

TACOMA POWER

# Transportation Electrification 2021 Action Report



**TACOMA POWER**  
TACOMA PUBLIC UTILITIES

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In 2019 the Washington state Legislature passed SB 1512 to clarify that public power utilities, like Tacoma Power, had an important role in decarbonizing the economy through transportation electrification (TE). The bill specified that each utility's governing board must endorse a strategic plan to guide our TE actions. The Tacoma Public Utilities (TPU) Board adopted the Transportation Electrification Plan in July of 2020 with a request that we update it annually on programs and activities. This Action Report will:

- Provide an overview of the state of transportation electrification, including updates on technology developments and developments in the electric vehicle (EV) marketplace.
- Describe the successes and challenges of current programs.
- Provide previews on future program development.
- Present information relevant to the mission, including resources and budget projections, state and local policy development participation, and community and customer engagement.

Our Transportation Electrification Plan aims to help customers increase our electric transportation load by 10 average megawatts (aMW) over 2019 by the end of 2030.

## Challenges in 2020-2021

Since the Transportation Electrification Plan was adopted, the general environment for promoting electric transportation has become more challenging than anticipated.

In March of 2020, many utility employees and most non-essential workers transitioned to “work from home” to reduce the risk of infection from the novel Coronavirus-19. Two months later, the tragic death of George Floyd sparked a nationwide social movement to recognize and address systemic racism. The combination of these events has had significant social and economic impacts and has made efforts to promote transportation electrification more difficult. Against these issues, the relative importance of electric transportation for many individuals and institutions was reduced, particularly for those struggling economically.

The utility made concerted efforts to restrict new spending in the 2021-2022 biennial budget to minimize rate increases recognizing many customers' challenges. The result was to limit the budget for transportation electrification efforts to \$220,000 for the biennium, significantly below our initial proposal.

Despite the obstacles of the past year, we successfully advanced electric transportation projects and programs by withdrawing from in-person events, and supplementing our budget with grant funding. As the pandemic wanes, the economy recovers, and institutional changes occur over the next year, we hope that public receptivity and funding opportunities will increase.

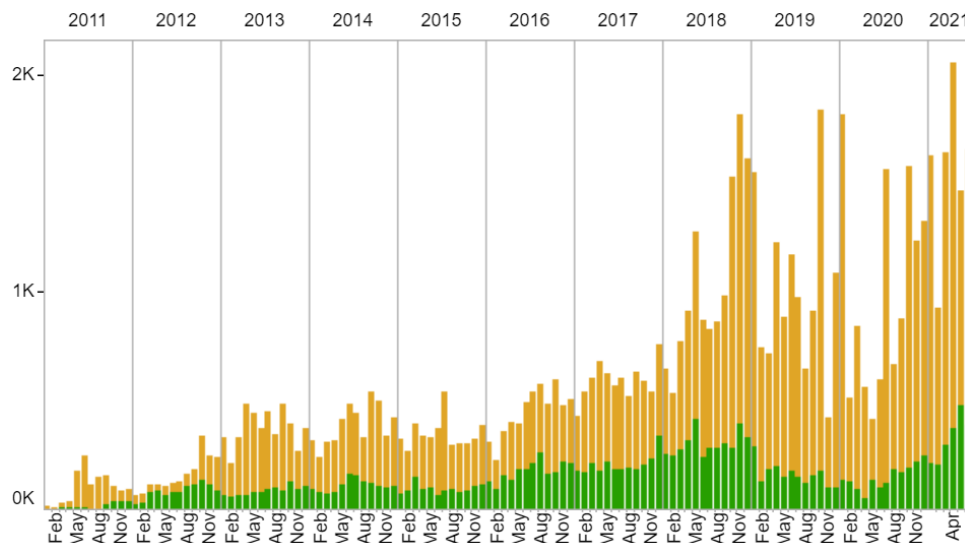
# The Changing Landscape



Electric motors are the challenger to the century-old incumbent of the transportation industry – the internal combustion engine (ICE). While the complete transition to EVs will take at least two decades, as the fuel provider, we need to act now and prepare for this radical shift occurring in the marketplace. It will require significant capital investment, changes to utility practices, and new technology to manage effectively.

Currently, there are over two million EVs in the U.S. and EVs comprise approximately 1.5%<sup>1</sup> of new vehicle sales. Electric vehicles comprise 1.5% (or 75,000) of the total vehicles in Washington state<sup>2</sup>, over 5000 in Pierce County, and over 2500 EVs are registered in Tacoma Power's service area. While this proportion may seem small, the market is poised to change rapidly due to three factors: supportive government policy, improving cost economics, and the expanding list of available EV models.

## Electric Vehicle Sales in Washington<sup>3</sup>



## Policy and Legislation

Federal and state policy is aligned with a clear strategy reduce greenhouse gases through de-carbonizing transportation. Legislation and fiscal policy are tilting the table in favor of EVs by providing billions of dollars in tax incentives, infrastructure grants, and utility program funding. Policymakers have designed these efforts to stimulate demand and seed initial investments in this promising technology.

The Biden Administration has announced plans to commit \$174 Billion to increase the number of charging stations nationwide from 100,000 to 500,000<sup>4</sup> to support a goal that 50% of vehicle sales be electric by 2030<sup>5</sup>. The Washington state legislature has adopted a non-binding goal in HB 1287 (2021) for all new vehicle sales in the state to be electric by 2030, the most ambitious goal set by a state yet.

<sup>1</sup> <https://www.eia.gov/todayinenergy/detail.php?id=43835> The recent decline in light-duty vehicle sales has affected cars more than light trucks - Today in Energy - U.S. Energy Information Administration (EIA)

<sup>2</sup> <https://www.autosinnovate.org/resources/electric-vehicle-sales-dashboard> electric-vehicle-sales-dashboard (autosinnovate.org)

<sup>3</sup> <https://www.autosinnovate.org/resources/electric-vehicle-sales-dashboard> electric-vehicle-sales-dashboard (autosinnovate.org)

<sup>4</sup> <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-biden-administration-advances-electric-vehicle-charging-infrastructure/> FACT SHEET: Biden Administration Advances Electric Vehicle Charging Infrastructure | The White House

<sup>5</sup> <https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/05/fact-sheet-president-biden-announces-steps-to-drive-american-leadership-forward-on-clean-cars-and-trucks/>

# The Changing Landscape

The state's last goal to have 50,000 registered EVs by 2020<sup>6</sup> was successfully met, and the number continues to grow steadily. There are over 78,000 plug-in EVs registered in Washington state and almost 6,300 in Pierce County.

Recent state legislation supporting transportation electrification include:

- House Bill 1287 – Zero Emission Vehicle Planning bill to direct state agencies to develop mapping and forecasting tools to assist with power utility planning of transportation electrification
- Substitute Senate Bill 5192 sets building code requirements to install 240-volt electric service to at least 10% of parking spaces to prepare them for EV charging equipment
- Senate Bill 5000 (2020) creates sales and tax exemptions for fuel cell EVs
- House Bill 1091 (Clean Fuel Standard) provides saleable credits based on the carbon intensity of the fuel supplied. With our utility's nearly zero-emission system power, significant credit revenue will be made available for future transportation electrification program spending beginning on January 1, 2023
- Senate Bill 5192 set forth EV Charging station regulations, interoperability, and reporting requirements

## Improving Cost Economics

As more electric vehicles are sold, the industry will realize economies of scale in production and EV costs will be driven lower than competitor ICE vehicles. Since 2010, EV battery costs have decreased by 85%<sup>7</sup> and are likely to break the pivotal \$100/kW<sup>8</sup> around mid-decade<sup>9</sup>. Many economists predict that when the purchase price favors EVs, the momentum toward mass market adoption will take over and will quickly carry EVs to a majority position<sup>10</sup>. Norway, a country with abundant hydroelectric power and low power prices had a similar recent experience. When government incentives and tax credits lowered the total cost of ownership for EVs, the adoption rate quickly exceeded 54% of new car sales. By comparison, most other European nations have less than 5% EV adoption.

In the last year new car sales in the US fell by 23% in 2020 due to the economic and social impacts of the COVID-19 pandemic but over the same time, EV sales only decreased by 10%<sup>11</sup>. Part of this decline can also be explained by the reduction in Federal tax credits paid to consumers in 2020 when some of the more popular EV manufacturers (Tesla, GM) hit their incentive caps<sup>12</sup>. All comparative industry indicators suggest EV demand remains strong in the United States and around the world.

Over the next couple of years, commercial fleets are expected to begin to significantly transition to electric versions. The most likely fleets to transition will be light duty pool cars, urban package delivery trucks, school buses, and transit buses. This is especially true for federal agencies around the country per President Biden's executive order to requisition all "clean and zero-emission vehicles for Federal, State, local and Tribal government fleets, including vehicles of the United States Postal Service."<sup>14</sup>

<sup>6</sup> <https://data.wa.gov/Transportation/Electric-Vehicle-Population-Size-History-by-County/q5qv-gkcz> *Electric Vehicle Population Size History by County | Data.WA | State of Washington*

<sup>7</sup> <https://data.wa.gov/>

<sup>8</sup> <https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/05/fact-sheet-president-biden-announces-steps-to-drive-american-leadership-forward-on-clean-cars-and-trucks/>

<sup>9</sup> <https://www.visualcapitalist.com/electric-vehicle-battery-prices-fall/>

<sup>10</sup> <https://theicct.org/publications/update-US-2030-electric-vehicle-cost>

<sup>11</sup> <https://www.tandfonline.com/doi/abs/10.1080/00963402.2017.1413055?journalCode=rbul20> *Electric vehicles: Approaching the tipping point: Bulletin of the Atomic Scientists: Vol 74, No 1 (tandfonline.com)*

<sup>12</sup> <https://www.iea.org/reports/global-ev-outlook-2021/trends-and-developments-in-electric-vehicle-markets>

<sup>13</sup> <https://insideevs.com/news/407295/today-federal-tax-credit-gm-gone/>

<sup>14</sup> <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/>



# The Changing Landscape

Heavy-duty, and long-haul trucks using battery-electric technology have technical limitations because of the trade-off between battery weight and effective range. It is important to address electrification of the heavy-duty vehicle sector because it accounts for 24% of all transportation emissions despite being only 5% of vehicles<sup>15</sup>.

Long-distance trucking, rail, maritime, aviation, and other heavy-duty applications may be better served with hydrogen fuel cell technology which can operate in a quiet, safe, and efficient manner. Hydrogen created with renewable, carbon-free electricity is essential in providing a zero-emission alternative to transportation fuels. To encourage investment in renewable hydrogen production and use in fuel cell transportation, federal and state governments expanded policy definitions and are expanding funding opportunities to include them on equal footing with battery-electric alternatives. The Department of Energy has recently launched a “Hydrogen Earthshot” effort to reduce the retail cost of green hydrogen to \$1 per 1 kg of renewable hydrogen within one decade<sup>16</sup>.

## Expanding List of EV Models

More and more automakers have noticed the success of EV manufacturers like Tesla, whose market capitalization in 2020 surpassed the world’s next nine carmakers combined<sup>17</sup>. Recognizing that EVs are projected to be a \$46 trillion market opportunity between now and 2050<sup>18</sup>, traditional carmakers are announcing that electrification is at the center of their future strategic plans. General Motors is planning to spend \$35 billion to convert ICE production to EVs by 2025<sup>19</sup>. Ford recently announced plans to help local utilities and customers install 40,000 EV chargers nationwide to support growing EV demand.

Some carmakers are even announcing that they intend to retire production and sale of ICE vehicles: Volvo in 2030, Ford (Europe) in 2030, General Motors (light duty) in 2035, and Volkswagen is pledging to over 50% of vehicles sold worldwide by 2030 will be EVs.

Automakers hope to compete by introducing more models, including sport utility vehicles (SUVs) and pickup trucks, a crucial market share battleground. They might be onto something - Ford recently received over 100,000 pre-orders just three weeks following the global release of its new, all-electric F-150 Lightning<sup>20</sup>.

## Impacts of Transportation Electrification on Utilities

EV charging infrastructure must significantly expand to power the incoming wave of EVs. One study estimates that the Seattle-Tacoma metroplex must more than double its current charging points to keep up with the expected vehicle demand<sup>21</sup>. Planning and adapting for this growth in electric service to accommodate the expected increase local peak and total electricity demand, particularly in areas with DC fast chargers. Waiting for this to become a widespread problem will frustrate customers and increase the need for costly capital investments. Recently, there have been calls for the electrification of all heating and cooling load in commercial and residential buildings and for electrifying industrial process load. If these trends continue simultaneously, utilities will face a wave of electrification not seen since the early 1900s.

<sup>15</sup> <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>

<sup>16</sup> <https://www.energy.gov/eere/fuelcells/hydrogen-shot>

<sup>17</sup> <https://www.cnbc.com/2020/12/14/tesla-valuation-more-than-nine-largest-carmakers-combined-why.html>

<sup>18</sup> <https://about.bnef.com/blog/electric-vehicle-sales-set-to-rise-faster-than-ever-but-more-policy-action-needed-to-get-on-track-for-net-zero/>

<sup>19</sup> <https://www.atlanticcouncil.org/blogs/energysource/electric-vehicles-and-the-metamorphosis-of-an-industry/> *Electric vehicles and the metamorphosis of an industry* - Atlantic Council

<sup>20</sup> [https://www.newsdata.com/clearing\\_up/clearing\\_it\\_up/electric-vehicle-advocates-see-wide-open-roads-ahead/article\\_ea9e1338-d05e-11eb-a7e8-bbd2a0249cf3.html](https://www.newsdata.com/clearing_up/clearing_it_up/electric-vehicle-advocates-see-wide-open-roads-ahead/article_ea9e1338-d05e-11eb-a7e8-bbd2a0249cf3.html)

<sup>21</sup> For more explanation, please refer to the Tacoma Power Transportation Electrification Strategic Plan

# The Changing Landscape

**Table A1.** Estimated cumulative electric vehicles and estimated workplace, public level 2, and DC fast charge points in 2020 and 2025 for the 50 most populous metropolitan areas in the United States

Area	2020 BEV	2020 PHEV	2020 Workplace charge points	2020 Public level 2 charge points	2020 DC fast charge points	2025 BEV	2025 PHEV	2025 Workplace charge points	2025 Public level 2 charge points	2025 DC fast charge points
Seattle	28,451	12,933	1,704	1,561	311	59,544	27,937	2,656	2,906	414

## Transportation Electrification Goal

In our Transportation Electrification Strategic Plan, we set a goal to help customers achieve the equivalent of 10 average megawatts of transportation electrification within 10 years. While the utility has a limited role in the overall market transformation, we felt a goal would help focus utility efforts, nonetheless.

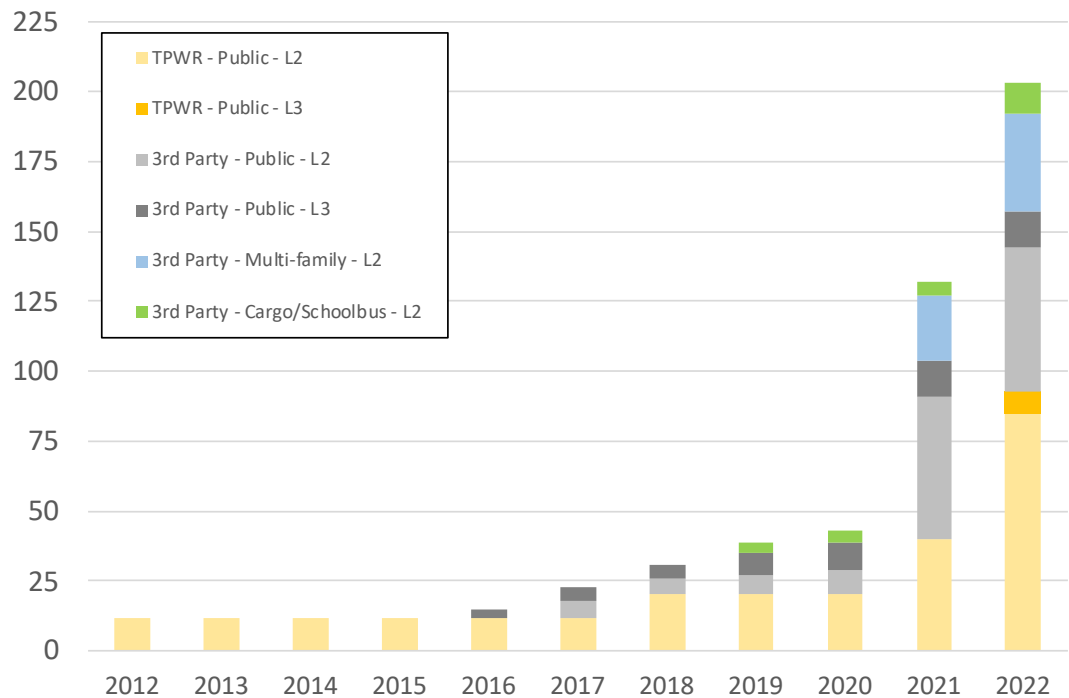
To measure our effectiveness in complying with the goal, we should consider three categories of influence:

1. Programmatic: estimated effectiveness of programs over the 10 years we launch to pursue transportation electrification. We offered a financial incentive for projects in this category, which made them possible; if we did not act, the project would not have happened.
2. Supportive: estimating the effectiveness of efforts that included our participation and support. Projects in this category were helped by our utility, making significant adjustments to corporate policy, offered a special rate to encourage behavior, or provided substantial technical support. Without our participation, this project may not have been as successful or might not have happened at all.
3. Momentum: transportation electrification growth that occurred without direct financial or organizational support from us, but our efforts may have indirectly influenced it. Our utility plays a crucial role in making electrification projects friendly through customer education, customer-friendly policies, and funding external organizations that promote electrification.

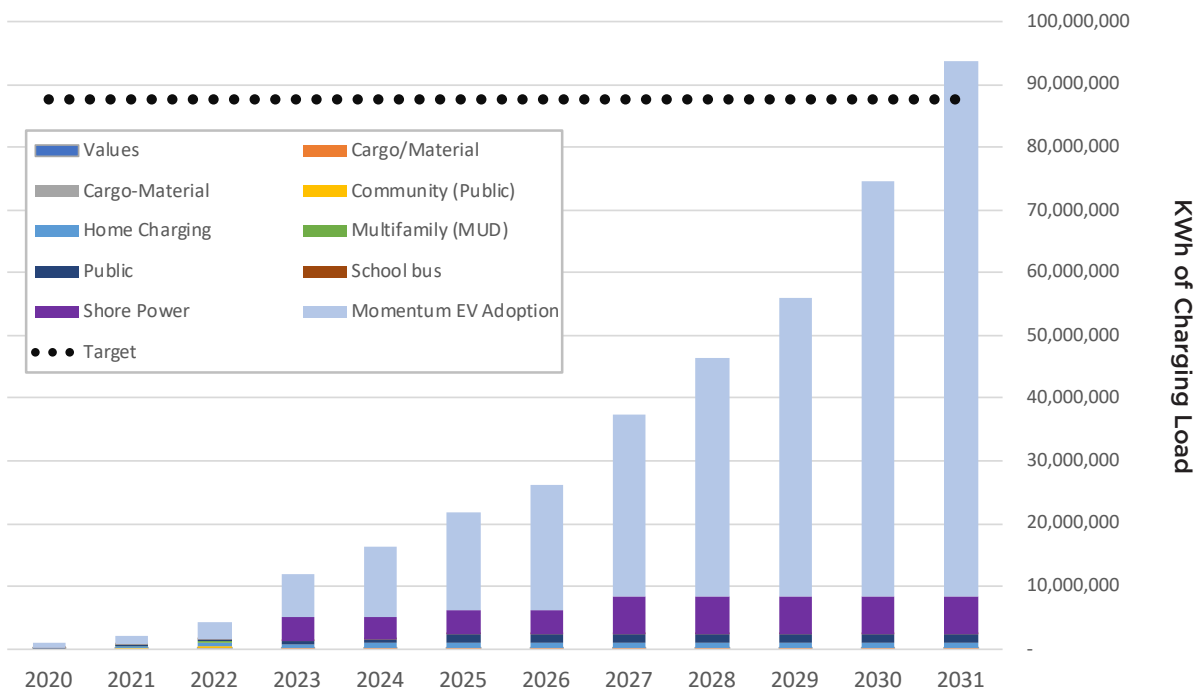
Given that we can only partly influence the outcome and that other factors may affect the measured result, it is ultimately up to the individual to decide whether they think our utility was successful in its efforts.

# Transportation Electrification Goal

## EV Charging Ports Installed with Tacoma Power Support

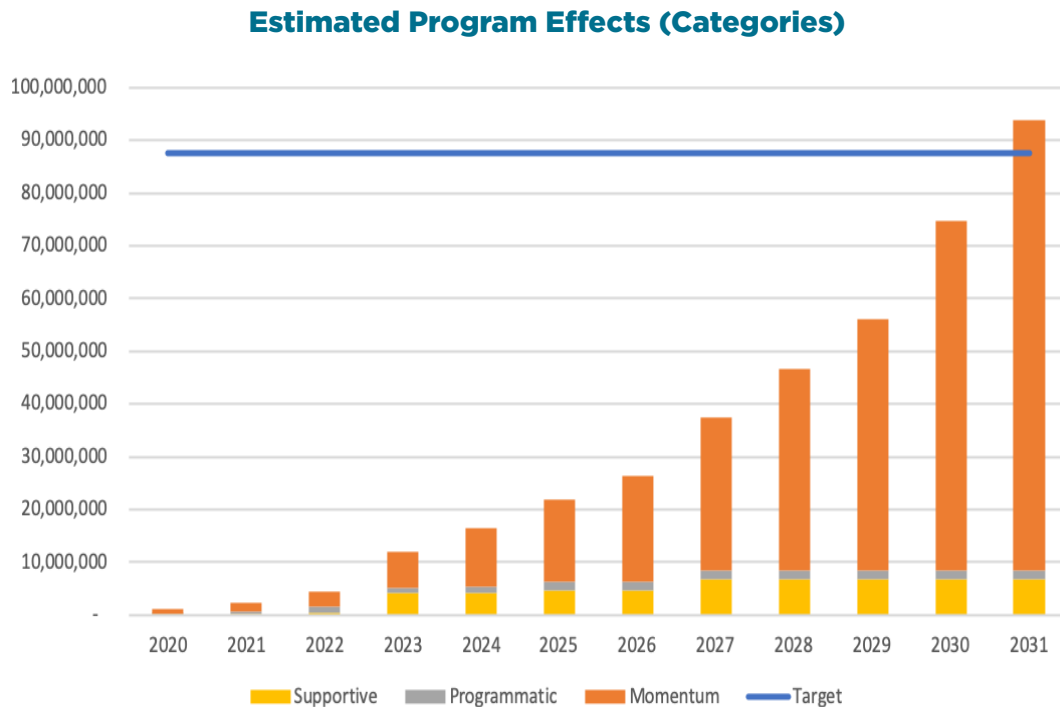


## Estimated Program Effects





# Transportation Electrification Goal



## Resources and Budget

### Staffing

Transportation electrification projects at our utility are led and managed by Energy Research and Development, a team within the Power Management Section. A staff of three plus two on loan from Customer Energy Programs worked with others across TPU and outside stakeholders to design and develop programs and partnerships in 2020-2021. We filled two new permanent positions in the third quarter of 2021, and the two loaned positions were returned. As the policy and legislative efforts continue to add regulatory requirements and increased funding opportunities, it may be necessary to add additional staff positions to help the utility, stakeholders, and customers navigate this industry transition.

### External Funding

Whenever possible, we seek to use external funding to keep transportation electrification programs affordable to customers. Grants and partnerships help keep the utility's investment in transportation electrification within spending limits the legislature imposed (SB 1512) and comply with a utility cost test<sup>22</sup>.

In 2021, the state legislature passed the "Clean Fuel Standard" (HB 1091), which will give credits to fuel providers (including electricity) that have a carbon intensity below the standard set by the Department of Ecology. These credits can be used for compliance, banked for later use, or sold to others. Revenue generated through credit sales can be used for decarbonization and transportation electrification projects. These credits will be valuable for programs designed for low-income and disadvantaged communities and high-value, hard-to-reach projects requiring additional upfront investment.

The Department of Ecology will host rulemaking sessions later this year to prepare for the bill going into effect on 1/1/2023. We hope that selling clean electricity through current and future projects will generate funds to continue offering programs to help our customers decarbonize by electrifying transportation.

# Resources and Budget

## Electric Vehicle Charging Station Fund

In March 2020, we worked with the City of Tacoma Office of Environmental Policy and Sustainability and Puget Sound Clean Air Agency to create an Electric Vehicle Charging Station Fund. The initial fund was made possible by a Supplementary Environmental Project – a program offered by the Environmental Protection Agency that diverts ecological fines to fund environmentally restorative projects - provided \$852,366 in external funding. Three transportation electrification programs were developed to use this funding: a Cargo and Material Handling Equipment Program, a Public EV Charging Incentive Program, and a Multi-Unit Dwelling EV Charging Retrofit Program. The fund was limited to projects within Tacoma city limits and to projects completed before December 2021.

We were able to start and launch the three new programs within nine months of creating the fund and have since allocated over 90% of the funding by August 2021, with many program applicants on a waiting list for additional funding. We also used a portion of the money as match funding to seek other grants in partnership with the City of Tacoma, adding \$597,558 more for public EV charging station projects.

Because of the challenges faced in 2021, we asked our partners to extend the funding agreement by one year to allow time for construction completion through to December 2022 and allow us latitude in allocating the remaining funding. We will continue to seek additional external funding to recharge the Electric Vehicle Charging Station Fund to address new and waitlisted applications until credit revenues from the Clean Fuel Standard (HB 1091) can be used in 2023.

## Current and Future Budget Needs

Energy Research and Development has a total budget for the 2021-2022 biennium of \$2.4 million, which includes all embedded labor costs and expenses and is also used for non-transportation electrification projects. Budgeted program spending available for transportation electrification direct incentives and matching funds is \$220,000 for the biennium. This budget will likely be exceeded and need to be increased in the 2023-2024 biennium to keep pace with growing customer demand for information, incentives, and services. It is important to remember that incentive spending on TE programs provides increased revenues and is a net financial benefit to the utility through increased retail sales. Incentive program spending must pass a utility cost test to ensure that non-participants are not subsidizing program participants.

## Taxation on Grant Funding

One unforeseen outcome of accessing external funding has been the recent decision by the Washington State Department of Revenue to assess a 2.5% Business and Occupation tax on the agreement that provided funding for the Electric Vehicle Charging Station Fund. The DOR explained that while the agreement had intentionally been structured as an agency contract that would hold the funds separate from general revenue to be dispersed wholly in customer incentives, it failed in this mission because the programs were designed to be “not fully designed,” and therefore the utility had discretion over how the funding would be used; this put it in the category of general revenue. While most grant funding from Federal and State sources is exempt from state taxes, this agreement did not have benefits from those protections.

The City of Tacoma decided that following the State DOR decision, it would apply the City's Gross Earnings Tax of 7.5% to the incoming funds as well. In total, taxes were levied by the State and the City for \$85,236 for accessing external funding. This realization has sparked some discussion between Finance and TPU. Finance has since declared that all future grant funding (federal, state, and local) would be subject to Gross Earnings Tax (7.5%) unless an appropriate exemption could be cited. Finance also indicated that its interpretation of Contributions in Aid of Construction would provide virtually no protection from taxation. This unilateral interpretation by the Finance department could significantly impact our ability to access competitively bid external grants consistent with current practice.

# Update on Existing Programs



## Education and Outreach

Market research suggests that public education and outreach are vital to helping customers learn about transportation electrification and address their concerns. We held several EV in-person demonstration events in 2017, 2018, and 2019 that were well attended and well regarded by the participants and the public. The experience of communicating directly with the public has been very rewarding to staff, it has helped customers better understand EV technology, and encouraged many to make the leap and replace their ICE vehicles with an EV.

Unfortunately, in-person events have been canceled for the past 18 months for public safety due to the pandemic. Due to continued uncertainty about COVID-19 variants and state mandates, we are not planning any in-person events until 2022. While we have not held in-person events in 2020 and 2021, additional virtual online events have been offered as a substitute.

## 2020 and 2021 Education and Outreach Events

Date	Organization	Event	Attendees
2/22/2020	EnviroHouse (In-Person)	EV 101 Workshop	10
5/20/2020	EnviroHouse	EV 101 Workshop	28
7/21/2020	EnviroHouse	EV 101 Workshop	11
9/10/2020	EnviroHouse	EV 101 Workshop	8
10/3/2020	National Drive Electric Week	Virtual Event	8
10/7/2020	Pierce County	Sustainability Series: Solar & EVs	12
11/18/2020	EnviroHouse	EV 101 Workshop	2
1/30/2021	Girl Scouts	Girl Scout STEM Conference (TPU broad coordination)	6
2/23/2021	COT	PDS Lunch and Learn (Internal presentation to GG)	32
4/13/2021	EnviroHouse	EV 101 Workshop	6
5/25/2021	Efficiency Exchange	The 2021 Year of the EV (Panel)	128
6/11/2021	Pierce Conservation District	Climate Change Impacts on the Utility	15
6/15/2021	COT	Climate Action Plan General Workshop*	10

## Update on Existing Programs

Date	Organization	Event	Attendees
7/21/2021	EnviroHouse	EV 101 Workshop	11
8/17/2021	Rotary Club	EV 101 Workshop	12
8/17/2021	Green Transportation Summit & Expo (In-Person & Virtual)	Utility EV Programs	110
9/29/2021	EnviroHouse	EV 101 Workshop	TBD
11/5/2021	Women in Energy Symposium	Panel discussion	TBD

\*Assisted in facilitation, did not give a presentation.

### Print and Electronic Media

EV messaging through print and electronic media channels during the past 18 months has also been limited in favor of higher priority messaging concerning COVID-19 related public safety announcements, notifications of bill assistance programs, and announcements of moratoriums on service disconnection. Encouraging customers to invest in electric vehicles and charging equipment during these ongoing crises was put on hold early in the pandemic by our executives while the organization focused on the public's more challenging issues.

We also renewed our contract with ChooseEV to provide our public website with greater online customer tools – check out MyTPU.org. New functionality was added, including additional vehicle information and an expanded EV savings calculator.

**Next Year:** We hope to hold an open house to highlight the electric hostler trucks when they arrive at RMS intermodal in early 2022. This event would serve as an important networking opportunity to connect with other cargo handling companies considering going electric. By providing participants with comparative information about performance, costs, and the estimated emissions reductions, they may become more curious about the available state, port, and utility programs to support their transition.

We would also like to re-establish partnerships with EV car and truck dealerships to help cross-promote EV options and inform customers of utility incentive programs. If dealerships are open to the idea, we would consider repeating our successful 2018 Electric Vehicle Discount Program, where dealerships offered limited-time discounts on new EV sales with utility promotion. This renewed partnership will help dealerships comply with the new ZEV mandates established in SB 5811 (2020).

### Electric Vehicle Charging Study

In 2018, we launched a study to understand better the charging and utilization behavior of EV drivers in our community. Understanding our customers' preferences can help the utility in future program design. We learned many lessons from the roughly 100 program participants who answered surveys and provided detailed vehicle usage data through an onboard sensor. With two years of utilization data collected, the study is reaching its conclusion, and a summary report is being compiled with many significant findings.

**Next Year:** We are considering a follow-on study to better understand the benefits and costs of a managed charging program. The utility may be able to reduce infrastructure costs if we can help customers avoid charging vehicles during peak hours by educating customers on the issue and possibly offering a financial incentive. Several companies are developing software to help utilities offer managed charging incentive programs without additional hardware. While no robust offerings exist yet, several competitive options are likely to be available in late 2022.

# Update on Existing Programs

## Public EV Charging Incentive Pilot

Finding ways to expand the community's charging infrastructure is one of the utilities' most important responsibilities in promoting electric transportation. Our utility has been opportunistically installing chargers in the service area since 2016.

This pilot provides customers with utility assistance to site and install customer-owned and operated charging stations. Energy Research and Development staff help customers identify locations, examine available electric infrastructure to find the least cost opportunities, assist with grant funding opportunities, and provide funding for utility infrastructure upgrades – typically paid for by the customer. Funded with \$350,000 from the Electric Vehicle Charging Station Fund, the project team began work in April 2020 and officially launched in September of 2020.

Seventeen customer applications have been received and approved for funding at the time of writing this report. Many additional applications are on a waiting list for additional funding. The program provided projects with a maximum of 60% of the total allowable installation costs. Additional funding was available for projects located in areas identified by the City of Tacoma Equity Index - up to 80% of the total project cost. We also agreed to cover all utility upgrade costs, as some can significantly affect a project's feasibility.

Customers installing EV charging equipment may collect payment from users of the chargers and pay Tacoma Power for the energy delivered. We intend to collect Clean Fuel Standard credits that will come available in 2023 to fund future transportation electrification projects.

**Next Year:** We will seek additional external funding to support the current program and to invite customers with applications currently on the waiting list. New applications will be added to the waitlist in anticipation of future funding from Clean Fuel Standard credits available in January 2023.

## City of Tacoma Parking Facility Chargers

The City of Tacoma was awarded a \$597,558 grant from the Department of Commerce to install another thirty-eight charging ports (30 Level 2 and eight DCFC) at eight City-owned parking facilities and venue locations in downtown Tacoma. We provided matching funds from the Electric Vehicle Charging Station Fund of over \$119,559. These combined funds will pay for engineering and equipment, and for contract services for networking and payment processing necessary to operate the chargers.

**Next Year:** Preliminary site design and engineering are underway, and installation is set to be complete by the end of 2022. In 2023, we will continue to collect data, share lessons learned with the Commerce staff, and conduct an extensive outreach process to promote the new chargers.

## DC Fast Charging Customer Care Program

DC fast charging is an essential element on the broader EV charging network. While most EV drivers will prefer to use Level 1 or Level 2 charging at homes, workplaces, and publicly, DC fast charging will be necessary for travelers and large fleet vehicles, and provides EV drivers with a fallback plan for when plans change. That assurance and flexibility are important for those struggling with range anxiety.

DC fast charging requires higher electrical system capacity at a significantly greater cost, often three to five times more expensive than installing Level 2 charging equipment. Together, the high installation cost and the initial low use of the equipment present a problem – investment in DC fast-charging stations is a challenging project to pencil out.

For this reason, utilities have relied heavily on outside funding – from commercial partnerships and by accessing state and federal grants. We are actively seeking opportunities and reaching out to partners to help support the installation of DC fast chargers in a way that reduces costs for utility customers. Help from the utility typically takes the form of advanced location scouting, electrical system design advice, assistance in permitting, and support in applying for grant funding.

## Update on Existing Programs

To make the conditions attractive for external investment, we also developed a pilot tariff to encourage this investment: Schedule FC. This rate provided a temporary recalculation of the general customer rate elements to reduce the demand charge during early years of use and to expand the energy charge to recover utility costs. Over 13 years, the rates slowly revert to their traditional general rate amounts. This tariff helps private partners avoid punitive rates that make it difficult to invest in DC fast fast-charging – and it has made a difference!

Using this combination of strategies, we have assisted in the installation of 16 DC fast-charging stations at four locations in Tacoma with minimal or no utility investment:

### DC Fast Charger Installations

DC Fast Charger Sites	# of Chargers	Install date
LeMay Car Museum	1	2018
Walmart on Union Ave	2	2019
Safeway on S M St	2	2021
AAA on Union Ave	2	2021
City of Tacoma Parking	8	2022

**Next Year:** We are partnering again with EVgo on multiple sites for DCFC installations. Our utility will also participate in the rulemaking for SB 5192, which establishes standards for EV charging station providers. We hope that participation in this process will help the Department of Agriculture adhere to the consumer protection aspects of the law without straying into excessive regulation on DC fast charging investments.

### Multi-Unit Dwelling EV Retrofit Pilot

This program aims to provide EV charging opportunities to those who don't live in single-family homes and struggle to find a convenient place to charge an EV. While current code requirements ensure 10% of parking spaces will be "EV ready" for future charger installation, these only benefit residents of newly constructed or newly renovated multi-unit dwellings. The Multi-Unit Dwelling EV Retrofit program tries to reach the many buildings that currently don't have chargers and often don't even have the available electrical capacity to serve them.

The program began work in April of 2020 and launched in September with \$250,750 allocated from the Electric Vehicle Charging Station Fund. This program has been popular with property owners in Tacoma, despite the economic challenges facing them in 2020. At the time of the writing of this report, thirteen applications have been approved for funding totaling \$232,339 with two additional projects in the approval process and over 60 more properties on a waiting list for more funding.

We responded to Senator Murray and Senator Cantwell's offices' requests for upcoming "Community Projects" funding to continue this program at the current level of funding until the Clean Fuel Standard credits become available in 2023. We hope to avoid a situation where the program may have to be reconfigured with a lower utility cost share. This would take some time and require additional customer education and outreach, and likely lead to customer disappointment and a reduction in participation.

One lesson learned through this pilot is that many property owners needed significant project assistance from us to understand their alternatives and engineering support to select the best configuration of chargers. Properties in areas identified by the City of Tacoma Equity Index (where properties were eligible for up to 100% of approved funding) struggled to find contractors willing to work with them. Several lacked any funds whatsoever to support project expenses. Other lessons learned include an awareness of property owner sensitivity to reserve parking spaces for EVs with limited overall parking. In a few cases, customers were interested in addressing parking concerns with a new solution - locating EV charging equipment in the Right-Of-Way on adjacent side streets.



## Update on Existing Programs

This has launched a workgroup of City of Tacoma and TPU staff committed to investigating the challenges associated with permitting and operating EV chargers in the Right-of-Way and finding possible solutions.

Customers participating in this program and installing EV charging equipment may collect payment by residents or visitors to use the chargers and pay us for the energy delivered. We intend to collect Clean Fuel Standard credits that will come available in 2023 to fund future electric transportation projects.

**Next Year:** We will seek additional external funding to support the current program and process applications on the waitlist. New applicants will be added to the waitlist in anticipation of funding from Clean Fuel Standard credits in 2023.

### TPU Campus Charging

In 2012, we accessed American Re-Investment and Recovery Act funding to install 12 Level 2 charging ports with added infrastructure for eight more Level 2 charging ports at the TPU campus in lot C for employees and visitor use. Funding to install four Level 2 ports in a TPU-owned lot adjacent to the Old Town substation in North Tacoma was provided to pilot public EV charging. TPU also installed dozens of Level 2 chargers to support fleet pool car electrification.

In 2018, we partnered with Pierce Transit to host 10 plug-in electric commuter vans for TPU employees in an Electric Vanpool pilot. This increased charger utilization and prompted TPU to complete installing the remaining eight Level 2 charging ports. Soon after, with the adoption of EVs by utility staff increasing, charger availability during business hours became scarce. Facilities staff began notifying employees they had to conserve charging space by moving their cars from EV charging spaces when not actively charging.

In 2020, we were awarded \$59,747 to partially offset the total project cost of \$119,495 to install 20 new charging ports in Lot D at TPU. This addition will add charging capacity for employees and our eight electric vanpool cars at the TPU campus.

**Next Year:** Due to restrictions on in-person work, it is uncertain what level of utilization our new campus chargers will experience once the installation is complete in November 2021. We hope to track use closely and, should there be a need to expand, begin to explore other on-campus parking facilities for additional charging resources.

### Electric School Bus

We support school districts interested in upgrading their fleets to EVs. Franklin Pierce School District was awarded grant funding from the TransAlta Central Coal Transition Fund in 2018 and bought the first electric school bus in the state. Our utility assisted the school district with electrical system planning and their applications for funding for an additional three electric buses. We communicated lessons learned to other school districts in our service area and assisted the University Place School District to apply and plan for the addition of their first electric school bus in 2020.

TPU assisted Senator Murray's staff in drafting federal legislation to support a \$1.2B federal school bus electrification bill that has the potential to offer funding resources for local school districts. Once the notice of funding opportunity is announced, we plan to assist any school districts interested to apply for funds.

In August 2021, we were awarded a \$99,000 grant through the Department of Commerce's Clean Energy Fund for a Grid Modernization project to research and design an electric microgrid at Franklin Pierce High School that will study the impact of significant schoolbus electrification at a single location. Through this engineering design study, we will also conduct community engagement and outreach and develop findings into lessons we can share with other school districts in the state.

This microgrid design project is essential because it will incorporate facility load, 100 kW of on-site solar panels, and electric school bus fleets with bi-directional charging capability (vehicle-to-building). The results of the study will inform future school facility design and utility infrastructure and program planning. Within a decade, it is expected that all school buses will be all electric, and will not only transport students, but also be used as a grid resiliency asset and for disaster recovery.

## Update on Existing Programs

A separate but connected study with Pacific Northwest National Labs will allow researchers to calculate the value of on-site battery energy storage systems to support school electrical systems and EV charging. Combining on-site batteries in the microgrid study may offer a partial solution for a more optimized and cost effective solution.

**Next Year:** We will work with partners Franklin Pierce School District, Community Energy Labs, Moment Energy, Pacific Mobility, and PNNL to develop a detailed scope of work, timeline, and community engagement plan. The microgrid design project is expected to be complete by the end of 2022. We look to convene a workgroup of all the school districts we serve to share the best school bus electrification practices and the potential to locate public EV charging stations at school facilities.

### Transit Electrification

Electrification of public transit is an important step to bring the benefits of electrification to all communities, whether with battery-electric or fuel cell electric models. Both technologies have costs and benefits and will require close integration with their fuel providers to ensure the service mission is carried out reliably and cost-effectively.

We are excited to partner with transit agencies that serve South Sound communities and help explore State and Federal funding opportunities. We have worked closely with Pierce Transit to support Bus Rapid Transit line 1 and the proposed charging equipment at the Commerce Street station.

We welcomed Pierce Transit's participation in our 2019 Ride and Drive event, where the public had a chance to see a new Pierce Transit battery-electric bus.

**Next Year:** We hope to partner with transit agencies to develop their long-term strategic plans and engage cooperatively on construction design projects.

### Port of Tacoma Electrification

The Port of Tacoma is an important industrial and commercial container port and a vital economic engine for the South Sound region. Together along with the Port of Seattle, the Northwest Seaport Alliance is North America's fourth-largest container gateway. The Port of Tacoma, in particular, is an important industrial and commercial container port and a vital economic engine for the South Sound. Transportation into, out of, and within the port area is done with diesel power and contributes high levels of harmful emissions to the adjacent communities. Our utility, the City of Tacoma, the Port of Tacoma, Puget Sound Clean Air Agency, and many other stakeholder organizations have identified decarbonization through electrification as an essential strategy for the next decade.

In 2019 we partnered with the Port of Tacoma to provide shore power services to Husky Terminal. The joint effort worked tirelessly for several years to source funding, develop a special power tariff, and design a system that will deliver clean, renewable hydropower to ships at berth, reducing the use of onboard generation for ship systems while loading and unloading cargo. Emissions reductions from shore power at Husky Terminal will remove an estimated 2,635 tons of carbon from the atmosphere per year, the equivalent of removing 570 cars from the road. We participated as a stakeholder in developing the Northwest Ports Clean Air Strategy and the Port of Tacoma's Electrification Strategic Plan to better understand the issues and opportunities for decarbonization through electrification of Port activities.

Over the past year, we have supported efforts to attract funding for a "Mobile Cold-Ironing System (MCIS)" that would use a tractor-trailer mounted fuel cell to provide power to ships at berth using a liquid hydrogen carrier created with clean energy as a fuel. While funding has not been forthcoming, this innovative idea has gathered significant attention in this growing industry from state and federal agencies.

**Next Year:** We will support the Port's South Harbor Electrification Roadmap project by providing engineering and project support. This roadmap will identify where the Port should focus near-term and long-term electrification efforts and identify utility system pinch points that will need to be addressed to meet climate goals. The roadmap will create a list of projects that the Port and Tacoma Power can use to apply for grant

# Update on Existing Programs

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funding to help meet the Port's climate goals. Additionally, we will seek new projects and opportunities to bring shore power via traditional infrastructure or a novel mobile fuel cell design. No known projects are on the table, but opportunities are welcome.

## Cargo/Material Handling Equipment

In September 2020, we launched a pilot program to encourage cargo and material handling equipment electrification with funding from the Electric Vehicle Charging Station Fund. By assisting customers interested in converting to electric cargo and material handling equipment (forklifts), we can help remove some of the barriers associated with EV charging.

Added funding is available through federal and state Diesel Emission Reduction Act (DERA) grants to replace older diesel equipment with electric versions. Still, that program doesn't assist with funding for charging equipment necessary to power the equipment. Additionally, many customers often don't understand charging needs or know what electrical infrastructure design will be needed to support them or strategies to make charging more efficient. This is where our pilot project can help with financial assistance and expert advice. We hope electric cargo and material handling equipment will become more prevalent in the port area. As costs decline relative to diesel versions, the momentum will shift, and electric equipment will be seen as the best available choice.

Since the pilot was launched, several customers expressed interest and are actively investigating the idea. Our first applicant, RMS Intermodal, has been approved for \$132,000 in funding to install Level 2 chargers to support the conversion of six-yard trucks from diesel to fully electric. All six trucks and charging equipment will be on-site and operational by the second quarter of 2022. We also assisted a local IKEA distribution center with the permit process and provided information to help their clean agency funding application.

One meaningful revelation from this pilot is that commercial truck fleet managers need considerable time to budget for fleet purchases and align them with available DERA funding. Customers will feel supported with a long-running, consistent program that will give customers time to plan for fleet electrification adequately.

We plan to use future clean fuel standard credits to help provide significant incentives to help customers consider and plan for fleet conversions.

**Next Year:** We hope to work with RMS Intermodal and other partners, including the Port of Tacoma and the Puget Sound Clean Air Agency, to hold a public open house event where other cargo and material handling equipment operators will be invited to see the equipment run and to gather information about how our utility and partners can help them electrify their fleets also. It is hoped that education and outreach will encourage other port companies to make a move and electrify their fleets.



## New Programs

### Home EV Charger Pilot

In September of 2021, we launched a program to help residential customers overcome level 2 EV charging barriers at home. This pilot is different from similar programs at other utilities because it provides a la carte options to address their specific needs.

Informed by the Electric Vehicle Charging Study over the past two years, staff hopes that helping customers adopt level 2 home charging will help prepare them to participate in future managed charging programs. This will be essential to help the utility avoid increases in peak load and avoid future utility distribution upgrades.

The program offers customers a choice of rebates to purchase Level 2 chargers, install a 240-volt outlet, or buy approved smart splitter devices that make it possible for customers to share a 240-volt outlet with another appliance (water heater, electric dryer). Customers may access up to \$400 for any one rebate or up to \$600 per customer if they purchase more than one device. Stacking devices is vital for many customers, particularly low-income customers that are more likely to need several pieces to enable Level 2 charging at home.

A marketing and public outreach campaign is being launched to attract several hundred customers for the pilot. Staff will monitor the pilot's success, evaluate the program's effectiveness and the overall customer experience.

### Fleet Charging Pilot

Commercial fleet owners are becoming increasingly interested in electrification, with Amazon and UPS leading the way. Over the next decade, many commercial fleets will make the transition as a wider variety of models are being introduced and as additional state and federal funding opportunities are announced. As new vehicle models are being introduced by OEMs<sup>23</sup> and state and federal governments increase funding opportunities, the dream of a zero-emission fleets will soon become more attainable. The extension of tax credits, and new clean fuel standard credits, can be combined to make the business case for fleet electrification very real.

We are conducting a review of existing fleet electrification programs to learn what other utilities have proposed to their customers. We have also begun initial customer outreach to understand their needs. Along with incentives for utility system upgrades and charging equipment construction, an initial program design will include customer outreach and education, and access to utility advisors about EV models and charging equipment. Commercial fleet managers becoming aware of EV technology for the first time will need assistance integrating EVs into their fleet operations.

Our discussions with two local fleets has been positive and could result in the first applicants to an upcoming Tacoma Power incentive program. We are also participating in a consultant-led evaluation of fleet operations for the City of Tacoma and hope to be a key partner to help City facilities prepare for fleet electrification. Pierce County Libraries has begun to explore the possibility of electrifying their library fleet and adding public EV charging stations as well.

### Research Projects

Energy Research and Development staff is engaged in research efforts to better understand the practical applications of several new technologies. Examples of research efforts currently underway include:

Participation in a research study to better understand the benefits and costs of applying Battery Energy Storage Systems (BESS) to DC Fast Charging stations. Pacific Northwest National Labs is the principal investigator, and Tacoma Power will provide data and real-world examples for analysis.

Tacoma Power and Tacoma Rail have formed an **Alternative Fuel Locomotive Technology Rail (AFTeR)** Workgroup to examine re-powering a Tacoma Rail shunter locomotive for operation in the Port of Tacoma area as a lower emission vehicle. Several alternative technologies are expected to be evaluated including, renewable

## New Programs

diesel, battery-electric, renewable hydrogen fuel cell, formic acid fuel cell, and hybrid diesel-hydrogen. The techno-economic analysis will be informed by similar global projects and may serve as the basis for future grant funding applications.

We sponsored a **Seattle University Engineering Capstone Study** project to examine alternatives to serving Ketrion Island in the event that the current undersea power cable reaches the end of its reliable life. The project will examine demand-side management programs, including energy efficiency and demand response technologies with new distributed generation technologies, including on-site solar panels and hydrogen fuel cells and storage.

We have been working with Washington Maritime Blue, OCO Chemical, Pacific Northwest National Labs, PACCAR, Toyota, and others to explore the idea of a **Mobile Cold Ironing System**. This truck-based ship refueler would provide power to ships at berth in the Port of Tacoma using a liquid hydrogen carrier and fuel cells. Using the proposed technology could reduce the burning of bunker fuel by ships in the Port and result in cleaner, healthier air.

We look forward to working with the City of Tacoma to enhanced **EV charging in the right of way**. Through careful analysis and collaborative partnerships, we hope that the City of Tacoma's current right of way charging pilot can be amended to provide residents with more options to install privately owned EV charging equipment for the benefit of everyone in the community. One technology that might help unlock the potential is leveraging a peer-to-peer EV charging network.

The recent emphasis on addressing the causes and impacts of climate change has resulted in significant changes in legislation and funding opportunities over the past few years. If this trend continues, utilities could see an unprecedented wave of electrification in transportation, heating and cooling, and industrial process load. Several departments in Tacoma Power are launching an **Electrification Study** to explore what changes might be necessary for utility processes and policies to accommodate this increase in electric demand.

We are also engaged in an evaluation of **on-campus renewable hydrogen production and fueling of fleet vehicles**. The study will examine the potential costs and benefits of hydrogen production at a Tacoma Power-owned facility.

**Review of the public EV charging fees.** In 2021, the State Legislature passed SSB-5192, a bill to ensure EV charging equipment standards. In addition to setting registration and reporting requirements to the Department of Agriculture, the law requires public EV charging station operators to offer a constant rate per kWh of energy delivered through the charger. Many of our chargers collect a fee based on the time occupied by the user of the charging equipment. It is necessary to change this practice to comply with the new state law. We will evaluate different proposals and submit the usual rate-making process and proposed tariff that will cover all Tacoma Power-owned public charging stations.

### EV Carshare Co-op

Mobile phone technology in recent years has made it possible for a new transportation option – carshare services. Several companies have been launched to give people access to cars in their neighborhoods for hourly use without visiting a car rental agency. Companies like Car2Go, ReachNow, and Lime expanded transportation alternatives and made it possible for people to forgo car ownership but still access reliable transportation when it was needed and convenient.

These companies have retreated from the North American market due to aggressive growth and a business model dependent on high costs. While the service was popular with users, it didn't work for companies involved financially.

Tacoma Power is working with partners to explore ways to bring carshare services back to the community, and to expand access to lower income customers. There are two key differences between the carshare models that introduced the idea and the idea we are pursuing: first the carshare fleet would be exclusively electric vehicles, and secondly would be based on a co-operative business model.

Electric vehicles are less expensive to operate and fuel on a lifecycle basis than gasoline powered vehicles, and the difference is likely to widen over the next few years. With new legislation and state and local governments



## New Programs

supportive of programs to reduce urban car ownership, the time might be perfect to invest in this new approach.

A co-operative business model to support a carshare fleet service may yield several significant benefits over the corporate model tried before. Carshare is about community sharing. By engaging and including the community in decision making, and focusing the mission on reducing cost, providing access, and treating the assets as a cherished resource, the problems that plagued previous carshare efforts might be avoided.

EVs are a relatively new technology, and with new technology, there is often an increased initial cost. For many residents of the South Sound, purchasing a new EV is not within budget. For consumers, the EV carshare model might be what they need to experience an EV without the upfront cost. An EV Carshare program might make it possible for customers to try out EVs for themselves, without taking any risk.

We are working with stakeholders interested in starting an EV-only carshare service. By providing EV charging services at EV Carshare hubs that can double as public EV charging, we can be more confident of charger utilization and help to launch a service to serve the community.

### Streetside EV Charging Pilot

This pilot will increase community charging in City of Tacoma Neighborhood Business Districts, our vibrant community centers where people already go to shop, work, and meet. Installing utility-owned, streetside light mounted EV chargers is cost-effective because it rarely involves trenching and uses existing capacity made possible by converting high-pressure sodium street lights to LEDs.

A collaboration between our utility, the City of Tacoma Public Works Department, the City's Parking Services, and its Community and Economic Development Office made the EV chargers possible. Stakeholders reviewed existing infrastructure to find locations with the capability to support a new charger to keep the installation and construction costs low, prioritize sites, and ensure the chosen areas would meet traffic and parking management requirements to match existing parking structures. An important consideration of the program was to add charging to all fifteen business districts in the initial pilot, including eight districts in low-opportunity areas, as indicated by the City's Equity Index. We think that the commitment to invest in all fifteen areas simultaneously demonstrates that EVs are for all our communities.

The Community and Economic Development Office and business district representatives also worked to secure support for the locations in each unique business community. In several instances, community response led to significant changes in the program, including the chosen charger location. We will continue to engage with business district councils as projects develop and follow up with in-person community outreach visits in each business district throughout the construction process. Meetings will be facilitated by TPU Account Executives and the City of Tacoma Community and Economic Development Office. Marketing materials will be used online and in person to share information.

We hope these new chargers will be used during the day by business district employees and customers and will be available in the evening hours by nearby multifamily residents, who often have difficulty accessing reliable charging options. Studies show over 80% of EV charging happens at home overnight, but according. We hope to introduce a future rate to encourage nearby residents to be able to charge overnight by offering a low cost, long stay rate – just \$5 to charge from 10 p.m. to 6 a.m. We hope that this effort can help address some of the two-thirds of renters who do not have a carport or garage for EV charging<sup>21</sup>.

## Public Input

We value the input of our customers and stakeholders. Visit our website ([MyTPU.org](https://MyTPU.org)) to comment on this Action Report and tell us what you think about our progress over the past year. We are also interested to hear what you think about our proposed transportation electrification programs for next year. Is there something we can be doing better? Do you have an idea for a project or program that we should research? Let us know!

As we develop and deliver new programs, we will continue to engage with interested communities on a program-by-program basis. Check our website regularly for new program pilots and incentive programs.