



TO: Commissioners McRae, Barofsky, Schlossberg, Brown and Carlson
FROM: Juan Serpa Munoz, Business Line Manager; Rodney Price, Assistant General Manager
DATE: May 7, 2024
SUBJECT: EWEB and Light Duty Electric Vehicle Charging Infrastructure
OBJECTIVE: Information and Discussion

Issue

During the October 2023 Board meeting, Commissioners requested information on Electric Vehicle (EV) charging infrastructure, also known as electric vehicle supply equipment (EVSE) in EWEB service territory. Currently, the medium and heavy-duty electric vehicle (MHDEV) sector has limited data, information and adoption rates, therefore not the main focus of EWEB EVSE programs. This Correspondence will provide an overview of EWEB's current and future EVSE programs and efforts focusing on the fast-growing light-duty electric vehicle (LDEV) adoption and its charging infrastructure.

Background

Electric vehicles can be broken down into light, medium and heavy-duty categories. Light-duty electric vehicles can come as hybrids, plug-in hybrids (PHEV) or full battery electric (BEV). PHEV and BEV require charging infrastructure to power their batteries. However, BEV have larger batteries that require longer charging times. BEV can have a range of 100 plus miles (some newer BEV have a range of 350 plus miles) on a full charge. In contrast, a PHEV's electric range is between 20 to 40 miles. After the PHEV's maximum electric range has been reached, it will then rely on its internal combustion engine.

There were 3,993 LDEV in EWEB's service territory as of August 2023 according to data provided on electric vehicle registrations by the Oregon Department of Energy (ODOE). Of these electric vehicles, 1,445 are PHEV and 2,548 are BEV.

Both PHEV and BEV need charging infrastructure to replenish their batteries. Charging stations for EVSE come in different types that include:

- Level 1: (1-1.8kW) Uses a typical 120-volt outlet providing 3-5 miles of range per hour of charging.
- Level 2: (3-22kW) Uses 240-volts providing 20 plus miles of range per hour of charging.
- Level 3: (30-360kW) Also known as direct current fast charging (DCFC), provides fast charging speeds, offering 50 plus miles per hour of charging. Mainly used in fleets and public charging.

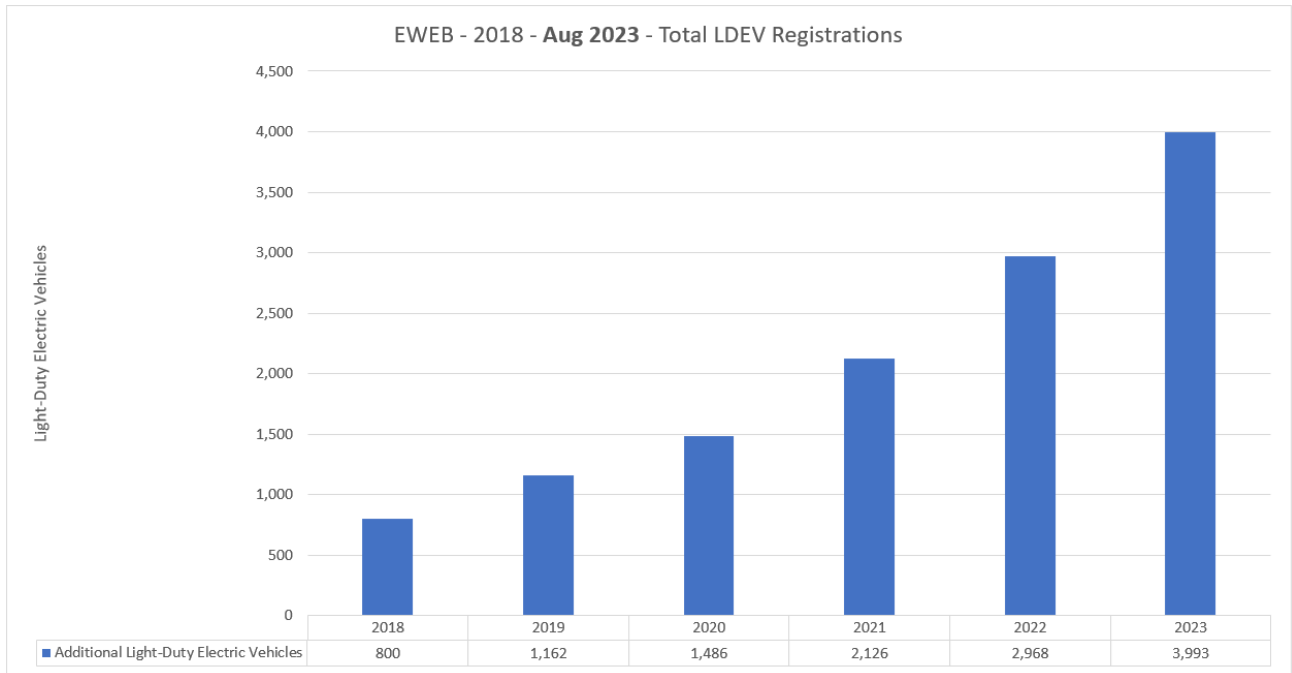
Level 1 and Level 2 can be used by PHEV, while BEV can leverage all three levels of charging. Although an EVSE will have a maximum amount of power it can output, the EV will ultimately dictate the acceptance rate of the vehicle and how quickly it charges its battery. As an example, a DCFC station may be rated to provide 150 kW, but the EV may only accept a maximum of 55 kW.

EVSE have additional plug and charging standards that include SAE J1172, CHAdeMo, CCS, and NACS depending on the level of the charger. In 2023 however, most EV manufacturers announced their intention to adopt the Tesla standard, NACS. Manufacturers will start moving to this standard in 2024 and 2025.

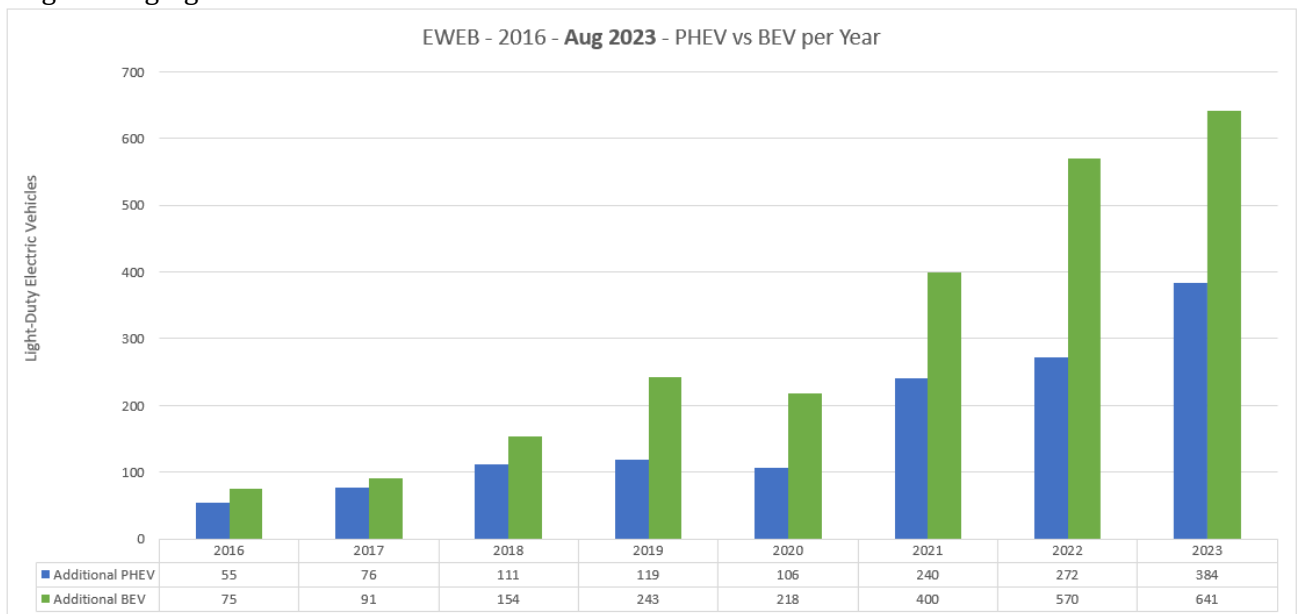
According to data from the Department of Energy, there are 65 public EVSE locations within 5 miles of downtown Eugene providing 145 ports. Of these, 10 are DCFC with 6 being 150 kW and part of the [Electrify America network](#).

Discussion

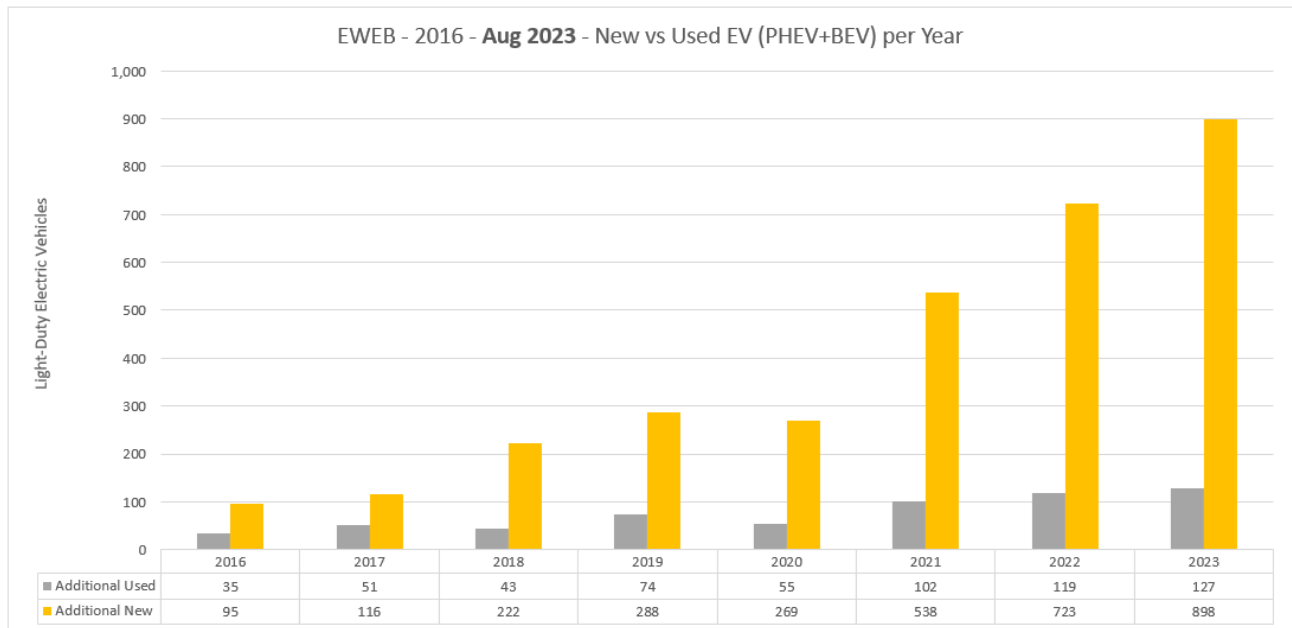
Since 2018, EWEB has seen a 40% average LDEV growth per year in its service territory.



The growth of EV is higher in the BEV sector, which equates to LDEV with bigger batteries that will need longer charging times.



Additionally, the growth of new LDEV is higher than the used market, which brings EV that can accept higher rates of power. The higher adoption of newer LDEV, which would have a higher financial cost, may also indicate the demographics of the populations that can currently access these technologies.



The trends above indicate increasing and higher charging needs from the LDEV sector. EWEB's residential EVSE rebate program data shows the majority of EVSE being installed in single-family homes, which indicates that these vehicles are leveraging Level 1 and/or Level 2 stations.

In understanding the LDEV adoption landscape in EWEB service territory, different sources of data are available and leveraged:

- [The Oregon Electric Vehicle Dashboard](#) (collected by the Oregon Department of Environmental Quality) provides information on LDEV registrations, but the data resolution is only available at the ZIP Code level and can take a few months to be updated.
- EWEB residential EVSE rebate program data provides data resolution at the address level on charging infrastructure. Since 2020, it has captured a yearly average of 27% of LDEV registrations in EWEB service territory.
- EWEB's commercial EVSE rebate program data provides insights on level 2 and DCFC EVSE installations in the public, multifamily, fleet, and workplace sectors, but the total number of these installations is likely not fully captured.

The above resources allow EWEB to understand and provide a basis for modeling LDEV growth, but medium and heavy-duty electric vehicle (MHDEV) data is not as readily available. This presents a gap in understating the MHDEV sector and the potential charging needs it may have in the future. The charging power and length of time needs of MHDEV will be much higher than LDEV and will likely leverage DCFC in a greater amount. However, growth in this sector will be slower because of the availability of technologies that can fully replace its internal combustion engine (ICE) counterpart.

EWEB continues to work to close these data gaps with various efforts and partnerships on evaluations and data sharing, including the Demand Response and Electrification Potential Assessments (both are components of the Demand Side Potential Assessment) that will cover the transportation sector and are to be completed in Q1 2025, a partnership with the University of Oregon on a fleet electrification study to be completed in Q3 2024, and working with ODOE in getting LDEV registration data resolution at the transformer level with initial deliverables in early Q3 2024.

The adoption of the LDEV sector helps in providing an understanding of its charging needs and how EWEB will prepare for the opportunities and challenges that come from this, but also how EWEB will support this infrastructure. Various studies, including the National Renewable Energy Laboratory's 2030 Light-Duty EV National Charging Network Study, indicate that private charging (single-family,

multifamily, and workplace) will be where most of the charging will need to take place to support LDEV adoption. DCFC has and will continue to have a place in providing options to those without overnight charging and for travel, but it will have a much smaller number of units as private charging will cover the majority of LDEV needs. Lastly public destination charging in dense neighborhoods, office buildings, retail outlets, etc. will support the additional charging needs of this sector. In these areas, the appropriate EVSE speed of charging should be implemented to match the typical parking times of the site.

In considering the power supply needs of LDEV, EWEB’s updated LDEV forecast assumes that there will be a total of 6,017 electric vehicles on the road within EWEB’s service territory at the end of 2024. This number is currently tracking with actual EV registration data for 2023 collected by Oregon DEQ. By 2030, the EV forecast estimates that the total LDEV could grow to over 32,000, which is estimated to be an increase of 10 aMW of annual energy use and an 18 MW peak (roughly 4 times higher than LDEVs represent today). The forecasted energy needs assume managed charging behavior where EV owners avoid charging during EWEB’s system peaks because of price signals from the utility. Note, these forecasted energy values are only for light-duty electric vehicles and do not include the impacts of medium and heavy-duty vehicle electrification.

On the distribution grid needs for LDEV, thirty-eight substations, connect the utility's electric grid to BPA sources and local generation both in the Urban and McKenzie River territories. The flexibility provided by original construction decisions has put EWEB in a good place in having robust and redundant transmission and substation systems to accommodate changing demands such as electrification and EV adoption. The transmission and substation systems in general have ample capacity and the ability to provide redundant feeds. However, for services or clusters of homes, some of the individual services were not originally designed with additional large load growth and will need to be upgraded for customers that wish to add to their electrical system. Typical upgrades include transformer, service line and in some cases the customer’s electrical panel. These “Make Ready” upgrades are common electrical installation work when loads are increased, but the challenge can be the speed of adoption and demand of that work amongst supply chain, staffing shortages, and funding.

To better understand potential customer related workload and grid impact related to EVSE work, in 2023 EWEB Distribution Engineering began tracking EVSE related work requests from customers. While there were only 9 EVSE Make Ready projects in 2023, growth trends indicate there will be around 32,000 LDEV registered in 2030, which will have impacts on EWEB’s ability to support all programs providing distribution related services.

LDEV Registrations	EWEB EVSE Rebates	EWEB EVSE Load Checks	EWEB EVSE Make Ready Upgrades
1,025	262	108	9

Additionally, EWEB’s ongoing work on grid resiliency has developed a plan to rebuild 10 substations in 10 years (out of 38 substations total). Much of EWEB’s infrastructure was built between the 1950s and 1970s and it is reaching the end of its life. These upgrades will serve many purposes, including ensuring reliable capacity at the substation and main distribution feeder level for future EV charging.

With the above considerations of where LDEV infrastructure will be needed, the effects on energy consumption and system peak, and the impact on our distribution system, EWEB looks to support charging infrastructure in our community that is effective and appropriate with a primary focus for private (single-family, multifamily, and workplace) applications, and a secondary one for public locations. Currently, and in the immediate future, EWEB support will be done through rebate programs to assist private and public infrastructure with the costs of EVSE hardware installations and with the potential utility service upgrades that may be needed. These programs will support EVSE hardware and

network technologies for the future support of EWEB’s goals that include standards for interoperability, connectivity, and demand-response readiness.

EWEB has considered being an EVSE operator and deploying EWEB-owned infrastructure in our community, including exploring partnerships with local retailers to install DCFC stations. However, with the bigger need for LDEV charging infrastructure being in the private (single-family, multifamily, and workplace) sector and with the challenges public EVSE owners and operators face, including vandalism, high costs, maintenance, reliability, and staff needed to manage these stations, EWEB will focus on supporting EVSE efforts while partnering with others to help grow public EVSE infrastructure.

EWEB leverages the Oregon Clean Fuels Program for funding for all transportation electrification (TE) efforts including those that support charging infrastructure. By using the Oregon Clean fuels funding instead of electric rates, TE efforts and programs have a greater capacity to bring social equity and accessibility to meet our community and EWEB needs for electric transportation growth.

EWEB currently provides the charging infrastructure incentives below. Additionally, EWEB offers the Electric Mobility Community Grant Program to help non-profit, educational institutions, and government entities with their TE efforts, including charging infrastructure. Although EWEB currently does not have a demand response program, EVSE rebate program requirements are in place to help provide these opportunities in the future.

Rebate	Amount	Installation Cost Coverage
Residential EVSE Rebates (Level 2)	\$500	35%
Commercial (Public, Multifamily, Workplace, and Fleet) EVSE Rebates (Level 2)	\$1,500	18%
Affordable Housing EVSE Rebates (Level 2)	\$2,000	25%
Commercial EVSE Rebates (DCFC) - Single Port	\$10,000	5%
Commercial EVSE Rebates (DCFC) - Multi Port	\$15,000	15%
Residential EVSE Make Ready (Utility Service Upgrades) Grant	\$2,000	52%

The funding from Oregon Clean Fuels Program is projected to continue increasing along with the registration of EVs in our service territory as reflected in our annual budgets since 2020. As funding increases allow, the rebates above will be reviewed and potentially expanded beginning in June 2024 to better support private and public charging and to further help with the costs of EVSE make ready utility service upgrades. Other possible changes in 2024 and 2025 include providing an increase in the residential EVSE rebate and the separation and increase for multifamily and workplace infrastructure rebates. Additionally, rebates for affordable housing EVSE rebates may increase, and new EVSE make ready grants will be added for multifamily and workplace locations. The rebates for DCFC could also likely see an increase to better support our partner agencies with public charging. TE goals and programs will continue to be reviewed in the future to best match the needs of customers and EWEB.

EWEB will continue to work on various TE evaluations and modeling to assess adoption rates to help the utility evolve and meet EV demands, including power supply, distribution grid, and program sectors. We need to have a better understanding of LDEV in comparison to MHDEV, and the partnerships and evaluations being completed will help illuminate and guide the future of our electric vehicle charging infrastructure programs, including considerations for demand-response, time pricing, grid-tied technologies, and a geographical approach to programs that also tie energy efficiency to electrification efforts. EWEB has, and will continue, to look at solutions that will involve our customers as future efforts will rely on them to be active partners in our work. Partnering with our customers will help support electric vehicle charging needs, accessibility, and adoption while helping ensure grid stabilization and access to clean power to bring a benefit to all EWEB customers.

Requested Board Action

Information only, no Board Action is requested.