality, speed, capacity, and energy efficiency both along lines and at stations.

Solutions for Mass Transit

Siemens Mobility intelligent and future-oriented mass transit systems satisfy both passengers and rail operators.

- **Operations Control Systems:** With operations control systems from Siemens Mobility, electronic and relay interlockings can be controlled and monitored. In addition, our operations control systems feature a large number of automated functions.
- **Electronic Interlockings:** Electronic interlockings monitor and control safety-related facilities in line with the dependencies between signals, points, and vehicles. We supply fully integrated electronic interlockings that are completely preassembled and tested at our System Test Center.
- **Train Control Systems:** Our train control systems provide drivers with the highest-level support for safety-related and operational functions.
- **Components and Subsystems:** Siemens Mobility provides a full range of components and subsystems from axle counters and point machines to LED signals. All components and subsystems feature top quality design and construction for fault-free installation, maximum availability, and simple maintenance.



Solutions for Freight and Product

Our solutions for the rail, industrial, and mining markets deliver customer-facing, best-in-class performance and profitability.

- **Locomotive Products:** Proven in applications worldwide, our portfolio spans train control, on-board products, and on-board communication systems that are safe, robust, and reliable and provide significant operational and performance benefits.
- **Communication Products:** Siemens Mobility's wireless communication system of fixed and mobile remote radios enables wide-area Internet Protocol connectivity. This allows railroads to transition from multiple, single-purpose networks to a common, managed, multi-purpose/ multi-band network and realize significant reduction of infrastructure and operating costs.
- **Level-Crossing Products:** Level-crossing protection systems from Siemens Mobility have been field-tested worldwide and are characterized by a high level of safety, reliability, and cost effectiveness. Brand new products like the S80 Smart Gate mechanism works wirelessly to communicate messages to both maintenance personnel and the nearby wayside system without any major changes to the gates existing infrastructure.
- **Electromechanical Products:** Siemens Mobility offers a single source of supply for a complete range of electrical and mechanical components for railway operators.
- **Wayside Products:** Wayside products effectively track occupancy throughout the system, exchanging information from a train or track to a wayside controller and to the back office for complete monitoring of train movement.
- **Design and Engineering:** Our U.S.-based projects and engineering group provide a broad range of engineering and project management services to mass transit and main line railroads, including PTC implementation, pole line elimination, capacity and reliability improvements, as well as complete grade crossing design, field testing and commissioning, field wiring verification, and field troubleshooting support.



Did You Know?

Communication Based Train Control (CBTC) enables operators to maximize their network capacity and throughput. Headways of 90 seconds or less are achieved by making best use of the moving-block working principle in combination with continuous, bidirectional communication via WLAN. This means the number of trains in operation can be increased and more passengers can be transported at the same time, resulting in a more punctual service and higher passenger satisfaction.

Selected References

- **Long Island/Metro-North Railroad:** Siemens Mobility, in a consortium with Bombardier Transportation, was contracted by the Metropolitan Transportation Authority (MTA) to develop, test, and commission a new Positive Train Control (PTC) system. This technology solution helps monitor and control train movement for the MTA Metro-North Railroad and MTA Long Island Rail Road (LIRR) commuter lines.
- **New York City Transit (NYCT):** NYCT awarded Siemens Mobility a task order to renew the large-scale display status board at its Rail Control Center. The board will leverage Siemens Automatic Train Supervision (ATS) technology to show train movement critical to NYCT's 24/7 operations. With 88 cubes, the NYCT status board is one of the biggest installations in the U.S.

I Rail Electrification

Our electrification and traction power solutions set the standard for technology, cost efficiency, and quality. We are well-known worldwide for creating tailored, reliable electrification solutions for mass transit systems that are backed by our comprehensive expertise and personal commitment developed through decades of experience.

DC Switchgear and Rectifier Assembly

We complete DC switchgear and rectifier assembly using a single team of experienced Siemens Mobility technicians and engineers. Our in-house assembly helps ensure cost control while ensuring better management of day-to-day quality for our customers.

Quality and Inspection

Siemens Mobility recognizes the critical need for quality. All overhead contact supply assemblies and DC switchgear and rectifiers undergo rigorous quality inspections during the assembly phase as well as before final shipment.

Overhead Catenary Assembly

We've introduced innovation to overhead catenary assemblies with our proprietary catenary "kits" that have a complete assembly in one box. The "kit" saves everyone time and money as it prevents piece parts from being inadvertently ordered and returned and streamlines the assembly process.



Engineering and Commissioning

Siemens Mobility engineering and commissioning experts are second to none. Our engineering staff completes final designs for each traction power project, including preparation of Operation and Maintenance manuals. Our commissioning team prepares the equipment on-site and provides training for the operator's staff, which is responsible for maintenance of the equipment during its in-service life.

Selected References

- **Miami Dade Transit:** Siemens Mobility provided design, supply, testing, and commissioning of equipment for the refurbishment of MDT's 2MW Palmetto Traction Power Substation.
- **Long Island Rail Road:** Completed the manufacturing, delivery, installation, testing, and commissioning of Long Island Rail's 3MW prefabricated traction power substation.
- **Metro Vancouver TransLink:** Conducted refurbishments at TransLink's Hull Street and Yukon Street Substations, including design, manufacturing, test, and delivery of two 1.5-MW rectifier transformers, AC switchgear lineups, DC disconnect line ups, battery chargers, and system programmable logic control. Siemens Mobility provided the programming at each station for station control, provided studies for AC protection, coordination study, ARC flash, and seismic studies.
- **Utah Transit Authority (UTA):** We provided electrification to support Utah's FrontLines light rail construction project. The scope included twenty-four 1.5MW traction power substations to support four new extensions servicing UTA customers.



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SIEMENS

TRI  MET

I Rail Services

Trust Siemens Mobility to extend and enhance the service life of your vehicle.

When the profitability and sustainability of your operations are on the line, who would you trust more than the people that built your vehicles? With Siemens Mobility you have a partner that not only knows your trainsets best, but can also draw upon 100 years of rail service expertise and a global network of experts. We've developed a portfolio of innovative services that can be tailored to your individual needs to deliver maximum availability, reliability, and return on investment.

Maintenance Services

Customizable Service Concepts for Urban, Regional, Long-Distance/High-Speed Networks

In order to increase the attractiveness and competitiveness of rail-based transport, rolling stock and infrastructure must work when passengers and freight customers need them. Siemens Mobility Rail Services offers you complete reliability so that you can offer that same reliability to your passengers. Many rail operators around the world are already benefiting from cooperation with Siemens Mobility, with more than 50 service contracts – some of which will be in effect past mid-century – and availabilities of up to 100 percent.

Technical Support & Spares Supply Agreements

Improve Reliability, Stabilize Costs and Eliminate Uncertainty

TSSAs are designed to improve maintenance operations and fleet performance at a fixed cost. Your goals for reliability and availability set the benchmark against which we track and measure our performance. The TSSA is designed to meet these targets and support your program objectives additionally linked to financial consequences. Our goal is to continuously improve our performance and the performance of your fleet. In addition, our entire engineering staff and 24-hour support center are available to help drive system availability to 100%.

Spare Parts Services

The Right Spare Parts at the Right Time

We make sure that your specialists have all the parts they need, quickly, easily, and reliably, any time they're needed. Whether you want new, repaired, or refurbished parts, our promise is Easy Spares® – for a lifetime. Store it or get it delivered? It's your decision. But increasing cost pressures mitigate against high safety reserves of spare parts. Siemens Mobility Services lets you optimize your spare part inventory. Keep A-parts on hand but get the ones you need less frequently identified and delivered quickly and easily.

Upgrade Services

Expert Refurbishment – Transforming Old into New

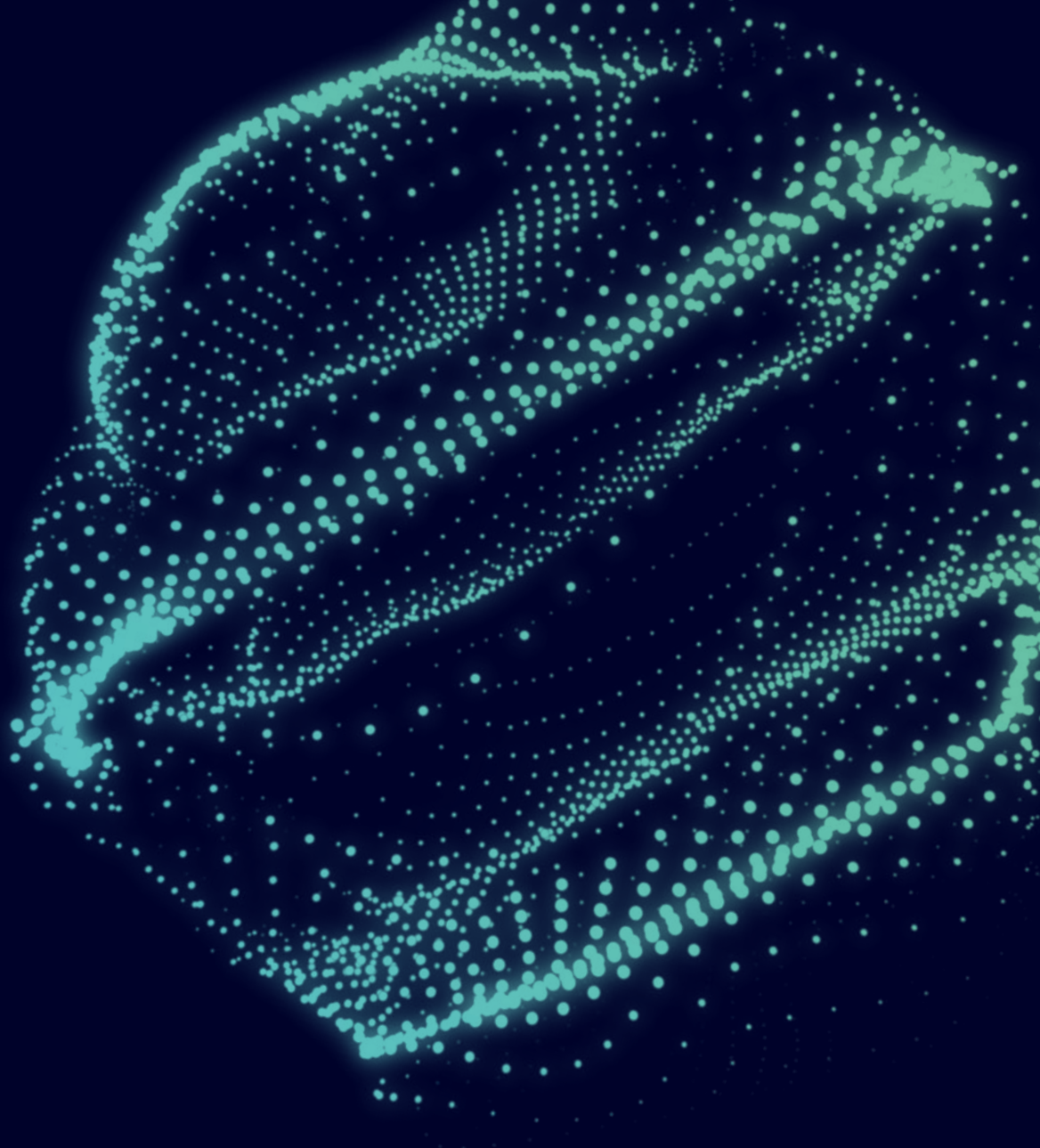
As fleets age and technology evolves, Siemens Mobility upgrade services ensure that your fleets meet the expectations of your passengers, service maintainers and operating infrastructure. Utilizing our comprehensive integration approach, we ensure that technology updates and product developments will meet the evolving targets of our customers. These can be measured by reducing life-cycle cost, improving reliability and efficiency while enhancing the aesthetics – each will add value by extending the expected life of your vehicles. Increased energy efficiency, improved comfort and greater reliability – there are many good reasons for modernizing, enhancing or repairing your rail vehicles and infrastructure. Another good reason is extension of lifetime. Because long lifetime enables to treat resources with care. Whether interior conversion, system upgrade or refurbishment – with Siemens Mobility Upgrade Services, you can be confident that your fleet will travel into the future with maximum comfort, low emissions and high energy efficiency.

Services include:

- Bogie refurbishments and repairs
- Passenger Information Systems/CCTV
- Vehicle refurbishments and overhauls
- Vehicle Accident repair services

Selected References

- **Amtrak Northeast Corridor:** Siemens Digital Rail Services monitors and analyzes data from 70 locomotives and relays information and recommendations to Amtrak's maintenance team.
- **Calgary Transit:** Siemens was selected to modernize 32 SD160 light rail vehicles, with an option for 40 more, improving passenger information systems, bogie systems, and coach and cab interiors.
- **Sacramento Regional Transit:** Through our light rail vehicle refurbishment program, Sacramento RT has added 21 vehicles to its fleet at a significant cost savings.



Digital Rail Services

Our new Digital Rail Services business uses intelligent sensors and advanced software platforms to help rail operators reduce unplanned downtime, improve operational efficiency, enable improved business planning and performance, and generate energy and cost savings.

Digital Rail Services are built upon our new Railigent® cloud-based, mobility platform. Powered by the Siemens Mindsphere IoT (Internet of Things) operating system, Railigent® captures the billions of diverse data points created by rail infrastructure and transforms them into a secure, intelligent, and customizable user interface.

Combining the latest technology, digital analytics know-how, and our extensive rail industry knowledge, we are bringing rail infrastructure and vehicles into the digital age with our full portfolio of Digital Rail Services.

- **Smart Data Analytics:** Root cause analysis and remote vehicle and infrastructure diagnostics from the experts. Smart Data Analytics leverages Siemens Mobility expert engineering talent and shared visibility into our entire fleet.
- **Smart Monitoring:** Real-time insight on vehicle state and location. Our Smart Monitoring services process and visualize data to help railways monitor operations more efficiently.
- **Smart Prediction:** Prescriptive maintenance and recommendations informed by near real-time diagnostics. Smart Prediction services enable preemptive service to avoid interruptions and delays.

Additional capabilities being developed include advanced cyber security and smart guidance services.

I Manufacturing in the U.S.A.

Throughout the United States, our team is hard at work designing, engineering, manufacturing, and servicing intelligent mobility solutions that create better passenger experiences and smarter railway operations.



Sacramento, Calif.

Our Sacramento, California plant serves as the North American Rail Manufacturing Hub and Headquarters for Rolling Stock. The rail plant boasts full manufacturing capabilities, including design, engineering, testing, carshell, bogies, subassembly and final assembly. With all aspects of the manufacturing process taking place at one facility. Siemens Mobility offers customers unparalleled access and optimum project management and quality from start to finish.

Siemens Mobility has been manufacturing in Sacramento for more than 30 years and the rail plant is almost entirely solar powered. Currently, more than 2,000 people are employed at the 583,000-square-foot facility, on 60 acres of land in Sacramento. The plant has manufactured more than 2,700 vehicles for 30 transit agencies in the U.S. and Canada.



Louisville, Ky.

The Rail Automation facility in Louisville, Kentucky, houses the global headquarters of the Siemens Freight and Products Business Unit, employing more than 300 people. The plant manufactures rail signaling and communications products, including grade crossing warning lights, bells and gates for rail lines around the world.

The manufacturing facility assembles and wires the complex control equipment required for train control systems, wayside signal systems and grade crossing warning systems. Siemens Mobility also engineers software solutions at this

location such as Positive Train Control (PTC), a signal enforcement system that will lead to more efficient train control, specifically for the North American market. This facility houses engineering, manufacturing and assembly, sales, marketing and program management personnel.



Marion, Ky.

Rail Automation currently employs roughly 200 workers at its Marion, Kentucky plant. Since the facility opened in 2001, additional operations were added including opening box assembly and welding functions to support cross cantilevers.

From 2005 to 2008, wayside wiring and other initiatives added signal mast wiring and machine shop activities. In 2009, the facility underwent an upgrade and expanded once more. From 2010 to 2013, manufacturing operations continued to grow and additional product lines were added, driving another 26,000 square foot addition to the facility. In 2015, the Marion facility expanded again, by moving the manufacturing portion of our traffic controller operation from Austin, Texas to Marion.



Alpharetta, Ga.

Home to Traction Drives, the Georgia 400 (GA400) facility in Alpharetta, Georgia manufactures complete propulsion solutions for the North American rail market. Products are both innovative and well-proven – providing the highest degree of reliability with minimum maintenance costs.

The product portfolio includes Converters, Motors, Gearboxes and Auxiliary Power Supplies. Products are project-specific designed, ensuring proper adherence to customer requirements.

In operation since 1990, with a manufacturing space of 138,000 square feet, the GA400 facility can manufacture both standard and custom products. The factory is ISO certified and can manufacture to standards like UL, CUL, CSA, as well as manufacture Buy America compliant products.



McClellan Park, Calif.

This 60,000 square-foot plant in McClellan Park, California is dedicated to our growing rail service, maintenance, and repair operations and serves as the Siemens Mobility Rail Services U.S. headquarters and West Coast service hub. The new facility is providing work for more than 100 employees and plans to continue hiring to support its growing service business. Shortly after opening, McClellan Park took on the modernization of thirty-two SD160 light rail vehicles for Calgary Transit in Alberta, Canada. This modern rail service facility complements our existing rail manufacturing operations in nearby South Sacramento.



Pittsburgh, Pa.

Rail Automation manufactures and engineers all their Cab Signaling and Positive Train Control equipment in Pittsburgh, Pennsylvania. In the fall of 2014, Siemens Mobility relocated this manufacturing facility from East Pittsburgh to Munhall, PA. The modern waterfront development space now combines our engineering office as well as our manufacturing floor. The facility is 23,000 square feet and houses state-of-the-art business equipment. There are currently more than 200 employees who work in our Pittsburgh facility.

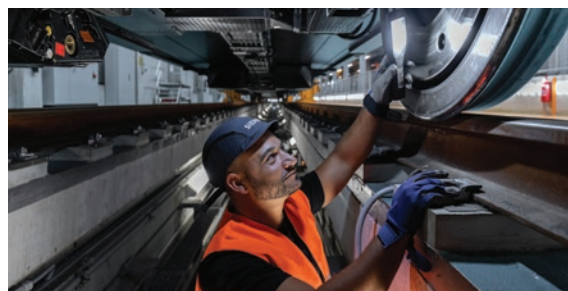
This facility is known for making all of the onboarding equipment for our vehicles, which include Cab Signal systems, display units, controls, control boxes, pickup receiver bars and axel generators.



Portland, Ore.

Rail Electrification in Tualatin, Oregon, specializes in the design, systems integration, assembly, testing, and commissioning of traction power substations, and provides overhead catenary assemblies for installation. Rail Electrification employs 70 experienced professionals, engineers, technicians and skilled workers.

The combined facility and office currently feature 24,000 square feet of total constructed area divided into DC switchgear assembly, rectifier assembly, warehouse, overhead catenary assembly, and engineering and office space. Design, engineering, procurement, fabrication and assembly, as well as bid-related activities take place in this facility.



New Castle, Del.

The Locomotive Service facility in New Castle, Delaware combines Siemens Mobility's global digital analytics know-how with its extensive industry knowledge to move rail further into the digital age. Using the latest in digital and predictive technology, the New Castle team trains service technicians and remotely maintains Siemens Mobility locomotives. The facility serves as the company's digital service, supply chain distribution center, and technical field training hub in the region.

The New Castle team is already putting its data capabilities to use by working with Amtrak to monitor and analyze data from Siemens-built ACS-64 locomotives running along the Northeast Corridor.

Siemens is a proud member of the following organizations:

- American Public Transportation Association
- American Short Line and Regional Railroad Association – ASLRRA
- Association of American Railroads – AAR
- Association for CA High Speed Trains
- California Chamber of Commerce
- California Transit Association
- The Canadian Association of Railway Suppliers – CARS
- Community Streetcar Association
- Midwest High Speed Rail Association
- The National Railroad Construction and Maintenance Association, Inc. – NRC
- Railway Supply Institute – RSI
- Railway Systems Suppliers, Inc. – RSSI
- Reliability Leadership Institute
- US High Speed Rail Association

Siemens Mobility, Inc.
One Penn Plaza
11th Floor, Suite 1100, New York, NY 10119, United States

Contact for information:
Rolling Stock Rail Plant
Sacramento, CA 95828
(916) 681-3000, siemensmobility.us@siemens.com

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Quality
ISO 9001

