Albireo Energy
Partnering for Success

CASE STUDY

Sound Transit Extends Light Rail Throughout Greater Seattle

Getting cars off the road and residents onto public transportation

The Central Puget Sound Regional Transit Authority, also known as Sound Transit, operates the Link light rail system in Seattle and Tacoma, regional Sounder commuter rail and Sound Transit Express bus service.

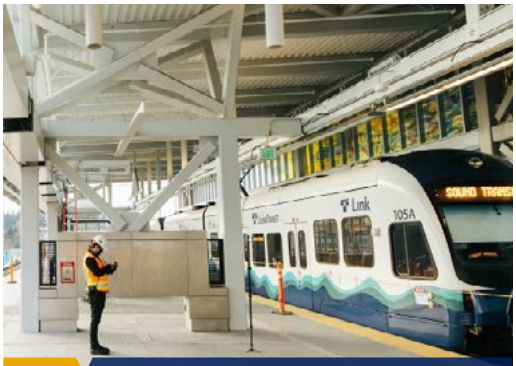
This Washington State public transit agency is planning and constructing 62 new miles of light rail to complete a 116-mile system with extensions to Everett via the Paine Field Industrial Center (Boeing Field); Tacoma via Federal Way and Fife; downtown Redmond; Ballard via South Lake Union and Seattle Center; West Seattle; and a new light rail line from south Kirkland through Bellevue to Issaquah.

CHALLENGE

Seattle is one of the last American cities to adopt an extensive transit system. Residents have quickly embraced public transportation. As the region grows, car traffic has actually gone down. City officials indicate average daily traffic in Seattle proper has stayed flat, and even declined a little since 2006. During this period, the city added more than 116,000 residents, the second biggest percentage increase among America's 50 largest cities. However, building transit systems in today's market takes years to complete. Tackling such an ambitious expansion project costs billions of dollars and depends on a giant roster of contractors.

ALBIREO ENERGY'S SOLUTIONS

For the safety of commuters, each new light rail station is equipped with emergency ventilation (EVS) and building management (BMS) systems. In the event of a fire, these systems will automatically respond by activating large jet fans that redirect smoke to create a safe egress path for passengers. These jet fans range from 100 to 400 horse power and rely on detailed sequencing. An integrated stairwell pressurization system also responds to further control smoke and keep routes clear, while the station's fire alarm and variable messaging systems (also included in the BMS) help guide passengers to the safest egress route.



Albireo Energy manages all aspects of the design, build and commissioning of the EVS and BMS systems.

The overall integration required precision and constant communication between the design team, multiple contractors and Sound Transit.

To implement the EVS and BMS systems at 28 new stations, Sound Transit turned to Albireo Energy, a trusted and known partner with expertise in the design, engineering and integration of building management systems.

Albireo Energy manages all aspects of the design, build and commissioning of the systems. This work includes developing control and network drawings, programming the PLC-based controls that operate the systems and integrating new EVS and BMS into Sound Transit's central SCADA system at their Link control center to allow for remote monitoring. Albireo also coordinates with contractors and vendors to procure the necessary equipment.

Operating these systems are a redundant pair of General Electric Rx3i PLCs (now Emerson) installed in panels positioned on each side of the station. General Electric Cimplicity is used for graphics on both systems.

If the main PLC malfunctions, the redundant PLC will seamlessly take over to prevent disrupting the EVS and BMS. The redundant PLCs and I/O racks are also connected via a ring network using a ring network manager installed to further improve the system's reliability. If communications between the connected PLCs and I/O racks are broken at one point in the ring, the ring network manager can maintain communications between all devices by enabling the signal to travel in both directions around the ring up to the point of the break.

While completing three new stations on the Northgate Link, the Albireo Energy team contended with missing conduit and stairwell pressurization concerns during installation. The overall integration required precision and constant communication between the design team, multiple contractors and Sound Transit.

Northgate Link extension officially opens on schedule for passenger service on October 2, 2021. The East Link extension, set to open in 2023, will bring a total of ten new stations and 40 miles of tracks to Judkins Park, Mercer Island, Bellevue and Redmond. Tens of thousands of Seattle residents are expected to leave their cars at home and take light rail instead.

I-90 Bridge

Transit history will be made in 2023 when Sound Transit's East Link light rail section opens, connecting Seattle and the Eastside. It will be the world's first light rail on a floating bridge. The I-90 floating bridge moves with Lake Washington's water levels to stay buoyant.

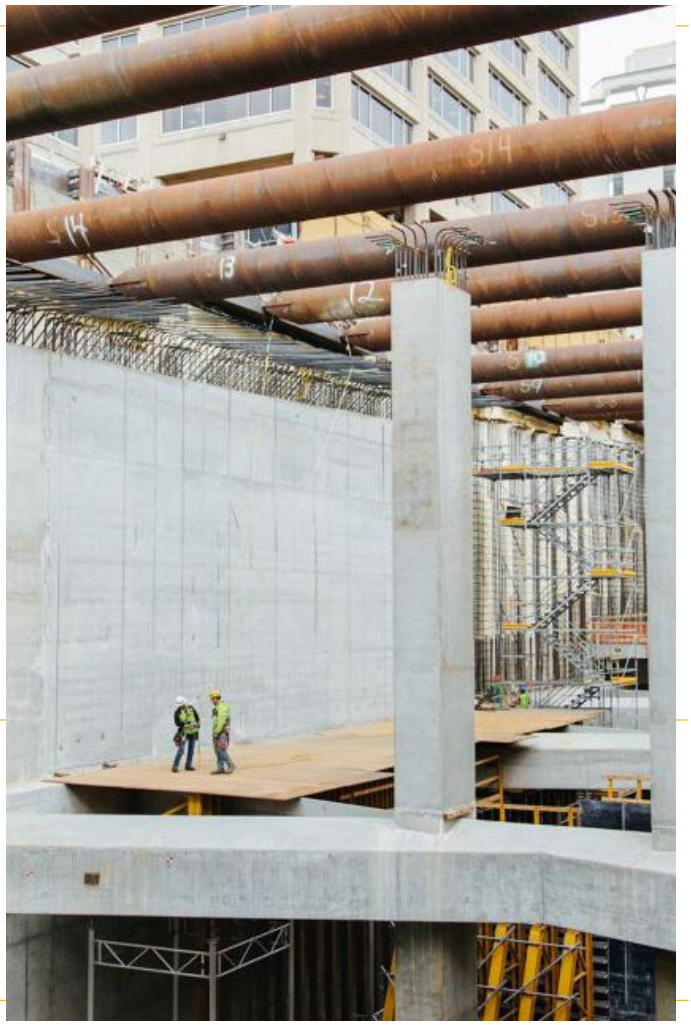
RESULTS

Albireo Energy has worked closely with Sound Transit since the late 2000s on over 20 intricate projects, establishing a proven track record. Through every stage of installation and commissioning of the EVS and BMS project, Albireo Energy performs thorough inspections and testing to ensure the systems are safe and reliable. The result is a proven system that provides peace of mind to light rail passengers that they will be led to safety in the event of an emergency at any of the newly constructed stations. Sound Transit also engaged Albireo Energy to perform audits at existing stations on legacy EVS and BMS systems.

To implement these systems required a tremendous amount of planning and coordination with dozens of subcontractors and system designers. Albireo Energy was so successful that Sound Transit elevated our team to the next level as an official design/build team member for the full expansion. Albireo Energy is designing:

Stray-Current and Corrosion Remote Monitoring System

This one-of-a-kind system monitors voltage spikes and corrosion to the rails. The voltage running through the track is 1,500V. The E750 Stray-Current and Corrosion Remote Monitoring System (SCCRM) is a Emerson Rx3i PLC System that will span the length of the first-ever floating light rail bridge on I-90. The system will monitor and alarm for any stray current from the energized track, measuring both track to water and track to earth potential differential, to ensure that none of the voltage can jump from the track to the water or earth causing damage to the track or life in the water. Albireo Energy works closely with corrosion control specialists to ensure that the complex integration of this unprecedented system will accurately monitor and report all information back to the Link Control Center.



Wind Monitoring System

The Control Center will limit trains on bridge when the system detects waves greater than 1.5 feet and will completely shut down the bridge when the system detects waves greater than 2.3 feet.

Interested in learning more? Reach out to Albireo Energy Energy at info@albireoenergy.com.