



SIEMENS

TriMet MAX Light Rail

Siemens innovative rail technologies help power mass transit, and growth, in Portland, Oregon.

In Portland, Oregon, mass transit is more than a way to get from place to place, it's a point of pride for the community. While it ranks as the 24th largest metro area in the United States, Portland boasts the 11th largest ridership of public transportation. The people of the Portland metro area recognize that all citizens benefit from mass transit, whether from a comfortable commute, less congestion on the roads, or cleaner air.

TriMet keeps Portland on the move. It serves this fast-growing metro area through bus, light rail, and commuter rail that combines for more than 100 million trips per year. With the help of innovative rail technologies from Siemens, TriMet's new Orange Line expands its MAX light rail service in a way that's uniquely Portland.

Client Objectives

With the Portland region expected to grow by an additional 400,000 residents in the next 20 years, TriMet must be forward thinking in everything it does. It needs to expand service intelligently to address population growth, while delivering a commute its riders can enjoy, day-in and day-out; and do it all as efficiently as possible.

Through its new Orange Line light rail service, TriMet sought to do just that. The new 7.3-mile line extends from Portland State University downtown to the Oak Grove neighborhood in North Clackamas County, southeast of the city center. It's a natural extension, providing service to new communities

and alleviating road congestion caused by limited crossings over the Willamette River.

In order to maximize ridership, the TriMet team needed a light rail vehicle that riders could embrace. "This is all for the public," notes Jason Grohs, TriMet's Manager of Vehicle Engineering. "The public wants service that is reliable; something they can depend on. The vehicles used for this service have to be safe, reliable, and comfortable to ride."

Knowing they had an engaged ridership, TriMet solicited feedback on what their ideal ride would be. TriMet took their feedback, with topics ranging from seating configurations to disability access to air conditioning levels, and worked them into their new vehicle specifications. Similarly, TriMet enlisted its vehicle operators and technicians to see how the new vehicles could be improved for them and included those requirements, too.

In addition to enhancing vehicle design, TriMet wanted to enhance its efficiency. For some time, the agency had been researching the concept of regenerative braking and energy storage, in which power given off from braking is stored and used to power trains. When they began planning the Orange Line, TriMet felt the technology was ready to be implemented. This too was included in the specifications knowing that, if successful, it would enhance TriMet's sustainability and reduce its electricity costs.

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“We have a very good partnership with Siemens. They were very open to the feedback and changes, and working in collaboration to deliver a vehicle that works for everyone.”

*Jason Grohs
Manager of Vehicle Engineering
TriMet*



Siemens Solution

Siemens was able to meet the requirements of TriMet and its ridership with innovative rail technologies, including customized S70 light rail vehicles, signaling and crossing technology, and a traction power system featuring one of the first regenerative energy storage units in the United States.

Siemens and TriMet have worked together for more than 20 years. In fact, the S70 vehicle has been in use on other TriMet MAX lines since 2009. For the Orange Line, Siemens redesigned the vehicle, addressing the rider, operator, and technician feedback TriMet gathered.

The new cars feature a seating layout that maximizes usable space and improves wheelchair accessibility from car-to-car, while increasing rider comfort and legroom. HVAC systems were also enhanced to automatically adjust cooling based on the number of people in the vehicle.

For operators, the S70 features ergonomically designed cabins and seating, better sightlines, and larger displays for monitoring vehicle status. Maintenance enhancements include easier access to key components so technicians can complete their job quickly and safely.

The Siemens regenerative energy storage unit makes the Orange Line more efficient and sustainable than its peers. Energy given off during braking is converted into electricity and then fed into a substation along the line, where it is stored in a lineup of supercapacitor racks. The electricity is then used when needed to power other vehicles, reducing the energy drawn from the utility feed. “Traction power is a significant cost,” says Kai Looijenga, a Senior Engineer for TriMet. “The cost savings from this project helps us, as an agency, to be able to do more for our riders.”

In addition to the S70 and energy storage unit, Siemens is also providing signaling, gate crossing, and communication technologies along the Orange Line to ensure efficient, safe operation.

Client Results

Siemens delivered 18 of the redesigned S70s for use on the Orange Line and on other MAX routes. Manufactured at Siemens solar-powered facility in Sacramento, California, the vehicles began arriving in September of 2014 and underwent rigorous testing prior to the Orange Line launch.

Orange Line service began on September 12, 2015 and featured a procession across Tilikum Crossing, *Bridge of the People*. It’s a first-of-its-kind bridge, spanning 1,700 feet across the Willamette River and designed specifically for public transit, cyclists, and pedestrians.

The procession also passed the substation near Tacoma Street, where the energy storage unit helps power the line. TriMet estimates it will save 176,000 kWh per month. Using remote monitoring, Siemens and TriMet service personnel are tracking its usage to identify ways to make performance even more efficient.

On the Orange Line, riders are enjoying the more roomy and brighter cars, according to Mr. Grohs. “We have a very good partnership with Siemens,” he adds. “They were very open to the feedback and changes, and working in collaboration to deliver a vehicle that works for everyone.”

Siemens Industry, Inc.
7464 French Road
Sacramento, CA 95828

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4/16