Washington Transportation Electrification Plan

Managed Charging Pilot Application

PacifiCorp

A BERKSHIRE HATHAWAY ENERGY COMPANY

2023

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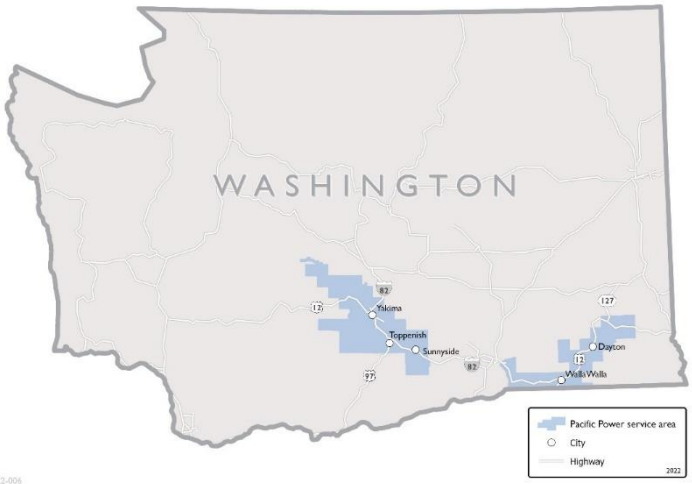
About PacifiCorp

PacifiCorp d/b/a Pacific Power & Light Company is a multijurisdictional, vertically integrated utility that serves nearly two million customers in six western states: California, Idaho, Oregon, Utah, Washington, and Wyoming. In Washington, PacifiCorp serves approximately 140,000 customers throughout Yakima, Walla Walla, Columbia, Benton, Cowlitz, and Garfield counties. The company's generation and transmission systems span the West and connect customers to safe, reliable, affordable, and increasingly renewable electricity. Our integrated transmission system connects thermal, hydroelectric, wind, solar, and geothermal generating facilities with markets and loads. The diversity of this integrated system benefits all of PacifiCorp's customers in all six states.

PacifiCorp Service Area—Washington



PacifiCorp's large regional footprint enables delivery of low-cost generation from some of the best wind and solar sites in the country and the Company remains actively engaged in finding ways to leverage the benefits of geographic diversity for our customers as we develop and implement plans to deliver the targets set forth in Washington's Clean Energy Transformation Act (CETA).

Over the past 13 years, PacifiCorp has successfully reduced its greenhouse gas (GHG) emissions and improved reliability while simultaneously delivering energy cost savings to our customers. The company has achieved these results by collaborating with others and through the visionary and collaborative efforts of our own generation, transmission, information technology, and energy supply management teams. PacifiCorp has been a key player in the creation of an open and connected western grid. All these factors have brought PacifiCorp into a very favorable position to achieve Washington's decarbonization goals.

1. Introduction

On May 20, 2022, PacifiCorp filed its 2022 "Washington State Transportation Electrification Plan" (TEP or Plan) with the Washington Utilities and Transportation Commission (Commission) under Docket UE-220359. PacifiCorp supplemented its original filing with an addendum filed on September 28, 2022. This is PacifiCorp's first filed TEP since enabling legislation was enacted in 2019. The Commission acknowledged the plan on October 27, 2022 enabling PacifiCorp to begin development of the proposed programs in the TEP inclusive of a Residential Managed Charging Pilot (Pilot).[1]

The proposed Residential Managed Charging Pilot (Pilot) aims to enroll owners of electric vehicles (EV's) and offer them ongoing financial incentives in exchange for the access to remotely control their vehicle's charging over a three-year period from 2024 to 2026. This "managed" charging of enrolled EVs can push the load to less critical, off-peak times of the day and can also respond to peak grid or localized system events, similar to demand response (DR) programs. The Pilot will optimize for minimum charging requirements for customer comfort, satisfaction, and safety, while also allowing customers to easily override utility control when necessary.

Similar pilots have been tested and researched by utilities, research groups, and third-parties since around 2015 and a growing market of software and implementation firms has emerged to provide managed charging services during this time period. PacifiCorp's proposed Pilot offering is designed with specific learning objectives and evaluation goals to determine if it can measurably benefit both customers and grid-needs at scale.

2. Description Of Pilot Program Measure

2.1 Measure Elements

The Pilot's measure elements include details surrounding financial incentives, eligibility criteria, and operational and technological requirements. Similar to DR programs, this Pilot will offer participants a one-time enrollment incentive and then recurring, ongoing incentives to encourage continued active participation. (See Section 2.8 for details on incentives and customer eligibility.)

The Pilot aims to enroll customers in a program that will effectively manage their charging schedules through one of the following mechanisms:

- **Controlling the Vehicle**. Remote control of EV charging load via the vehicle's original equipment manufacturer (OEM) telematics. The telematics approach leverages software to directly communicate with the vehicle via OEM Application Programing Interface (APIs), receiving charge capacity information and sending instructions of charging timing, speeds, and amounts.
- **Controlling the EV Charging Equipment**. A two-way communicating charger (also referred to as EV supply equipment, or EVSE) is used to send signals to the charger itself, as opposed to the vehicle directly. This approach may receive different or more limited information about the state of the vehicle's charge than controlling the vehicle itself. EVSE devices that are eligible to participate in the pilot will be linked to PacifiCorp's qualified products list (QPL), as listed on the Company's website.[2]

[1] Washington Utilities and Transportation Commission. Available online: UTC Case Docket Document Sets | UTC (wa.gov)
[2] See QPL documentation. Available online: https://www.pacificpower.net/content/dam/pcorp/documents/en/pacificpower/savings-energy-choices/electric-vehicles/Level_2_Home_Charger_Qualified_Products_List.pdf

Customer communications (which may include emails, texts, and/or online portal messaging) and customer experience will be defined during the Pilot planning phases.

2.2 Objectives

The Pilot ultimately seeks to create benefits for both customers and the grid. Since this offering is being designed as a pilot, it will also aim to answer a set of learning objectives to determine large-scale and long-term viability. See Section 13 for further detail and discussion on those learning objectives.

The Pilot's four objectives are to:

1. Shift charging load to off-peak times
2. Improve customer satisfaction with PacifiCorp service offerings
3. Increase affordability for EV charging for customers
4. Integrate EV managed charging into future DR program portfolios

2.3Timelines

The following information provides the initial timing for the pilot's discrete activities; this timeline may shift due to internal and/or external factors.

PacifiCorp's Transportation Electrification (TE) Plan has been approved by the Commission. After approval from the Commission, the Company plans to initiate the procurement process for an implementation contractor(s). This will be conducted via a request for proposals (RFP) targeted at interested third parties. The RFP is expected to be launched in the second or third quarter of 2023. The Company plans to evaluate bids, award winner(s), and negotiate and sign contracts by the third or fourth quarter of 2023. The exact timing will depend on the quantity and complexity of received bids and the timing of requisite PacifiCorp-internal reviews and controls.

After signing an agreement with an implementation firm, it will likely take six to nine months (two to three quarters) to complete Pilot onboarding, set-up, user testing, data protocols, and other activities before fully launching the program, putting the likely program go-live date by no later than the first half of 2024. The Company anticipates implementing the pilot for three program years: PY2024, PY2025, and PY2026. Table 1. Timeline of Pilot Implementation Activities Post RFP Stage provides an overview of the pilot's phases and activities over the three-year time period.

See Section 2.6 for further details of the timeline and major performance milestones.

Table 1. Timeline of Pilot Implementation Activities Post RFP Stage

Managed Charging Pilot Timeline		Y1				Y2				Y3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1.0 Launch													
1.1	Host kickoff meeting with team members												
1.2	Develop pilot documentation and operational plan												
2.0 Technical Integrations													
2.1	Determine specs for securely integrating data across platforms												
2.2	Conduct EV detection modeling												
3.0 Marketing & Outreach													
3.1	Align on marketing and outreach strategies												
3.2	Develop marketing collateral												
3.3	Launch initial customer outreach												
3.4	Perform continuous marketing and outreach efforts												
3.5	Develop case study												
4.0 DERMS													
4.1	Establish program dashboard												
4.2	Explore integration into DERMS												
5.0 Evaluation													
5.1	Contract with third-party evaluation firm												
5.2	Conduct process and impact evaluation, measure cost effectiveness												
6.0 Expansion Feasibility													
6.1	Leverage evaluation results to determine feasibility of future expansion												

2.4 Expected Outcomes

Aside from the learning objectives defined in Section 13 below, this Pilot aims to achieve specific outcomes (see Section 2.2). Refer also to Section 4 for the metrics and performance areas.

1. **5% to 15% of customers enrolled.** PacifiCorp anticipates that 5% to 15% of EV owners may participate in the pilot by the end of the third program year. There are currently over 850 known EV owners within PacifiCorp's service area, which is projected to increase to over 1,800 customers by the third program year. This means that roughly 100 to 300 customers may participate.
2. **Minimum of 75% of charging load shifted to off-peak times.** One of the primary performance metrics for the Pilot will be the amount of EV charging load that is enrolled in the Pilot and flexed ("shifted") to off-peak times. Determining the extent of this expected outcome, and whether it varies by program design element or customer characteristic, is a core learning objective.
3. **Continuous participation in the pilot throughout pilot life.** Ongoing participation in the Pilot will likely be driven by incentive payments for participation, as well as high customer satisfaction due to the user experience and tailored program design. A learning objective will be to determine if varying program design elements has an impact on participation rates or other evaluation metrics.
4. **Meaningful evaluation, measurement, and verification (EM&V) of the Pilot.** Data-driven analysis of program impacts, along with clear and actionable conclusions and recommendations, will allow the Company to determine if the offering is cost effective and viable for continued implementation beyond the pilot phase. PacifiCorp tentatively expects a need to conduct both process and impact studies, highlighting both quantitative and qualitative findings. Evaluations are likely to cover a range of topics, including realized load shift, customer satisfaction, greenhouse gas (GHG) emissions impacts, and

market barriers, among other topics. (See Section 13 for further discussion about the Pilot's learning objectives.)

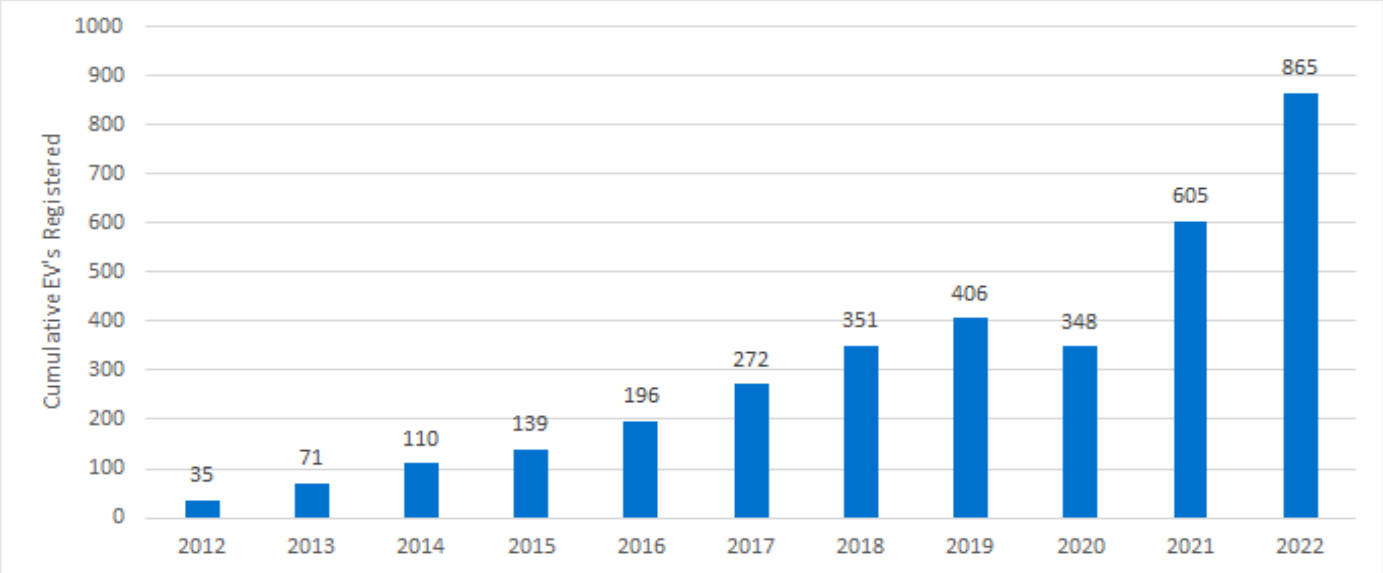
5. **Feasibility study completed of integration into distributed energy resource management system (DERMS).** PacifiCorp anticipates developing a feasibility plan to transfer Pilot data to the Company's existing and future energy management systems and dashboards, including its DERMS.
6. **EV detection modeling strategy developed.** Leveraging customer and energy data to detect (within a reasonable margin of error) which PacifiCorp customers own and regularly charge EVs will be an objective of the pilot.

2.5 Market Baseline Assumptions

There is a growing amount of EV ownership and charging in PacifiCorp's service area, along with a nascent and expanding market for managed charging software solutions.

According to the Washington State Department of Licensing (DOL) vehicle registration data, there were more than 850 light-duty EVs and plug-in hybrid EVs (PHEVs) registered in PacifiCorp's service area at the end of 2022[3] (Figure 1). There is a slight dip in total cumulative EVs registered in 2020 due to a COVID-19 shift that caused Washington to recalculate its registration.

Figure 1. Electric Vehicle Cumulative Registrations in PacifiCorp's Washington Service Area.



EV owners in PacifiCorp's Washington service area charge their vehicles at home (as opposed to public- or work-place charging) an average of 79.4% of the time during a typical week, according to the Company's 2021 residential customer survey (n= 68). PacifiCorp defines peak times for its residential customers on Schedule 19 as the hours between 2:00 p.m. and 10:00 p.m. daily from June through September and 6-8am and 4-10pm from October through May (Figure 2).[4]

[3] Washington State Department of Licensing - Washington Electric Vehicle Dashboard. Washington gov. Available online: https://data.wa.gov/Transportation/Electric-Vehicle-Population-Data/f6w7-q2d2

[4] PacifiCorp. *Time of Use: Washington Choice*. Available online: https://www.pacificpower.net/savings-energy-choices/time-of-use.html

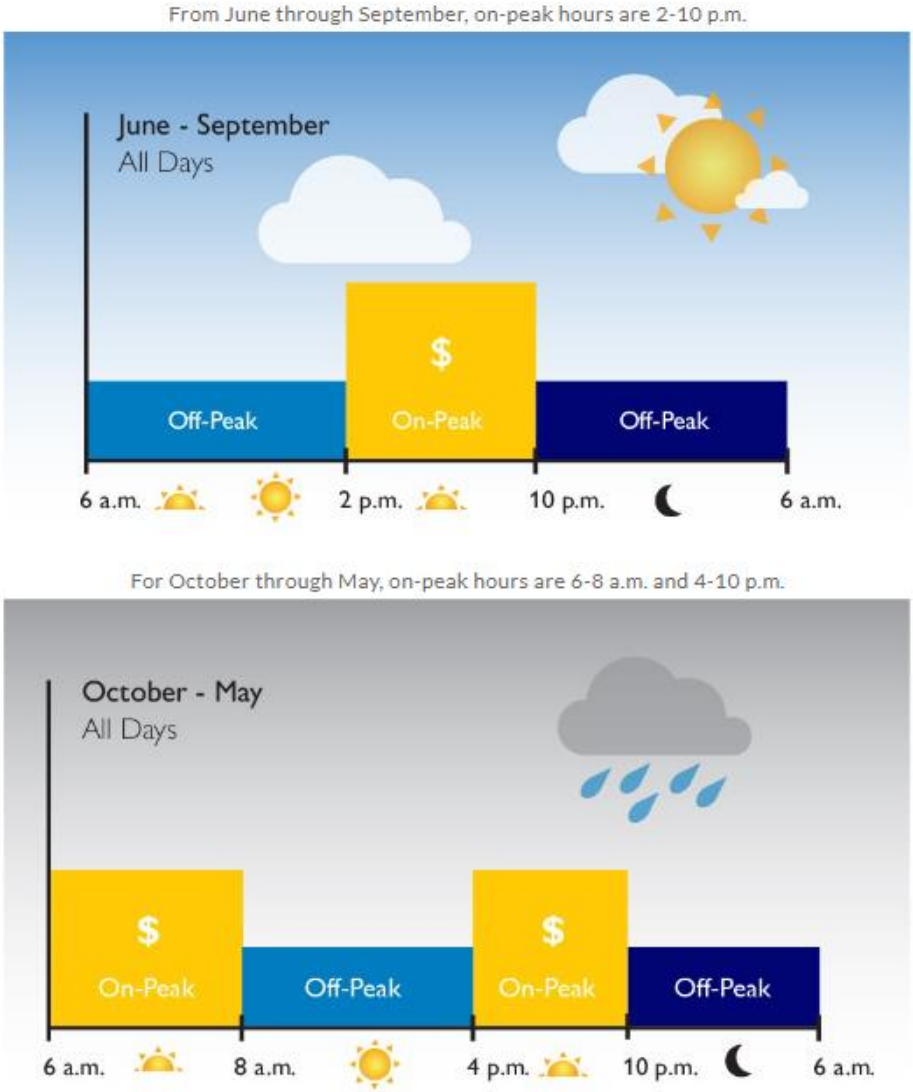
According to PacifiCorp's 2023 Integrated Resource Plan (IRP) Update, the Company forecasts an average annual compound growth rate to the system's peak load of 1.7%, reaching nearly 13,500 megawatts (MW) of annual coincident peak load by 2033, which is a 17% increase from the 2021 IRP. For Washington specifically, that load is forecast to grow at a compound annual rate of 1.9%, reaching approximately 985 MW in that time horizon.[5] Demand-side management resources continue to play a key role in PacifiCorp's resource mix and the IRP model selected nearly 1,000 MW of demand response across the grid over the 20-year horizon, adding an incremental 372 MW of demand response assets by 2026.[6] In fact, Washington requires each utility to "pursue all cost-effective, reliable, and feasible conservation and energy efficiency resources and demand response."[7] Exploring such as this managed charging pilot can contribute towards that resource.

[5] For Washington-specific figures, see 2023 IRP Volume II, Appendix A. Available online: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2023-irp/2023_IRP_Volume_II_A-P.pdf

[6] PacifiCorp. *2023 Integrated Resource Plan*. See pages 2 and 8. Available online: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2023-irp/2023_IRP_Volume_I.pdf

[7] See WAC 480-100-610 (4)(a). Available online: https://app.leg.wa.gov/WAC/default.aspx?cite=480-100-610

Figure 2. Customer-Facing Visualization of PacifiCorp's Residential Choice Time-of-Use (TOU) Program Peak Hours



Absent intervention via price signals, TOU rates, or a managed charging program, EV owners are likely to charge their vehicles during peak hours. Figure 3 from the Northwest Power and Conservation Council (NWPCC) Regional Technical Forum (RTF)[8] and the grey (home charging) line in Figure 4 from the Smart Electric Power Alliance (SEPA)[9] provide two examples of residential customers' EV charging load shapes – both of which coincide with PacifiCorp's system peak hours. Greater EV adoption on constrained feeders could lead to localized grid pressure on PacifiCorp's distribution system during these peak hours absent measures to shift charging activity to non-peak hours (see Section 6 for further details on distribution impacts of non-managed EV charging).

[8] Northwest Power and Conservation Council. Regional Technical Forum. RTF Load and Savings Shape v5.05, Residential Charging generalized load shape, R-All-Plug-EVSEChargeSave-All-All-U, Available online: https://rtf.nwcouncil.org/work-products/supporting-documents/procost/

[9] Smart Electric Power Alliance. *Managed Charging Incentive Design: Guide to Utility Program Development.* October 2021. See page 6. Available online: https://sepapower.org/resource/managed-charging-incentive-design/

Figure 3. Daily Weekday Load Shape for Residential EV Charging, NWPCC RTF

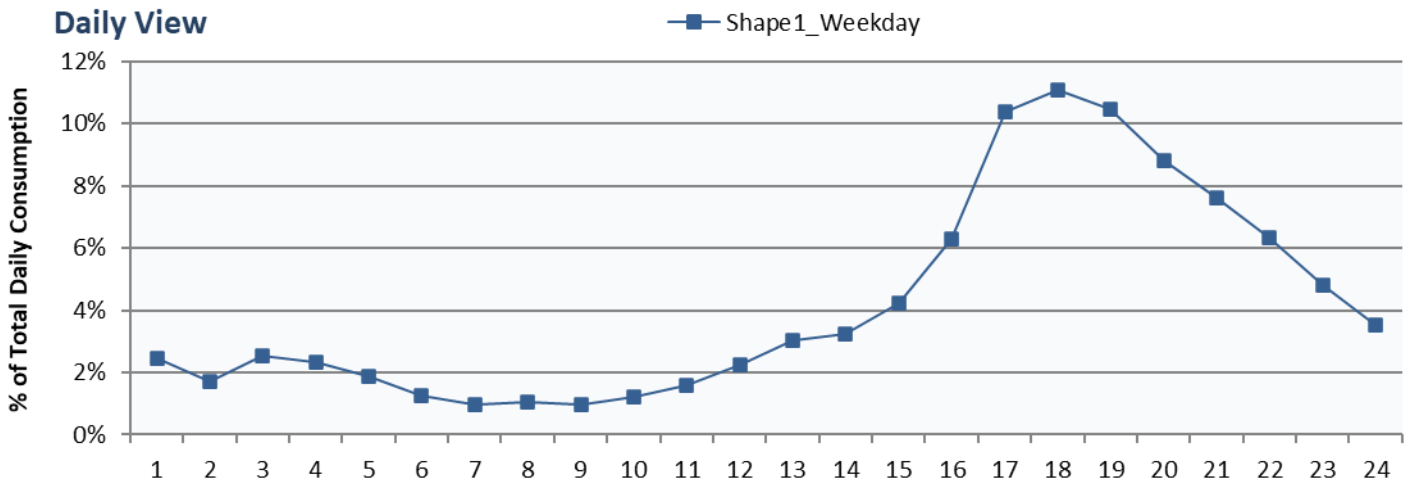
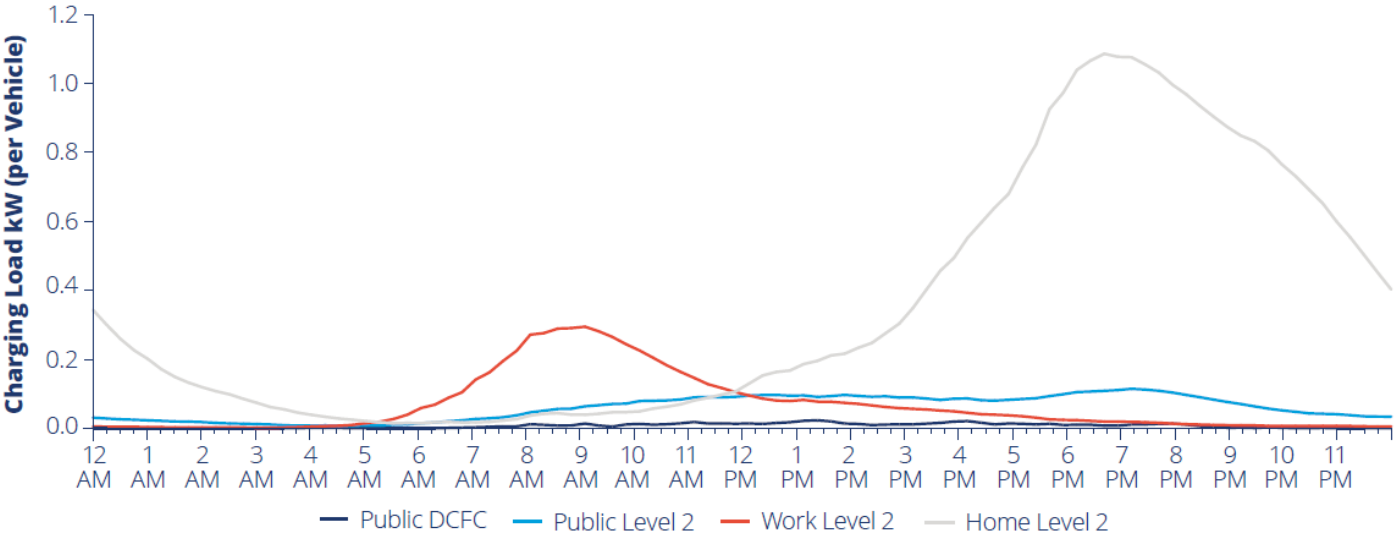


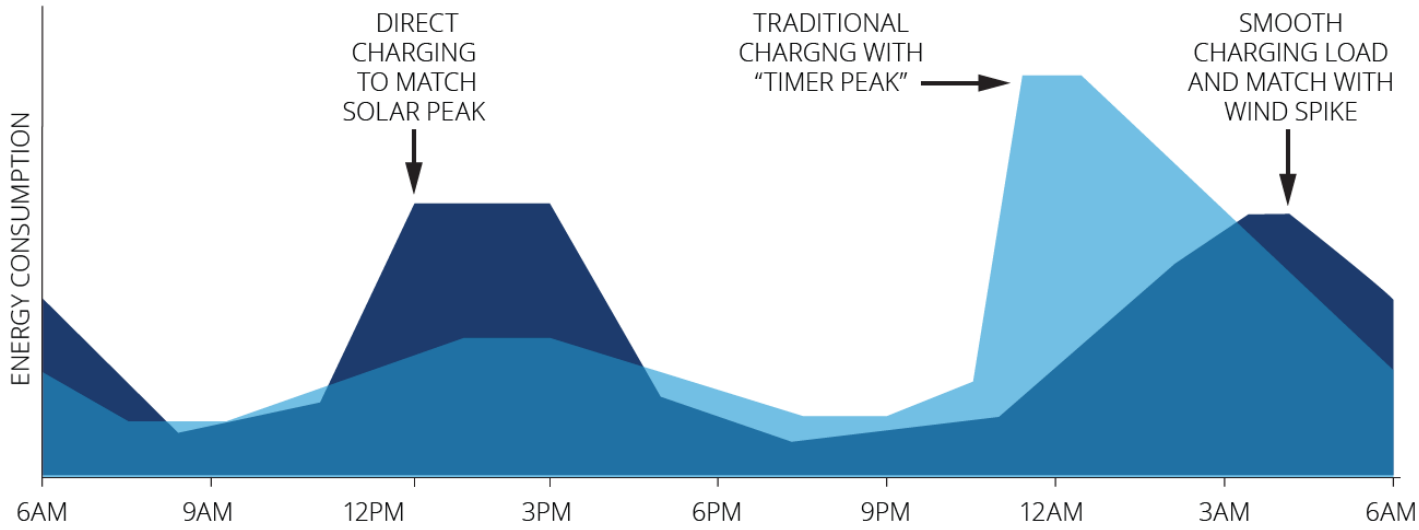
Figure 4. Load Shapes of EV Charging, SEPA



The Pilot plans to explore shifting home EV charging outside these peak hours and the feasibility of response to DR type peak events. According to SEPA, managed charging has the potential to flex a range of 1.4 kilowatts (kW) to 20 kW of charging load per EV, depending on EV type, EV OEM, battery specifications, EVSE type, weather, and other factors (Figure 5).[10]

[10] Smart Electric Power Alliance. *Utilities and Electric Vehicles: The Case for Managed Charging*. 2017. See page 7. Available online: https://sepapower.org/resource/ev-managed-charging/

Figure 5. Examples of Load Shift Potential from Managed Charging Programs



SEPA has tracked the growth of managed charging pilots and programs that have sought to flex EV charging load across North America over the past decade, including by those by utilities surrounding PacifiCorp in the Pacific Northwest (Portland General Electric Company and Avista Corporation) and in California (Pacific Gas & Electric Company and Southern California Edison).[11] Some pilots have focused exclusively on traditional "event-based" DR design to "shed" load, others have focused more on daily optimization to shift load, and others incorporated both approaches to "shimmy" load (Figure 6), per the vocabulary developed by the Lawrence Berkely National Laboratory (LBNL) to describe various approaches in DR.[12] PacifiCorp is planning to study the potential for managed charging on all three of these types of DR, which is one learning objective of the Pilot (Section 13).

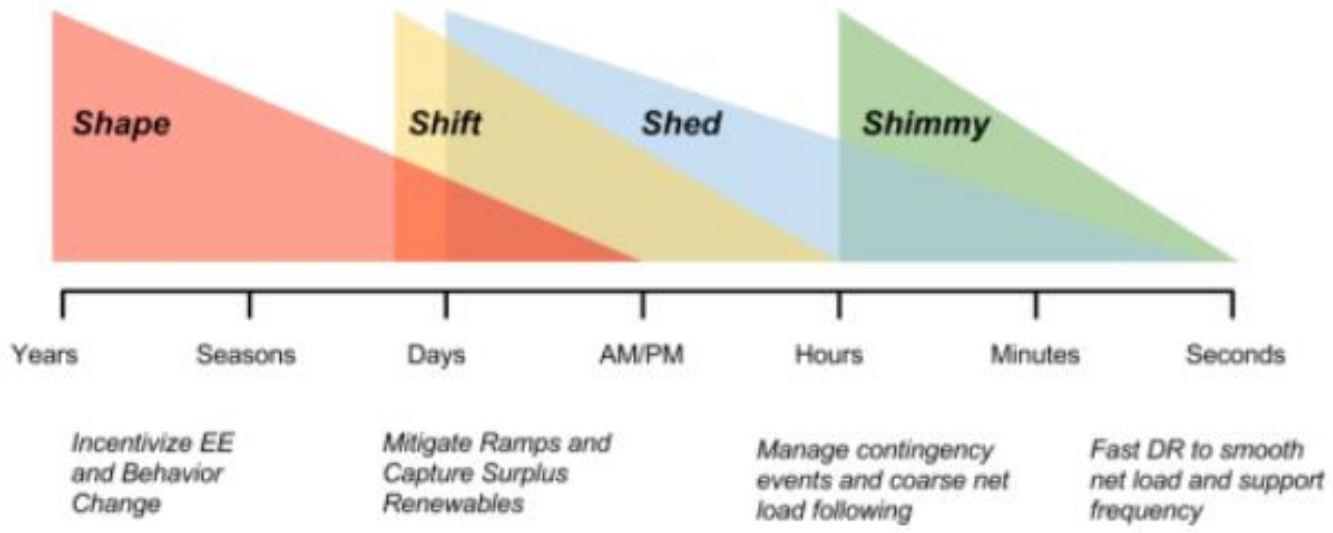
The impact of these types of DR on the customer experience is not expected to be noticeable. PacifiCorp aims to select a vendor with a successful track record for implementing managed programs that meet objectives and maintain high levels of customer satisfaction and trust. The program will ensure that minimum charging thresholds are met and that customers can easily override if needed. Ideally, from a customer perspective, participating in the program will become a "set it and forget it" experience: they plug in their vehicle when they get home from work and expect it to be charged and ready to use when they leave the next morning, regardless of whether that day PacifiCorp employed a load shed, shift, or shimmy strategy.[13] The "shed" and "shimmy" type demand response events, which respond to frequency or contingency events could happen off peak, are generally rare, and commonly do not last more than 30-45 minutes. Validating this assumption and understanding whether these strategies are noticeably experienced by participants will be an important learning objective of the pilot.

[11] Smart Electric Power Alliance. *A Comprehensive Guide to Electric Vehicle Managed Charging.* May 2019. Available online: https://sepapower.org/resource/a-comprehensive-guide-to-electric-vehicle-managed-charging/

[12] Lawrence Berkeley National Laboratory. *2025 California Demand Response Potential Study—Charting California's Demand Response Future: Final Report on Phase 2 Results.* March 2017. See section 3.4 on page 3-12. Available online: https://eta-publications.lbl.gov/sites/default/files/lbnl-2001113.pdf

[13] For customers who work "non-standard" hours, such as late shifts, may still be able to participate in the program, depending on their exact charging load shapes and habits. PacifiCorp will work with the selected vendor during the program onboarding phase to confirm.

Figure 6. Varieties of Demand Response and Flexible Load Potential, LBNL[14]



As the number of utility managed charging pilot and program offerings has grown, so has the number of innovative offerings from third-party companies. These offerings include managed charging capabilities such as developing software solutions for program implementation and enabling device aggregation services. SEPA estimated that there are at least 22 "network service providers" active in providing the underlying software to enable the EVSE-driver interface, at least 42 EVSE manufacturers offering managed charging capabilities, and at least nine vehicle OEMs offering vehicle telematics capable of being applied to managed charging.[15]

A growing number of companies offer customer management, program implementation services, and aggregation capabilities for managed charging programs. These services are similar to DERMS providers that have capabilities to aggregate load from smart thermostats, grid-enabled water heaters, and other devices to support flexible load and DR offerings. Such companies serve as a central intermediary (or aggregator) between the customer, utility, and OEM/EVSE provider. Commonly they charge implementation fees for software set-up and then either an annual Software-as-a-Service (SaaS) fee or a software license fee (with annual payments) on a per-user basis.

2.6 Major Performance Milestones

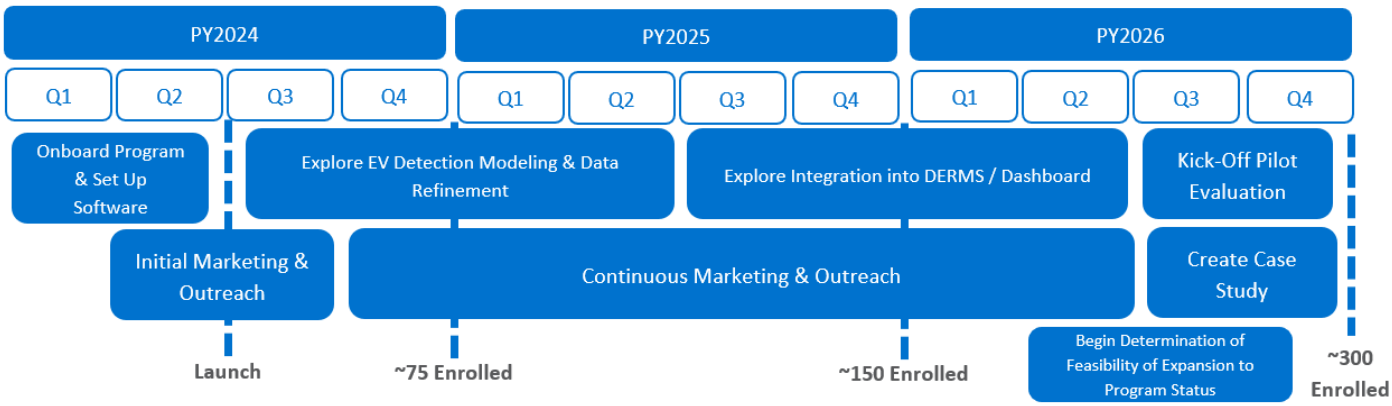
Figure 7Figure 7 provides an initial draft of PacifiCorp's planned milestones, partly depending on when the Pilot is approved and launched, including activities involving participant enrollment, data collection, and marketing stages. Specific activities and their details include:

- Onboarding and software set-up, which refers to the steps involved in establishing data flows and user acceptance testing

[14] Ibid.
[15] Smart Electric Power Alliance. *A Comprehensive Guide to Electric Vehicle Managed Charging.* May 2019. Available online: https://sepapower.org/resource/a-comprehensive-guide-to-electric-vehicle-managed-charging/.

- Marketing and outreach, which refers to the ways the Pilot will inform EV-owning customers of the offering and encourage them to enroll as participants
- EV detection modeling and data refinement, which refers to leveraging energy and customer data to determine which customers own an EV and could qualify for the Pilot offering
- Integration of the managed charging resource into PacifiCorp's DERMS / Dashboard, which refers to investigating how to incorporate the Pilot data on flex load under management into PacifiCorp's existing energy management systems and tools
- Pilot evaluation, which refers to hiring a third-party technical EM&V consultant to measure Pilot impacts, evaluate process flows, and provide actionable recommendations (Section 2.4)
- Creating a case study, which refers to gathering participant feedback and Pilot impacts into a tangible document explaining the results of the Pilot for external use
- Determining the feasibly of expansion to program status, which refers to the steps needed to see if the Pilot should continue in the future beyond PY2026

Figure 7. Demonstrative Performance Milestones During Pilot Period



The Company expects to align on more exact details during the program launch period and may add or remove performance milestones to this timeline.

(See Section 2.3 for additional implementation timing details, especially relating to the tasks the Company expects to undertake before the pilot launch date.)

2.7 Program Infrastructure Phases

The Pilot is expected to rely on communications with residential-based, user-owned EVSE and vehicle telematics as opposed to requiring installation of additional infrastructure or equipment. Exploring the feasibility of expanding Pilot offerings to customers who live in multi-unit dwellings is a learning objective and could require integration with public charging infrastructure in a later phase (Section 13). At this time, the Pilot will not address non-residential customers.

2.8 Utilization, Participation Eligibility & Incentive Structures

PacifiCorp anticipates approximately 5% to 15% of EV owners in its service area to participate in the Pilot, resulting in a maximum of around 270 participating customers for program year three. (Section 2.4). This adoption rate estimate is for demonstrative purposes only; there will not be an enrollment cap on participation during the Pilot's implementation phase. If more customers want to participate than originally anticipated, they will be allowed to enroll. The more customers who participate, the higher the grid benefits are expected to be.

To be eligible for the Pilot offerings, customers must be on a residential rate, confirm ownership of an EV,[16] agree to participation terms, and own qualifying equipment (either an EV whose OEM allows vehicle telemetric or a qualifying EVSE). PacifiCorp expects that the majority of the Pilot's early adopters will be customers living in single-family housing, owners and renters, though it is also interested in exploring ways to reach and include customers living in multi-unit dwellings.

The Pilot likely will leverage existing QPLs in place for other Company TE program offerings to further define qualifying equipment.[17] Customers likely will not need to be enrolled in a TOU rate in order to participate in the Pilot, though they would likely benefit financially from doing so. Details on eligibility terms might be refined following receipt of stakeholder input and during the Pilot's kick-off phase.

PacifiCorp currently envisions offering customer incentives based upon the following concepts, though these could be modified following the RFP and procurement process, stakeholder input, and onboarding phases, as well as due to changing market conditions:

- Up-front incentive payment, in the range of $100 to $200, to sign-up for participation
- Ongoing incentive payments for continued active enrollment, paid one or more times a year, in the range of $25 to $100

Some of the managed charging pilots already fielded by utilities offer customer payments based on the amount (kW) of their actual load shift performance. Although that is not currently planned for PacifiCorp's Pilot, the Company's prospective financial incentives (described above) may be partially dependent on the number of opt-outs a participating customer undertakes during a set time-period. PacifiCorp will better define "active enrollment" upon the launch of the Pilot.

Also, the Pilot likely will seek to explore the most impactful method and timing for issuing incentive payments. Questions to explore would be:

- Which type of incentives create the most continued participation
- Which type of renumeration is most attractive, including gift cards, checks, and bill credits, among other possible ideas.

Finally, the terms could change during the pilot phase as well, depending on feedback and lessons learned during the implementation phase.

3. Market Barriers & Mitigation Strategies

PacifiCorp foresees a number of potential market barriers that will confront the Pilot. In fact, the "test and learn" aspect of the Pilot is part of its design and an expected outcome (Section 2.4). Five potential market barriers

[16] Eligibility is expected to apply whether the customer owns or leases their EV.
[17] See QPL documentation online at: OR_Charge_at_Home_Qualified_Products_List.pdf (pacificpower.net)

and corresponding mitigation strategies are detailed in Table 2. Potential Market Barriers and Mitigation Strategies, though PacifiCorp recognizes that additional barriers could arise. Therefore, PacifiCorp intends to revisit the list of potential barriers during the onboarding period and include a post-pilot summary of barriers as part of the Pilot's evaluation process.

Table 2. Potential Market Barriers and Mitigation Strategies

Barrier	Description	Mitigation Strategies
Accurately detecting electric vehicle owners	Need to determine which customers own an electric vehicle and regularly charge it at home to conduct outreach and confirm eligibility criteria	EV detection modeling, cross-referenced with existing customer data such as DMV data and participant lists for existing EV-related programs (e.g., EVSE rebates), etc.
Adoption hesitation relating to charge anxiety	Customers may be initially unsure about how remote control of their electric vehicle charging may impact their ability to drive or respond to emergencies	• Opt-out capabilities – participants will be able to easily retain or revert to direct management of their electric vehicle charging, without incurring penalty "fines" as desired, though financial incentives might be impacted at a certain volume of opt-outs • Establish minimum charge thresholds via optimization algorithms that will define the amount of battery charge required for participants to always be able to use their electric vehicles for emergency purposes • Careful and thoughtful user experience, as PacifiCorp and its selected implementation firm will aim to ensure communications with customers are regular and clear throughout all stages of the Pilot, using best practice communications methods and easy-to-understand terminology • Financial incentives set at the correct level for customer payments to make it worthwhile for customers to participate in managed charging of their electric vehicles • Monitor and measure customer satisfaction throughout implementation phase and especially during the evaluation phase of the Pilot; PacifiCorp will ask customers directly about their satisfaction with the Pilot in general and specific components of the Pilot, and will aim to develop mitigation strategies as required to meet their customers' needs
Ability to integrate the Pilot into PacifiCorp's broader DR portfolio	Other programs in the Company's DR portfolio are being implemented as load shed designs, as opposed to load shift: the Pilot will need to explore how a load *shift* offering, which may not be	• Leveraging a "set it and forget it" design may be preferable from a customer experience stand-point, as opposed to the potential for inducing customer stress due to the uncertainty of when peak events may be called • Leverage the approach PacifiCorp uses with grid interactive water heaters and methods for

	able to fully or analogously curtail load during traditional peak events, fits into the broader "flex load" strategy of its DR portfolio	aggregating this load for its Residential DR program • Seek new approaches to analyze and demonstrate the economic and reliability value streams of load shifting impacts on the grid
Measuring cost effectiveness	Pilots are commonly exempt from needing to meet minimum cost effectiveness thresholds of 1.0, though exceeding this threshold may be necessary to expand the Pilot to a full program	PacifiCorp expects from the Pilot's chosen EM&V provider or internal analysis teams an analysis and recommendations on how to cost effectively expand the Pilot to a full-scale program at the end of the Pilot's implementation phase
API access limitations by OEM	Not all OEMs offer the same APIs or degree of integration, which could limit the scope of participation among willing customers based on their electric vehicle make	The selected implementation vendor should have the ability to directly integrate vehicles from as many OEMs as possible, along with a strategy for integrating with other OEMs via home-based EVSE

4. Performance Areas

The pilot should be able to positively impact many of the metrics in Table 3. , though some are not applicable to the pilot.

Table 3. Performance Categories Discussed in TE Plan

Metric	Discussion
Community-focused efforts and investments (customer benefit indicator in the CEIP)	PacifiCorp plans to track this CBI and corresponding metric consistent with the 2021 CEIP[18]
Participation in PacifiCorp energy and efficiency programs and billing assistance programs (customer benefit indicator in the CEIP)	PacifiCorp plans to track this CBI and corresponding metric consistent with the 2021 CEIP[19]
Charging adequacy (equitable access)	• During the program design stage of the Pilot, the Company plans to explore the feasibility of offering incentive tiers based on income • The Pilot could explore how to engage with EV owners living in multi-unit housing
Grid Benefits	One of the key learning objectives of the Pilot will be to measure load shift potential and possible integration of the managed charging resource into the Company's broader flex load / DR portfolio (Sections 2.2 and 2.4).

[18]See UTC case Docket Document Sets. Available online: UTC Case Docket Document Sets | UTC (wa.gov)
[19] Ibid

Environmental Benefits	Load shift and peak reduction are commonly associated with GHG emissions reductions. PacifiCorp will likely seek input from an evaluator to estimate these impacts, which are one of the pilot's learning objectives.

5. Charging Infrastructure, Billing Services, Metering & Customer Information

The Pilot will remotely manage customers' EV charging load via two-way dataflows. From the EV (or EVSE) to the utility, the charging level of each EV's battery will be transferred; from the utility to the EV (or EVSE), the signal to charge (or stop charging) will be transferred. In addition to the communications with the EVs and EVSEs, implementation of the Pilot will leverage customer-level data surrounding EV ownership, rates, and potentially other sensitive demographic data, such as underserved community status and home addresses. The same reliance on customer-level data will be true for the Pilot's evaluation. As such, the successful implementation and evaluation vendors will need to conform with data privacy and cyber security terms to protect the integrity of customers' private information, per Berkshire Hathaway Energy requirements and relevant legal rules.

6. Expected Distribution System Impacts

PacifiCorp expects managed charging to reduce the incremental EV peak demand from residential customer adoption of EVs. This should provide grid benefits by increasing deferral periods on distribution equipment and thereby lowering overall distribution system costs relative to the baseline absent such an offering.

In an unmanaged system, residential EV charging patterns would be expected to coincide with existing periods of peak demand. Currently, as EV owners arrive home from work or other daily activities, they typically plug in their vehicles to be fully charged for the next day; this is the most common (and convenient) time for EV owners to start a charging session (Section 2.5). As EV penetration grows, such a usage pattern would result in a large number of chargers coming online at roughly the same time period. And if peak electricity usage increases, it has the potential for distribution equipment to begin operating at emergency ratings and creating reliability issues. Most EVs are not required to be charged for immediate use during these late afternoon/early evening peak load times. Likewise, most generally only require a few hours to achieve full charge after a day's use. With managed charging, charging sessions can be automatically delayed and staggered until later in the evening, well past peak load times, without disrupting customer schedules (Section 2.5). The utility distribution system, therefore, will encounter fewer instances where system capability is facing limits.

Although managed charging cannot entirely eliminate the increased peak load that will be added from EV adoption, it can potentially mitigate a large share of that load, downgrading impacts from urgent concerns requiring immediate action, to a more predictable issue that can be addressed via standard distribution system practices and procedures.

PacifiCorp's benefit cost analysis (Section 12.3) includes some minor Pilot cost savings from deferred maintenance of the distribution system. However, one of the learning objectives of the Pilot will be to further understand whether the managed charging will have further impacts on distribution system costs (Section 13).

7. Ownership Structures

The end-customer will own or lease the EV and the at-home EVSE, as opposed to PacifiCorp and/or its contractors.

8. Technical Requirements

There are two primary areas in the Pilot that will leverage technical requirements: the charging equipment and the flex load aggregation data. Section 2.1 details the use of telematics vs. EVSE to manage charging load. Section 2.4 includes discussion on evaluating the feasibility of incorporating the Pilot's aggregated flex load into PacifiCorp's DERMS or energy management system platforms.

9. Supporting Data

Throughout the Pilot's implementation phase, the Company expects to gather new, service area-specific data to help inform the Pilot's evaluation and provide answers to those questions asked via the learning objectives described in Section 13. Some of these data may include the following customer participation information:

- Market share reached by the Pilot, including total customers, eligible customers, and participating customers, segmented by EV make, model, and load control device (OEM telematics or EVSE)
- Mapping of participants overlaid by PacifiCorp's distribution system circuits to illustrate distribution system planning (DSP) impacts
- EM&V results including load shift, environmental impacts, cost effectiveness, customer satisfaction, other possible measurable pilot impacts, ideally broken out by A/B test groups (e.g., telematics vs EVSE, incentive type or level, incentive timing, messaging, etc.)
- Costs incurred including incentives and non-incentives

Other pertinent data points may emerge during the Pilot phase and during the evaluation process.

(For existing data availability or gathered in writing this program application, see Section 2.5: Market Baseline Assumptions.)

10. Program Development Process

10.1 Efforts to Coordinate with Related State Programs

The Company is unaware of any current state programs that directly manage EV owners' charging loads. All the past pilot programs in other jurisdictions (Section 2.5) have been directly implemented by utilities, rather than by state government agencies.

11. Alignment with the Company's Long-Term TE Strategy

PacifiCorp's goal is to be a trusted advisor to support equitable acceleration of TE across all our communities in the West. To ensure achievement of these goals, PacifiCorp has identified four objectives to help drive towards this vision of equitable acceleration:

- Improving Access
- Reducing Costs
- Electrifying Equitably
- Reducing CO2 Emissions and Grid Impacts

The development of this Pilot aims to positively impact the fourth objective, managing the future load effectively on the grid. The Pilot is also expected to reduce costs to customers by paying financial incentives to Pilot participants, while also potentially reducing participants' energy costs if they use the TOU rate.

12. Program Costs and Benefits

12.1 Estimated Costs, Incentives, Program Delivery, Evaluation, Marketing and Administration

The pilot's estimated budget totals nearly $375,000 over the course of the three-year implementation phase. Approximately one third of that cost is for incentive payments, another third for administration expenses, and the remainder for marketing and evaluation activities (Table 4. Residential Managed Charging Program Budget). In the Addendum[20] provided by PacifiCorp on September 28th, 2022, PacifiCorp original proposed a budget of $378,000 for the pilot. This budget below is aligned with that proposal.

Table 4. Residential Managed Charging Program Budget[21]

Managed Charging Pilot	Year 1	Year 2	Year 3	Total
Incentives	[redacted]	[redacted]	[redacted]	[redacted]
Program Administration	[redacted]	[redacted]	[redacted]	[redacted]
Marketing	[redacted]	[redacted]	[redacted]	[redacted]
Evaluation	[redacted]	[redacted]	[redacted]	[redacted]
Total Program Costs	**$95,596**	**$90,726**	**$183,836**	**$370,159**

12.2 Estimated Participant Costs and Benefits

Pilot costs incurred by participants are expected to be zero since the Pilot will send signals via the EV or EVSE, which participating customers already own. Given the financial incentives paid to customers for enrolling and participating, they will economically benefit from the Pilot. A customer enrolled in PacifiCorp's TOU rate would likely obtain additional economic benefits from Pilot participation.

12.3 Program Cost Benefit Analysis

Utility electric system benefits and costs represent grid or ratepayer impacts resulting from TE investments. Where these impacts result in a net avoided cost or a realized gain, they can lead to greater reliability, lower costs, or lower rates for the utility's electric system.

To better understand the potential impacts of the Pilot to customers and society, the Company conducted three benefit-cost tests. Each test—Ratepayer Impact Measure (RIM) test, Total Resource Cost (TRC) test, and Societal Cost Test (SCT)—uses a different set of benefits and costs to examine overall impacts and trade-offs.

[20] Washington Utility and Transportation Commission. (2022, May 2). UE-220359 PacifiCorp Transportation Electrification Plan. UTC Case Docket Document Sets | UTC (wa.gov)

[21] Note that this budget is an estimate of total Pilot costs. The RFP process and procurement negotiation step will confirm the final administrative budget needed to run the Pilot in Washington and will be followed-up with a tariff sheet filing. Then, the program onboarding phase will confirm the final plan for customer incentives.

Each test seeks to provide insight into different questions; therefore, cost-effectiveness results should be viewed through the following lenses:

- *RIM:* The costs and benefits to all Washington PacifiCorp ratepayers; will average utility rates increase or decrease?
- *TRC:* Will utility system costs and host customer costs collectively be reduced because of the program?
- *SCT***:** The costs and benefits to the state of Washington; does the program provide net benefits for the state as a whole?

Whether a particular value stream is a cost, a benefit or not included depends on the test used. The benefits and costs considered for each test are summarized in Table 5. Cost and Benefit Impacts by Test. For each test the Company, compared the net present value of costs and benefits accrued over the duration of the pilot.

Table 5. Cost and Benefit Impacts by Test

Type of Impact	Impact	RIM	TRC	SCT
Utility	Energy	Benefit	Benefit	Benefit
	Generation Capacity	Benefit	Benefit	Benefit
	T&D Capacity	Benefit	Benefit	Benefit
	Distribution upgrades	Benefit	Benefit	Benefit
	Revenues	Benefit		
Pilot	Administrative Costs	Cost	Cost	Cost
	Incentives	Cost		
Societal	Avoided GHG emissions			Benefit

Pilot Costs

Pilot costs include incentives, administration, marketing, evaluation, and other operating expenses incurred by the utility specifically to provide Pilot services. Incentives paid by the Pilot are included as a Pilot cost in the RIM test, though they are considered “pass-through” transactions in the TRC and SCT, and therefore do not represent a cost or benefit. The Pilot costs are provided in Table 4. Residential Managed Charging Program Budget.

Energy Impacts

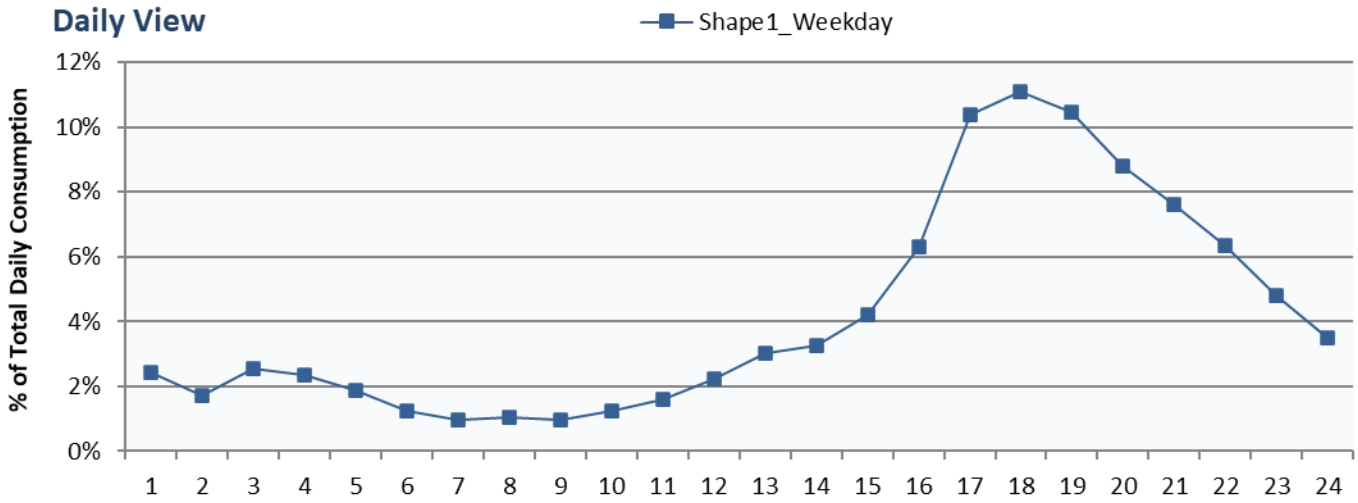
Consideration of energy impacts is important in minimizing risk and maximizing benefits related to integration of new loads from TE. To integrate new TE load in the future, PacifiCorp seeks to understand how TE charging behavior will impact the grid and overall revenues collected. Insight into energy impacts can help improve planning for future opportunities and inform how PacifiCorp prioritizes technologies, pilot designs, and market interventions. Table 6. Residential Managed Charging Pilot Annual Energy and Demand Impacts estimates total energy load enrolled in the pilot, and the expected impact to summer and winter peak capacity.

Table 6. Residential Managed Charging Pilot Annual Energy and Demand Impacts

Number of Participants	Total Energy Consumption at Site (MWh)	Reduction to Coincident MW (Summer)	Reduction to Coincident MW (Winter)
283	1,008	0.22	0.02

For each participant, the Company assumed the Pilot shifts 100% of the charging expected to occur during peak periods to off-peak periods. Participants were assumed to have one EV, and each EV was assumed to consume 3,563 kilowatt-hours (kWh) per year. This consumption value is the average of the annual value published by Oregon DEQ Clean Fuels Forecast from 2017 through 2022.[22] Participants were assumed to be on a standard residential rate. Hourly charging impacts were determined via Northwest Power and Conservation Council Regional Technical Forum's (RTF) residential charging load shape (Figure 8). Absent managed charging, residential EV charging predominantly occurs during the late afternoon hours, and largely coincides with summer peak hours. The RTF load shape provides a more conservative estimate of load shift potential per participant than SEPA estimates, which estimate the lower range to be approximately 1.4 kW of peak load shift.[23] Determining the extent of load shift potential is a core learning objective of the Pilot.

Figure 8. Daily Load Shape for Residential EV Charging



To model system impacts from the Pilot, the Company used the annual energy use and the timing of consumption in the RTF load profile to determine anticipated revenues without the Pilot. Next, the Company created a second load profile to model time of consumption with the Pilot, where any energy consumed during summer or winter peak hours in the RTF load profile was shifted to off-peak hours. The difference in the total energy and capacity costs across the two models represents the system benefit from the Pilot.

[22] "2022 Oregon Clean Fuels Forecast," Oregon Dept of Environmental Quality. Available online: https://www.oregon.gov/deq/ghgp/Documents/CleanFuelsForecast2022.pdf

[23] Smart Electric Power Alliance. *Utilities and Electric Vehicles: The Case for Managed Charging.* 2017. See page 7. Available online: https://sepapower.org/resource/ev-managed-charging/

The cost inputs used to model the energy and capacity impacts were specific to the PacifiCorp system, when available. They were also consistent with the Company's planning assumptions. Table 7 lists the various utility-specific inputs used to estimate grid impacts and anticipated utility revenue.

Table 7. Utility Impacts and Sources

Parameter	Source
Discount rate	PacifiCorp 2021 Integrated Resource Plan
Inflation rate	PacifiCorp 2021 Integrated Resource Plan
Generation capacity costs ($-kW/year)	PacifiCorp 2021 Integrated Resource Plan
Transmission and distribution costs ($-kW/year)	PacifiCorp 2021 Integrated Resource Plan
Energy supply costs ($/MWh)	PacifiCorp 2021 Integrated Resource Plan
Social cost of greenhouse gases ($/Short Ton)	PacifiCorp 2021 Integrated Resource Plan
Residential rate ($/kWh)	PacifiCorp Schedule 16, Residential Service (base energy rate)

Societal Impacts

The SCT builds on the TRC (which includes only financial impacts) by incorporating broader societal benefits that are often non-monetized. As a result, a common challenge in applying the SCT is finding appropriate methods for quantifying and valuing societal benefits. The societal benefit most often accounted for in DER programs in Washington is a reduction in carbon dioxide emissions.

This Pilot does not directly result in a reduction in carbon dioxide emissions from gasoline or diesel consumption, because the pilot is not shifting any ICE vehicle driving time to EVs. Although there may be carbon impacts from shifting load to off-peak hours, the Company is not currently able to reliably model fluctuations in hourly carbon emissions on its system. This is largely due to the high degree of variability and diverse mix of generating units supplying power in any given hour. Similarly, other beneficial outcomes—such as the reduction of criteria air pollutants—that might result from managed charging suffer from limited data to quantify, monetize, and attribute benefits to managed charging pilot activity. As more data becomes available, the Company will seek to analyze additional benefits from shifting load off peak times.

Host Customer Impacts

Host customer benefits and costs are typically included in the TRC and SCT tests. Given that PacifiCorp assumed all participants are on a standard residential rate, and participation does not affect the total amount of

energy consumption, there are no financial benefits that accrue directly to host customers from the shift in charge time.[24]

Results

Table 8. RIM - Benefit Cost Analysis

Benefits (NPV)		Costs (NPV)	
Avoided Supply Cost	$53,004	Incentives	$102,697
		Pilot Administration	$216,739
Total Benefits	**$53,004**	**Total Costs**	**$319,436**
Benefit/Cost ratio	**0.17**		

Table 9. TRC - Benefit Cost Analysis

Benefits (NPV)		Costs (NPV)	
Avoided Supply Cost	$53,004	Pilot Administration	$216,739
Total Benefits	**$53,004**	**Total Costs**	**$216,739**
Benefit/Cost ratio	**0.24**		

Table 10. SCT - Benefit Cost Analysis

Benefits (NPV)		Costs (NPV)	
Avoided Supply Cost	$53,004	Pilot Administration	$216,739
Avoided Carbon Cost	$0		
Total Benefits	**$53,004**	**Total Costs**	**$216,739**
Benefit/Cost ratio	**0.24**		

13. Learning Objectives

The Company's anticipated learning objectives from the Pilot are listed below. These may be updated during the planning and implementation phases of the Pilot, given potential input from stakeholders, implementers, and/or evaluators. (Section 2.2 and Section 2.4 discuss the broader pilot objectives and expected outcomes, both of which include similarities to the following learning objectives.)

- Calculate total EV load enrolled in managed charging and potential for managed charging
- Determine the estimated percentage of EV load enrolled in managed charging

[24] Host customers do receive incentives to participate, but these are considered pass-through payments. Passthrough payments are not included in the cost-benefit analysis because they are not funds coming into or going out of the total accounting for the utility and customers.

- How much load can be effectively shifted from baseline?
- What are the environmental impacts of the load shift?
- Understand barriers to participation in managed charging programs
- Measure impacts to customer satisfaction
- Determine if managing telematics and managing EVSE yield different impacts or enables different levels of pilot participation
- Learn how managed charging could be integrated with the existing DR portfolio and/or renewable generation management
- Explore potential ways to allow Pilot participation by EV owners who reside in multi-dwelling housing units
- Explore feasibility of offering tiered incentives based on participating customers' income levels
- Investigate if managing EV load has impacts on distribution system planning and expenses
- Understand any additional costs absorbed host customers, such as original equipment manufacturer (OEM) API fees that be incurred.

The Company plans to explore the use of an experimental design framework for the Pilot (e.g., a randomized encouragement design), and whether it could yield more accurate or nuanced results toward meeting the Pilot's learning objectives.

14. Data Collection and Reporting

PacifiCorp will release periodic reports to TEP stakeholders focusing on major program progress or changes, expenses, and revenues, with the first report released in Q4 2023, which will be an interim report on progress to date of the TE plan activities. A more detailed report will be released by end-of-year 2025 and may include updates on EV adoption and forecasts by type, updates on load and grid impacts, product activities and progress, lessons learned, expenses to date, and cover comprehensively the last two years of the TE Plan. In 2026, another interim report will be released covering the previous year. By the end of 2027, PacifiCorp will deliver a final TE Plan report that will cover the last five years comprehensively as we also develop a new TE Plan.

Appendix A: Stakeholder Comments

Item No	Category	Comment Provided	PacifiCorp Response
1	Overview	What types of outreach has PacifiCorp done for these draft programs and pilot applications? What types of feedback did PacifiCorp receive?	PacifiCorp worked directly with the Equity Advisory Group during the drafting and creation of the named communities grant program as well as the outreach and education program. Furthermore, the WUTC EVSE Stakeholder Group was consulted and informed during the development of these programs as well as the managed charging program. The programs were originally discussed and detailed in the Washington Transportation Electrification Plan approved by the Commission in in October 2022.
2	Overview	In PacifiCorp's TEP it noted that about a third of the budget is set aside for the named communities grant program and that more than 50% of investments from the TEP would serve named communities. Could PacifiCorp outline for staff how these objectives are being achieved with the current applications? Further could PacifiCorp outline how these applications compare to the $3.5 million budget described in the TEP?	The communities grant makes up about 28% of the budget. While the proposed utility-owned infrastructure program makes up about 30% of the budget, these projects are meant to serve named communities and be placed in named communities. Those two programs applications are estimated to be around $2million dollars over the next five years. The rest is planned for workplace and utility-owned infrastructure programs.
3	Managed Charging	Page 5, section 2.1, has PacifiCorp investigated any of the privacy concerns that might arise from this degree of control? Were any less invasive alternatives considered? Are there any other management techniques that might facilitate customers better managing charging on their own? Has PacifiCorp investigated any ways to mitigate or assuage privacy or control concerns?	PacifiCorp proposes the active managed charging pilot in an effort to add another "tool" in the flex load "tool chest" along with other demand response programs and a time of use rate pilot. Having flexible load with this degree of control is an important clean energy resource for PacifiCorp's Energy Supply Management and is a part of the specific actions proposed by Company's Clean Energy Implementation Plan. Please refer to WAC 480-100-610 (4)(a) for the mandate required of PacifiCorp to "pursue all cost-effective, reliable, and feasible conservation and efficiency resources and demand response." The Company has contemplated layering in behavioral / passive managed charging as a part of the pilot, as well, and anticipates working with the selected vendor to determine the most appropriate strategy. Among stakeholders and interveners, such as Northwest Energy Coalition and Verde, comments have been generally supportive, especially relating to the similar proposed program in PacifiCorp's Oregon Transportation

			Electrification Plan. The Company acknowledges the importance of customer privacy and would like to emphasize a number of points relating to the proposed pilot: First, the pilot will be voluntary. While the program will pay customers incentives in exchange for the right to actively control when their electric vehicle charges, it is possible that some customers will still not be comfortable with the concept. There will be no obligation for them to join the program. Additionally, participants will also still be able to opt out of a certain amount of the active management during the pilot and still be considered active participants who are eligible for incentive payments. They can also unenroll from the program altogether at any point; there will likely be no "clawback" of incentives in those cases. The program will also ensure minimum charging thresholds are maintained for all participating vehicles. A program webpage will display customer-facing program information and frequently asked questions outlining how the program will work and what customers are signing up for. Customers will also be required to agree to terms and conditions before enrolling. Second, the SEPA research cited in the program application suggests that other markets have been successful in running programs with similar designs: customers have willingly chosen to participate and, in some instances, have even over-subscribed. Similar programs are happening at PSE and Avista already in Washington. Finally, the Company has rigorous cyber security terms which define data protections for customers. The implementation vendor will have to agree to those before PacifiCorp will execute a contract.
4	Managed Charging	Page 7, section 2.4, subsection 3, there is a reference to “tailored program design” and “ varying program design elements” Could you explain what PacifiCorp might have in mind? What variables is PacifiCorp considering?	The program elements referenced in that section which the Company and chosen vendor may tailor during the pilot include: telematics vs EVSE, incentive level, incentive method, incentive timing, and messaging. Please refer to page 19, section 9.

5	Managed Charging	Page 8, section 2.4, subsection 6, “EV detection modeling strategy developed.” Is this type of detection consistent with customer data privacy? Has PacifiCorp considered how customers might react to getting a notification about their EV if they never informed PacifiCorp? Is this a practice used by PacifiCorp in other applications or by other utilities to detect EV ownership? Has PacifiCorp investigated other means of locating EV drivers in its service territory?	PacifiCorp acknowledges the importance of customer privacy. Please see response to item number 3. While still being compliant with data privacy rules and regulations, PacifiCorp aspires to investigate whether EV detection modeling is cost effective, accurate, and feasible at scale during the pilot. A number of vendors in this space offer this type of modeling as a service and conduct it for utilities at scale across North America, in compliance with data rules and regulations. This type of modeling is also similar to what is done by other DSM programs, such as Bring Your Own Device programs, and within other industries. The Company plans to do mass marketing for the program across the Washington service area and will look to leverage multiple inputs to drive results. Customers can opt out of the messaging if they choose and will be excluded from marketing if they are on the Do Not Contact list. Conducting data analysis to drive tailored marketing and outreach to promote DSM programs, in addition to or in conjunction with mass marketing, has helped meet increasing energy efficiency and demand response goals over the last decade or more. Finding out who owns an EV in the Company's Washington service area can help enhance marketing and could increase the speed of the program's adoption rate. While there are other sources of data about who owns an EV, such as DMV data or data from third-party EV apps, there could be inaccuracies about where charging occurs, and so having another data source can help cross-verify findings. PacifiCorp aims to select a vendor with a successful track record for implementing managed programs that meet objectives and maintain high levels of customer satisfaction and trust; PacifiCorp expects the selected vendor to have experience messaging to end-customers and doing so in a way that minimizes negative reactions when doing outreach.

6	Managed Charging	Page 12, it states “PacifiCorp is planning to study the potential for managed charging on all three of these types of DR, which is one learning objective of the Pilot (Section 13).” How will this be experienced by program participants?	PacifiCorp aims to select a vendor with a successful track record for implementing managed programs that meet objectives and maintain high levels of customer satisfaction and trust. The program will ensure that minimum charging thresholds are met and that customers can easily override if needed. Ideally, from a customer perspective, participating in the program will become a "set it and forget it" experience: they plug in their vehicle when they get home from work and expect it to be charged and ready to use when they leave the next morning, regardless of whether that day PacifiCorp employed a load shed, shift, or shimmy strategy. The "shed" and "shimmy" type demand response events, which respond to frequency or contingency events could happen off peak, are generally rare, and commonly do not last more than 30-45 minutes. Validating this assumption and understanding whether these strategies are actually noticeably experienced by participants will be an important learning objective of the pilot.
7	Managed Charging	Page 14, Section 2.7, it states “residential-based, user-owned EVSE and vehicle telematics” has PacifiCorp investigated other customer types such as industrial or commercial managed charging? Or how community based organizations might take advantage of managed charging?	At this time, the pilot plans to focus on residential customers. Non-residential charging could be explored as a "phase 2" project after the initial pilot term, depending on how the customers use their EVs.
8	Managed Charging	Page 15, section 2.8, it states “PacifiCorp expects that the majority of the Pilot’s early adopters will be customers living in single-family housing, though it is also interested in exploring ways to reach and include customers living in multi-unit dwellings.” Has PacifiCorp considered renters in single-family homes?	Yes. PacifiCorp believes that it will be reasonable to accommodate renters in single-family homes in the case that the renter has the electricity account with PacifiCorp and has access to / control over the EV charging at the home. The program webpage and materials can confirm those details for prospective customers. Customers living in multi-unit dwellings are likely to be harder to reach on the offset and one of the learning objectives will be to explore potential ways to allow them to participate in the program.
9	Communities Grant Program	Could PacifiCorp describe how it arrived at the budget size for this program?	PacifiCorp estimated funding three to five projects a year with a range of funds equaling about $50-100k per project. From previous experience, average funding awards are around $70-80k.

10	Communities Grant Program	Appendix A, Table 5, Staff appreciates the ambition reflected in the categories and subcategories for scoring. Could PacifiCorp provide more information on how this scoring rubric will be implemented? Are there objective bases for applying scores to various proposals that might be received?	The suggested scoring criteria was created in conjunction with the Equity Advisory Group (EAG) on how to best to award grant funds. The scoring rubric is meant to be used by a third-party grant evaluator when scoring each application. The third-party evaluators would be neutral third-parties reviewing grant applications providing objective analysis.
11	Overview	All three documents include tables with budget information. In the tables, the totals are shown, but not broken down by category (admin, incentives, etc.). Is this information known or still being sorted out? It's helpful to see all the numbers by category as well, so it would be great if you are able to include it.	PacifiCorp will file the budget information as both confidential and redacted. The filings will be filed under confidential protection. Both staff and public counsel are covered under statute and be available to review. NDAs will need to be signed with specific parties that want access to confidential information.
12	Overview	Regarding the Outreach and Education Program, I'm curious about how much your team has been learning from or adapting the methods used by either PSE or Avista in developing this program. I'm glad to hear (and expected) that you'd reviewed PSE and Avista's outreach efforts. And I agree that Pac's territory in Washington is a bit unique, though Avista serves some more rural areas as well. Avista's recent annual report mentioned having a couple of displays in partnership with the Spokane Public Library, which seemed like an interesting approach to consider. The other thought I had was about partnering up with Avista for ride or drive events with local dealerships. I grew up in a rural area where people would drive pretty far to check out a vehicle if it was the right make/model/price	PacifiCorp has gained several insights from reviewing PSE and Avista's outreach and education programs. Avista's partnership with the Spokane Public Library is similar to the Company's proposed dealership engagement program. PacifiCorp is aiming to have a similar type of partnership with the local dealerships in the Company's Washington service area that will empower the dealerships that the Company partners with EV educational trainings, materials and tools that will be similar to those provided to the Spokane Public Library by Avista. The Company believes that the resources provided will position dealership partners to be trusted advisors that customers can rely on for information about EV ownership, charging and available incentives. PacifiCorp appreciates the comment regarding collaborative ride and drive events with Avista and local dealerships. The Company has had similar partnerships with Clark PUD for the last couple of years to offer EV education and test drives at the Portland Autoshow's Electric Avenue. The partnership has been mutually beneficial and collaborative outreach as proved to be a valuable way of stretching outreach funds further. The Company plans to reach out to neighboring utilities to set up a meetings to discuss future engagement events and collaboration opportunities in the TE space moving forward.
13	Overview	Regarding the Managed Charging Program, the document mentions (p. 15) that PacifiCorp "will better define 'active enrollment' upon launch of the Pilot." Do you have a sense of	The Company aims to create an inclusive program that provides customers needed flexibility to override / opt out of active management, to use their vehicle at unexpected times. Allowing this

		when you might have that term defined? The document also notes that there may be terms of the pilot that change—how will you work to make sure that customers understand/acknowledge that possibility? As far as defining 'active enrollment,' maybe I'm not quite understanding why that term wouldn't be defined prior to the program being approved. Is the point that Pac isn't quite sure where the cutoff should be and needs more information from running the program? Key to me is communicating well to customers whatever the definition ends up being and that any changes to the definition would also be broadcast widely.	flexibility and paying incentives on an ongoing basis will be an important step towards the goal of earning customer trust in the program and it is the Company's expectation that the majority of participants will offer reliable load shift in exchange. On the other hand, the Company recognizes that there likely should be a minimum amount of ongoing participation for customers to be considered an "active" part of the program to ensure that there is still grid benefit in exchange for the incentive payments. According to industry research, including by SEPA, other utilities running similar managed charging programs have defined "active participation" in various ways. Some base incentive payments on the amount of actual load shift performance, others have a "three strikes, you're out" rule on a monthly basis, while others use even different approaches. Given the wide array of options available, and an ever-evolving landscape, PacifiCorp is seeking further information before deciding exact structure. PacifiCorp plans to collaborate with the selected implementation vendor to decide the most appropriate method for defining this cutoff for "active enrollment." During the onboarding phase, the Company will conduct a thorough review of the implementation vendor's proposed options and recommended best practices, based on their experience running other managed charging pilots and programs, and make a decision that will work best. Once a vendor is selected to support program launch and implementation, PacifiCorp will file a tariff sheet explaining all the terms associated with the program for WUTC approval. The comment about transparency is well received. PacifiCorp acknowledges that customers will need to understand what they are signing up for and how the incentives work. PacifiCorp plans to communicate the final definition clearly and openly to customers and potential participants via the Company's program website and other collateral, like an FAQ document, customer implementation manual, using plain language an average customer would be able to understand. Customers who sign up for the program will also need to read and agree to terms and conditions.

14	General	Staff appreciates that Pacificorp sought feedback on the three applications from the following sources: Equity Advisory Group, WUTC EVSE Stakeholder group, Flex Charging, and Public Counsel. Staff questions if Pacificorp could expand on lessons learned during the TEP drafting process to improve outreach within its service territory.	PacifiCorp appreciates this comment and will investigate opportunities on how to best improve outreach and lessons learned during the drafting of the next TEP.
15	General	Staff lauds Pacificorp for aiming to exceed the goal of 50% of investments from the TEP serving named communities. Staff questions if Pacificorp can present these budgetary goals and the intended flows of resources to named communities within the application documents.	PacifiCorp has added in a section in the named communities grant program application discussing the budgetary goals of spending in named communities.
16	General	Staff notes that the total TEP budget has expanded. Staff asks if Pacificorp could clearly communicate the expected TEP budget changes especially as they relate to the total budget within the application documents.	The overall TE budget was estimated at $3.5 million over the next five years. The current proposed applications equal a proposed budget of $2.3 million. The remaining funds are to support the future workplace/multifamily program as well utility-owned public infrastructure program. At this time, PacifiCorp anticipates a potential increase in the utility-owned public infrastructure program costs due to equipment cost increases. However, strategies can shift and allow PacifiCorp to stay within the $3.5million anticipated budget. At this time, PacifiCorp believes that the overall TE budget has not been exceeded.
17	Managed Charging	Page 5, section 2.1, Staff has reservations about degree and directness of control over the charging of customer vehicles. Staff would like to see assurances within the application that customers will be fully informed of the degree and directness of control over the charging of customer vehicles. Staff would like more clarity around customers' ability to override the managed charging. Staff would appreciate more clarity within the application on why this approach was chosen over other less invasive alternatives.	Please refer to the response to item number 3. The state of Washington's CETA rules obligate PacifiCorp to pursue all available, cost-effective flexible load.

18	Managed Charging	Page 7, section 2.4, subsection 3, there is a reference to "tailored program design" and "varying program design elements". Staff would appreciate more clarity in the application about what tailoring and variables the program will entail.	Please refer to the response to item number 4. As discussed earlier, PacifiCorp will be filing a tariff sheet in alignment with the managed charging upon vendor award. WUTC and stakeholders will have an opportunity to revisit the program eligibility requirements and parameters.
19	Managed Charging	Page 8, section 2.4, subsection 6, "EV detection modeling strategy developed." Staff questions if this strategy is consistent with the following statutes: RCW 19.29A.110: Persons—Customer information—Capture, obtain, or disclosure for commercial purpose—Requirements—Application of consumer protection act. (wa.gov) RCW 19.29A.100: Electric utilities—Customer information—Sale or disclosure—Requirements—Exemptions—Application of consumer protection act. (wa.gov) RCW 19.94.585: Charging session—Consumer data disclosure. (wa.gov) If this practice is consistent with law, Staff would appreciate greater clarification around the ethics of this strategy and the public interest. Staff wonders if PacifiCorp might investigate alternative strategies to contact EV owners in its service territory such as targeted Google or Facebook ads for users who search for EV related products or partnering with dealerships to sign up customers when they first purchase an EV.	Please refer to the response to item number 5 for discussion about EV detection modeling at a high level. The response to item number 3 also discusses data privacy. Specific to this item, PacifiCorp conducted a preliminary review of the statutes cited in WUTC Staff's comment and the following represent the initial conclusions: RCW 19.94.585 -- Does not appear to be applicable as PacifiCorp does not sell the data and the Company is not considered an EVSP. RCW 19.29A.100 -- See subsection (5)(a), it appears it will not prevent a third party from sharing information back to the customer. PacifiCorp will have a contract with a third party, in which it will be directly related to utility business and that has a provision that prevents disclosing or selling the data to any other entity. Additionally, Subsection 7 states that if the marketing material is provided in the billing package, the messaging is allowable. RCW 19.29A.110-- Appears to apply to persons, as opposed to electric utilities (see subsection (3)).
20	Managed Charging	Page 14, Section 2.7, it states "residential-based, user-owned EVSE and vehicle telematics". Staff would like clarity regarding whether participation by community-based organizations was considered as an option?	Please refer to the response to item number 7.

21	Managed Charging	Page 15, section 2.8, "PacifiCorp expects that the majority of the Pilot's early adopters will be customers living in single-family housing, though it is also interested in exploring ways to reach and include customers living in multi-unit dwellings." Staff lauds Pacificorp's goal to include multi-unit dwellings. Staff also supports Pacificorp's use of telematics to include renters who may not be able to physically modify their home with EVSE.	Please refer to the response to item number 8.
22	Managed Charging	Page 13, section 2.5 – "SEPA estimated that there are at least 22 'network service providers' active in providing the underlying software to enable the EVSE-driver interface, at least 42 EVSE manufacturers offering managed charging capabilities, and at least nine vehicle OEMs offering vehicle telematics capable of being applied to managed charging" Staff questions if the pilot might also be an opportunity to investigate interoperability and apply lessons to other related EV developments.	At this time, PacifiCorp does not see a direct link with the managed charging pilot and interoperability standards. However, PacifiCorp will work to make connections and bring out lessons learned as they unfold.
23	Managed Charging	Page 15, section 2.8 – "Customers likely will not need to be enrolled in a TOU rate in order to participate in the Pilot, though they would likely benefit financially from doing so." Staff would like clarification about the effectiveness of existing TOU rate programs, where they exist, and the expected benefits of managed charging over these other programs.	Beginning in May 2021, PacifiCorp launched residential and non-residential service time of use pilots. The residential pilot (Schedule 19) targets single family residential customers and is available for up to 500 customers on a first-come, first-served basis. As of May 2023, there are 23 Washington customers on Schedule 19. PacifiCorp is studying the efficacy of the TOU pilot. Managed charging will be another tool that allows the Company to further leverage the potential flexibility of charging loads. Customers will not be required to participate in the TOU rate, but will be an added option. See also the response to item number 3.
24	Managed Charging	Page 15, section 2.8 – "Ongoing incentive payments for continued active enrollment, paid one or more times a year, in the range of $25 to $100." Staff would like clarification about whether any other methods of incentivizing customers were considered.	Yes. Please refer to the response to item number 4.

25	Managed Charging	Page 17, section 4 - "During the program design stage of the Pilot, the Company plans to explore the feasibility of offering incentive tiers based on income · The Pilot could explore how to engage with EV owners living in multi-unit housing" Staff is generally supportive of these measures and would like to see them explored more.	PacifiCorp appreciates the positive feedback on this item.
26	Managed Charging	Page 20, Section 12.1, table 4, – Staff would appreciate greater clarity regarding the anticipated values in the table.	PacifiCorp provided general budgetary information in light of sensitive market data. PacifiCorp will be filing both a redacted and confidential version of this program application.
27	Managed Charging	Further, Staff would like clarity around how the company anticipates customers who work nonstandard hours will participate	PacifiCorp aims to select a vendor with a successful track record for implementing managed programs that meet objectives and maintain high levels of customer satisfaction and trust. The Company would expect to work with the vendor during the onboarding phase to determine the strategy for reaching customers like the ones referenced in this comment. It may depend on these customers' typical charging habits, whether they have load that is available during the times it is needed for curtailment. It is possible that by staggering the off-peak charging and the testing of shedding and shimmying, these customers may end up being eligible to participate.
28	Managed Charging	Additionally, Staff would life clarification about whether the program applies to or considers customers who do not charge at their home, and other non-standard charging arrangements.	At this time, the pilot plans to focus on residential customers who charge their EV at home. Non-standard charging arrangements could be explored as a next phase after the pilot period is completed or via another program.
29	Communities Grant Program	Page 11, section 8, table 4. Staff would appreciate more clarity about the anticipated allocation of the budget between incentives, administration and evaluation. Further, Staff would appreciate more clarity around the ability of the grant program to scale up if it proves effective.	PacifiCorp will provide a confidential unredacted version for staff to review the anticipated allocation of incentives, administration and evaluation for each program application. To scale the future grant program, PacifiCorp can either shift funds from future programs (i.e. workplace/charging or utility-owned infrastructure) or PacifiCorp is planning to participate, at this time, in the WA Clean Fuels Program which will also add additional funds into the grant pool. PacifiCorp is currently a registered participant, however, 2023 is a compliance year and no credits are being sold and monetized at this time.

30	Communities Grant Program	Page 12, Appendix A, Table 5, Staff appreciates the ambition reflected in the categories and subcategories for scoring. Staff would appreciate more clarity on the steps of the approval process and how scoring criteria will be weighed.	PacifiCorp, at this time, has not defined the full approval process or awardee process for the grants as this would like be done in conjunction with the third-party evaluator that will be leading this effort. Scoring criteria weightings will be discussed with EAG and others once the third-party evaluator is hired.
31	Outreach & Education	Page 5, Setion 2.1, Staff questions whether technical assistance should also be available to multi-family units	PacifiCorp agrees that Technical Assistance should be available to multi-family unit dwellings and will offer technical assistance to multi-family dwelling customers that are on both a commercial and/or residential rate.

32	Managed Charging	Incorporate a customer-friendly interface A customer-friendly interface, available to customers via web and/or as a stand alone mobile app, can best facilitate the numerous customer interactions that we understand PacifiCorp will seek from its implementation vendor. As a vendor that has successfully co-branded web and mobile app interfaces on behalf of the utilities we partner with, we have seen firsthand that a customer-friendly interface can provide the following functionalities which on the whole will maximize pilot performance: a. Maximized customer eligibility via a hardware-agnostic APIs across a range of both vehicles and chargers; b. Seamless 3-step program enrollment with guided instructions c. Customer transparency over the status of their EV battery level and optimized charging schedule, including the capability for a customer to set their preferences for managed charging e.g. desired departure time and battery level; d. Customer control over charging if needed (e.g. temporarily override active managed charging or opt out of a DR event); e. Detailed history of customer EV charging consumption, costs, savings and incentives earned, along with direct payment functionality for the customer to redeem/cash out any off-bill incentives; and f. Behavioral nudges and messaging via mobile push notifications and/or pop-up messages.	PacifiCorp acknowledges this comment. The Company aims to select a vendor with a successful track record for implementing managed programs that meet objectives and maintain high levels of customer satisfaction and trust.

33	Managed Charging	Optionally expand the size of the pilot. We appreciate PacifiCorp's ambition to enroll between 5% and 15% of EV drivers in its service territory. However, given both the continued growth of EVs in Washington State and the proposed use of EV load detection modeling, we believe that PacifiCorp will be positioned to achieve an even greater level of enrollment. In addition, the benefits of a larger pilot are that PacifiCorp will have a richer data set from which to derive findings, the pilot size will increase excitement and awareness for the program among customers, and every customer who wishes to participate can do so. We would suggest that PacifiCorp incorporate an optionality clause that can further increase the size of the pilot once the enrollment caps are reached.	PacifiCorp is not currently planning on putting a cap on enrollment during the pilot. The 5-15% enrollment growth quoted in the program application was for demonstrative purposes only. If the program vendor acquires greater than 15% customer participation, nothing will prohibit those additional customers from enrolling. The more customers who participate, the higher the grid benefits will be.
34	Managed Charging	Develop checkpoints to increase the budget as needed. Based on the pilot plan, we understand that PacifiCorp is planning on a $375K budget over the three years of the program. We applaud PacifiCorp for incorporating a number of advanced elements into the managed charging program, including testing for "shimmy" EV response, developing EV load detection, and proposing meaningful customer incentives. We believe that if the budget were increased it would make it more likely that the final program will be able to incorporate all of these components. In addition, this would create potential space for the pilot to increase should the enrollment targets be exceeded.	The budget provided by PacifiCorp is an estimated budget at this time. The RFP process and procurement negotiation step will confirm the final administrative budget needed to run the pilot in Washington. Then the program onboarding phase will confirm the final plan for customer incentives.

35	Managed Charging	PacifiCorp should give consideration to ensuring that potential applicable fees for OEM connected services, which are a necessary precursor for a telematics-based managed charging program, do not pose a hurdle for customers to participate. The OEM fees can vary between free to over $200 a year depending on manufacturer of the electric vehicle and whether the manufacturer offered free connectivity for a few years. While Section 12.2 explicitly states that participant costs are expected to be zero, some participants may need to activate their telematics for a fee before they are able to participate in this pilot program.	PacifiCorp acknowledges this comment. The Company will seek to understand the extent of the cost impacts of OEM API fees during the RFP and onboarding process, and will want to monitor these fees during the course of the pilot. The Company would expect the program to cover these costs, as opposed to the end-customer, so that there are no out-of-pocket costs to participate in the program.
36	Managed Charging	PacifiCorp may be able to push further from a perspective of enabling and quantifying greenhouse gas emissions savings. While the pilot assumes no ICE to EV conversions and therefore doesn't claim any of those fuel emissions savings, the shift in managed charging times may align with greenhouse gas emissions savings for the pilot. FlexCharging has integrated with WattTime to allow for managed charging based on emissions savings by using the day ahead hourly generation mix of power to quantify savings when charging patterns are shifted. The quantification of these savings may improve the business case for a future program while also allowing for greater customer satisfaction based on improved emissions. Specifically, after scaling a program, the reduction in CO2 emissions per vehicle will help PacifiCorp achieve Washington's CO2 reduction requirements without building new resources. Relatedly, offering customers an option to charge from their on-site DERs may also have both customer satisfaction and emissions savings benefits, not to mention localized distribution system advantages.	PacifiCorp acknowledges this comment. Table 3 under Section 4 Performance Areas, outlined the metrics that the Company plans to track as part of the pilot. "Environmental Benefits" is the performance area most closely aligned with this comment. PacifiCorp will likely seek input from an evaluator to estimate these environmental impacts, one of the pilot's learning objectives. Additionally, PacifiCorp will aim to select a vendor with a successful track record for supporting a 3rd party evaluation.

37	Managed Charging	There are a variety of program design elements that can make for a better pilot by improving participant customers' experiences, which can improve expected outcomes related to customer enrollment, minimum percentages of charging load shifted to off-peak times, and continuous participation in the pilot throughout the pilot life. Having run managed charging programs across North America and Australia since 2018, FlexCharging would offer the following as critical elements for inclusion in an RFP for evaluating bids from EV telematics companies: o Ensuring a smooth customer journey for EV drivers by focusing on the creation of an easy and quick enrollment process to better capture interested parties and translate those into ongoing participants. o The user experience in terms of added battery drain through telematics access is not identified as a potential market barrier, but could have a detrimental effect on continued user participation. FlexCharging has developed a patented adaptive polling algorithm to ensure 15-minute interval data access for charging without contributing to appreciable range loss to customers participating in managed charging programs. Telematics companies should speak to their capabilities for minimizing vampire drain issues and this should be considered for part of the RFP evaluation criteria. o Telematics companies should speak to their ability to work with a variety of customers that reflects the urban and rural nature of PacifiCorp's footprint, including on strategies for retention of participants. o The EV telematics space is rapidly evolving, such that the capabilities of existing and future makes and models of EVs today may not be reflective of the state of affairs in the months and years to come. Given that this is a three-year pilot, the managed charging RFP should consider asking for details on EV telematics companies' respective roadmaps of increasing OEM/vehicle coverage as more capabilities become possible over time. This would allow PacifiCorp to consider expanding the initial program eligibility to a greater number of customers,	PacifiCorp acknowledges this comment.

		thereby increasing the robustness of data collected. o Given that the cost savings from deferred maintenance of the distribution system is one of the goals that this pilot is looking to quantify, RFP respondents should be asked for their ability to and experience with mapping customer charging stations to distribution substations. o Data-driven analysis of the program impacts is critical for providing meaningful evaluation, measurement, and verification of the pilot. FlexCharging has the ability to support EM&V activities, particularly around counterfactual creations that we have developed and currently provide to support other managed charging programs. To better support the pilot's learning objectives, the RFP should consider asking respondents to speak to their experience providing quantitative support to better inform verification activities and ultimately actionable conclusions and recommendations.	