



FINAL REPORT

**Contract #
Grant Agreement No. MS21025**

Costco Wholesale Off-Road Transportation Electrification

Contractor Organization: Costco Wholesale Corporation

October 4, 2023

**Prepared for the Mobile Source Air Pollution Review Committee
(MSRC) under the AB 2766 Discretionary Fund Work Program.**

Acknowledgements

Costco Wholesale Corporation would like to acknowledge:

SCAQMD - South Coast Air Quality Management District
Clean Transportation Funding from the Mobile Source Air Pollution Review Committee (MSRC)

Penske Corporation - Penske Truck Leasing Co., L.P.

City of Jurupa Valley

- Rod Butler, Greg Reneau, Erica Levy, Sandra Schmitz, & Danielle Carriedo

Trinity Structures

Saetec

Sol-Ark

Uptime Charging

Warner Construction

Warner Energy

Endure Energy

WL Butler

MG2

FUSCOE Engineering, Inc.

Costco Mira Loma Depot & Fleet Team

Costco Depot Department

Costco Energy Department

Costco Construction Department

Costco Real Estate Department

Costco Purchasing Department

Orange EV

SunWest

This report was submitted in fulfillment of Contract # Grant Agreement No. MS21025 Costco Wholesale Off-Road Transportation Electrification by Costco Wholesale Corporation under partial sponsorship of the Mobile Source Air Pollution Reduction Review Committee (MSRC). Work was completed as of 8/28/2023.

Retro commissioning began 8/29/2023, everything is working and operating. Still working on fine tuning to be more efficient.

Disclaimer

The statement and conclusions in this report are those of the contractor and not necessarily those of the Mobile Source Air Pollution Reduction Review Committee (MSRC) or the South Coast Air Quality Management District (South Coast AQMD). The mention of commercial products, their sources or their uses in connection with material reported is not to be construed as either an actual or implied endorsement of such products.

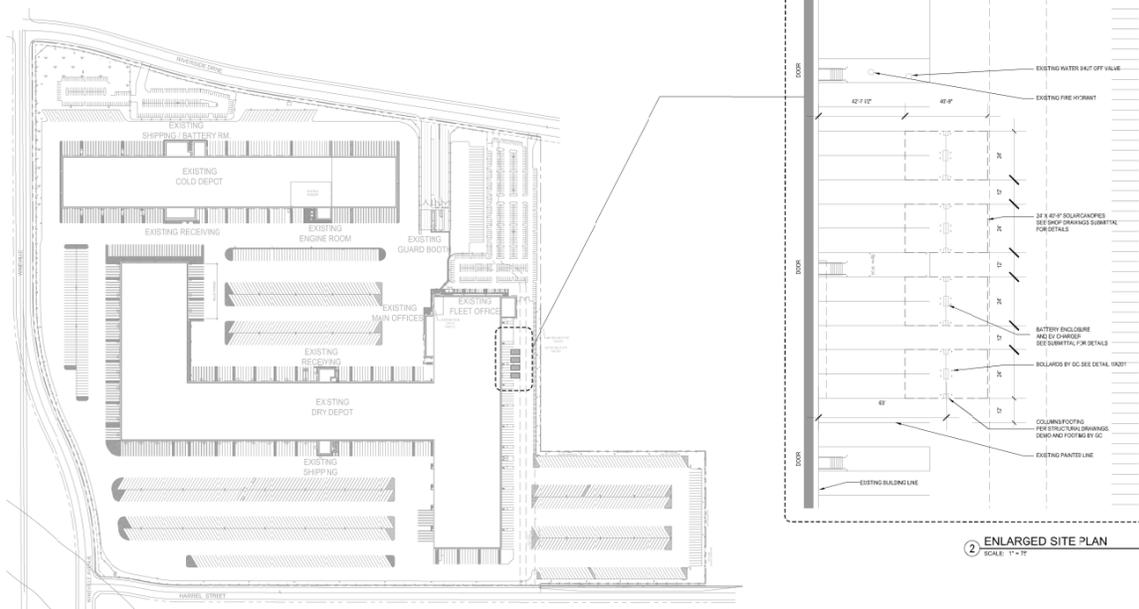
Project Description & Work Performed

Costco Wholesale has supported transportation electrification and are seeking innovative ways to lower emissions and greenhouse gas and do their part to become more environmentally friendly.

AB 2766/MSRC Zero & Near-Zero emission cargo handling equipment & infrastructure at warehouse, distribution, & intermodal facilities in Riverside & San Bernardino counties Grant Agreement.

The installation of four 'off-grid' solar structures (Trinity TS2600's) that integrate solar, storage (batteries), inverters, network communications interface, Modbus Cellular and EV chargers to support the operational use of Orange EV Yard Goat (eTreivers). Trinity will design, engineer, and fabricate structural solar canopies and will then manage Warner energy on direct contract with Costco, the installation of the canopy, batteries, inverters and EV chargers. Trinity will also bring to the project Satec/Expert Power to set-up and establish on-going monitoring and reporting. In addition, Trinity will contract Uptime Charger to be responsible for preventative and emergency maintenance of the four Solar structures, network interface, batteries and inverters as well as the five Orange EV Chargers. The 5 Orange EV Chargers for the project are already procured by Costco with 4 connected to the 'off-grid' solar structures and 1 connected to the grid.

Costco Mira Loma Depot 960 - Fleet Yard
11600 Riverside Drive
Mira Loma, CA 91752



Problems Encountered

SUCSESSES:

- Deployment of the first scaled decarbonized, off-grid fleet charging in the U.S.
- Executed the project from original concept discussion in late April to charging 4 months.
- Complete site design to permitting was completed in 4 weeks.
- Total construction was completed in 5 weeks.
- Deployed and integrated with zero interruption in business operations.
- Executed the complete scope under budget and with superior quality.
- Total project exceeds Costco's internal Climate Action Commitments.
- The structures are 100% off-grid in all aspects and will generate in excess of 400kWh when all four structures are on-line during peak season.
- Integrating industry leading cloud-based monitoring and reporting.

CHALLENGES:

- Required speed to execute circumvented our process for integrated electrical design in advance of deployment.
- Issues that cascaded from that decision were primarily around system settings and electrical architecture.
- Battery and Charging optimization were executed after installation, not prior, which led to rolling shut-downs of the structures as we updated settings and hardware.
- Full power metering and automated monitoring are not yet complete, requiring traditional data downloads from the Inverter until the monitoring is live.

Emissions Benefits

SCAQMD will Calculate

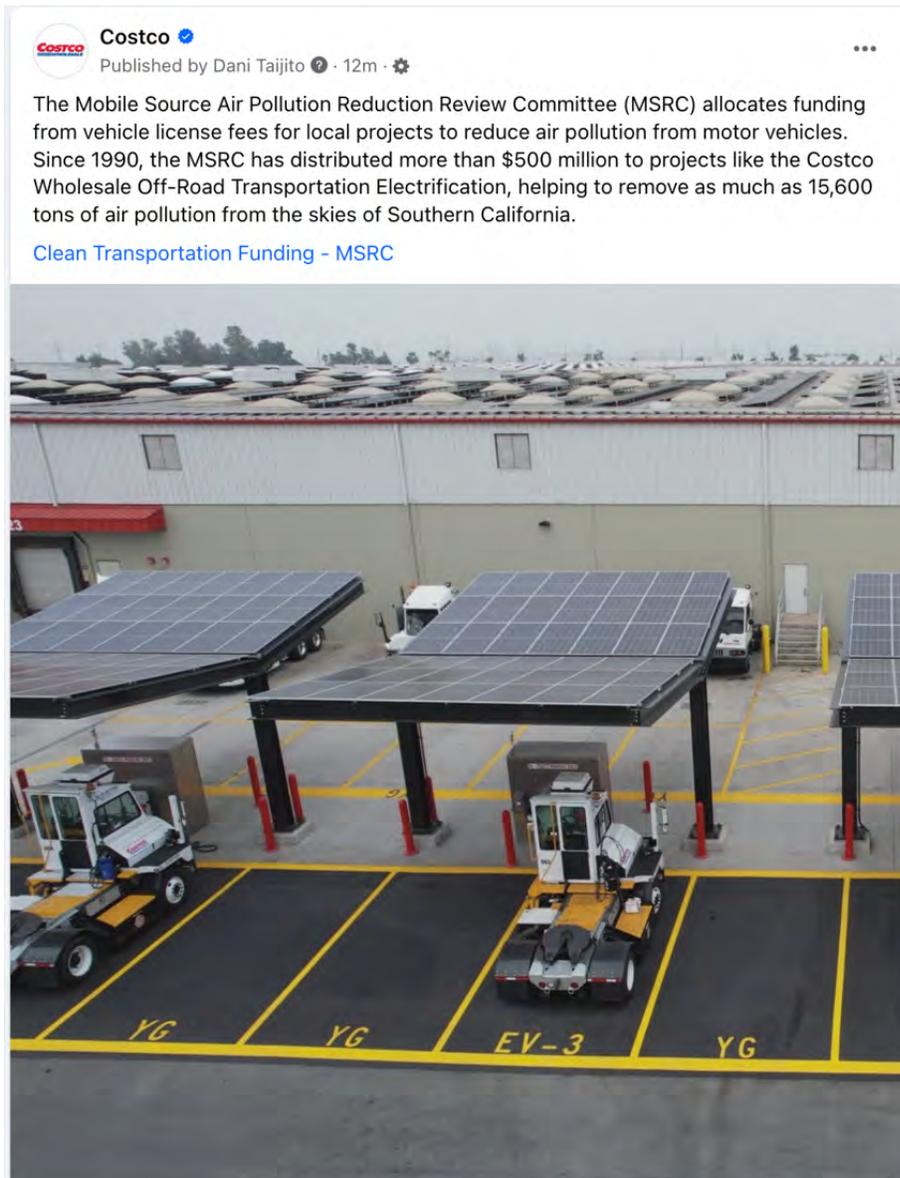
Photographs



EV Charger w/ MSRC Logo/Decal



Outreach



Summary and Conclusions

The installation of four 'off-grid' solar structures (Trinity TS2600's) that integrate solar, storage (batteries), inverters, network communications interface, Modbus Cellular and EV chargers and the one grid tied EV charger are to support the operational use of Orange EV Yard Goat (eTreivers). Each EV Yard Goat is paired with an EV Charger so we are able to collect the data to ensure accuracy and energy efficiency. Back up measures are in place with the Grid Tied EV Charger.