

## Flexible Solutions for Freight Facilities – San Joaquin Valley Zero- and Near Zero-Emission Enabling Freight Project

Flexible Solutions for Freight Facilities is a BNSF Railway led initiative to demonstrate zero- and near zero-emission technologies in and around its yards. GE Transportation, now a Wabtec company, will design, manufacture and commission a single Battery Electric Locomotive (BEL) running from Stockton to Barstow in commercial operations. The BEL will reduce operating costs while simultaneously reducing criteria pollutant and greenhouse gas emissions.



In addition, zero and near zero equipment will be demonstrated at the company's intermodal yards in Stockton and San Bernardino. The Stockton and San Bernardino facilities will each demonstrate a Mi-Jack brand hybrid-electric rubber-tire gantry (RTG) crane. The San Bernardino facility will also deploy a full-electric side loader and BYD's Class 8 drayage truck solution, which will be used for short-haul drayage operations in San Bernardino. The project also includes electrical upgrades and electric vehicle supply equipment (EVSE) to charge the series of zero and near zero pieces of equipment and vehicles.

**Dates:** 03/01/2019 – Spring 2021  
**Grantee:** San Joaquin Valley Air Pollution Control District  
**Partners:** BNSF Railway, GE Transportation, BYD, MiJack, Southern California Edison, Pacific Gas & Electric, SH&H Inc., ITS ConGlobal, Southwest Research Institute, Café Coop

**Grant Amount:**  
CARB Contribution: \$22,616,647  
Matching Funds: \$22,620,673  
Project Total: \$45,237,320



### Vehicles/Equipment Funded

**Equipment:** This project funded five pieces of equipment/vehicles deployed at BNSF's Stockton and San Bernardino railyards including:

- One GE Transportation Battery Electric Locomotive (Stockton)
- Two Mi-Jack hybrid-electric rubber-tire gantry crane (Stockton, San Bernardino)
- One Taylor Machine Works, Inc. full-electric side loader (San Bernardino)
- One BYD all-electric Class 8 drayage truck (San Bernardino)

**Infrastructure:** This project provided for the accompanying electrical upgrades & EVSE equipment at Stockton and San Bernardino used for charging the equipment including:

- One wayside charger to recharge the BEL batteries (Stockton)
- One RTG EVSE (Stockton)
- EVSE for the Class 8 drayage truck and electric side loader (San Bernardino)

### Lessons Learned

- Early and constant communication with utilities and contractors is key for successful electric charging infrastructure
- Awardees, not the agency, are responsible for registering with the Department of Industrial Relations to allow contractors to report on prevailing wages
- Provide vendors with deliverables and grant agreement milestone descriptions to ensure reporting and invoicing is correct

### Status Updates

- Power limited test of assembled locomotive with single battery module successfully completed December 2019
- Electric drayage truck in operation at San Bernardino yard
- Assembly of hybrid-electric RTG cranes complete and all-electric side loader in production
- Offsite electrical upgrades complete with onsite improvements in process

