

The background image shows a row of electric vehicles parked at a charging station. The focus is on the charging cable and connector in the foreground, which is plugged into a station. The vehicles are white and blue, and the scene is set outdoors with a brick-paved ground.

Transportation Electrification Workshop

Learning Lab - April 20, 2023



Meeting Objectives

Share PGE's Transportation Electrification strategy and programs

Request feedback prior to filing of draft TE plan (June 1)

Open the floor for questions

Share timelines and next steps

Meeting Logistics



Audio



Microphone



Chat box



Video



Raise Hand



Closed Caption

Operating Agreements



Establishing norms with our communities is foundational to building trust

To create a **safe space**, we established **common agreements** such as **respect, honoring diversity of thought**, and **inclusivity**

Practice curiosity and **seek to understand different perspectives**

**Stay
Engaged**

**Be Willing To
Experience
Discomfort**

**Speak Your
Truth**

**Expect and
Accept Non-
closure**

**Share the
Airtime**



[The courageous conversations framework](#)
by Glenn Singleton and Curtis Linton

Agenda

9:00 – 9:10 Welcome, introductions, meeting logistics

9:10 – 9:25 Resource Planning Context

9:25 – 9:40 PGE’s Role in an Evolving Market

9:40 – 9:55 Clean Fuels Program

9:55 – 11:20 2023-25 TE Portfolio Revision

- Residential
- Muni
- Multi-family
- Fleet

(10 min Break)

11:20 – 11:30 TE Budget

11:30 – 11:50 Questions & Answers

11:50 – 12:00 Closing Remarks & Next Steps

A photograph of an electric vehicle charging station. In the foreground, a black charging cable is plugged into a station. In the background, several white electric vehicles are parked in a row, each with a charging cable connected. The scene is outdoors, and the lighting suggests it might be late afternoon or early morning.

Resource Planning Context

JASON SALMI KLOTZ, PGE

PGE's New Planning Team



PGE has convened a new Planning team to consolidate resource planning, Environmental, Social, and Governance work, and long-term strategy

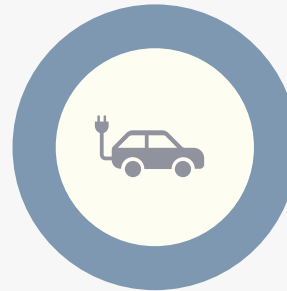
Integrated Resource Plan Clean Energy Plan

Long term resource planning to ensure we have adequate resources to serve our load and meet the decarbonization targets in HB 2021



Transportation Electrification Plan

Consolidates PGE's transportation electrification activities. Planning assists the TE Team in developing scope and impact of customer transportation electrification activity.



Distribution System Plan

Planning identifies and models energy efficiency, demand response, transportation electrification, local generation



Multi-Year Plan

The Multi-Year Plan lays out Flex Load acquisition activity and proposed spending. Planning assists the DER Programs Team in the same manner as for the TE Plan, above.



Consolidating these efforts within one Team creates efficiencies and clarity

PGE & Transportation Electrification



SB 1547 (2016) & HB 2165 (2021) directed utilities to:

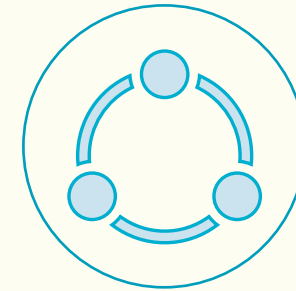
- Support transportation electrification through creating a portfolio of programs & infrastructure measures
- Collect a monthly fee supporting electrification, at least 50% of which will support underserved communities



PGE's 2019 TE Plan outlined the programs and future vision of the programs or rates



In 2022, PGE led five workshops to discuss its next TE plan



Today, we present how our proposal has evolved since the Oct 2022 workshop, in preparation for our **June 1, 2023, TE Plan filing**

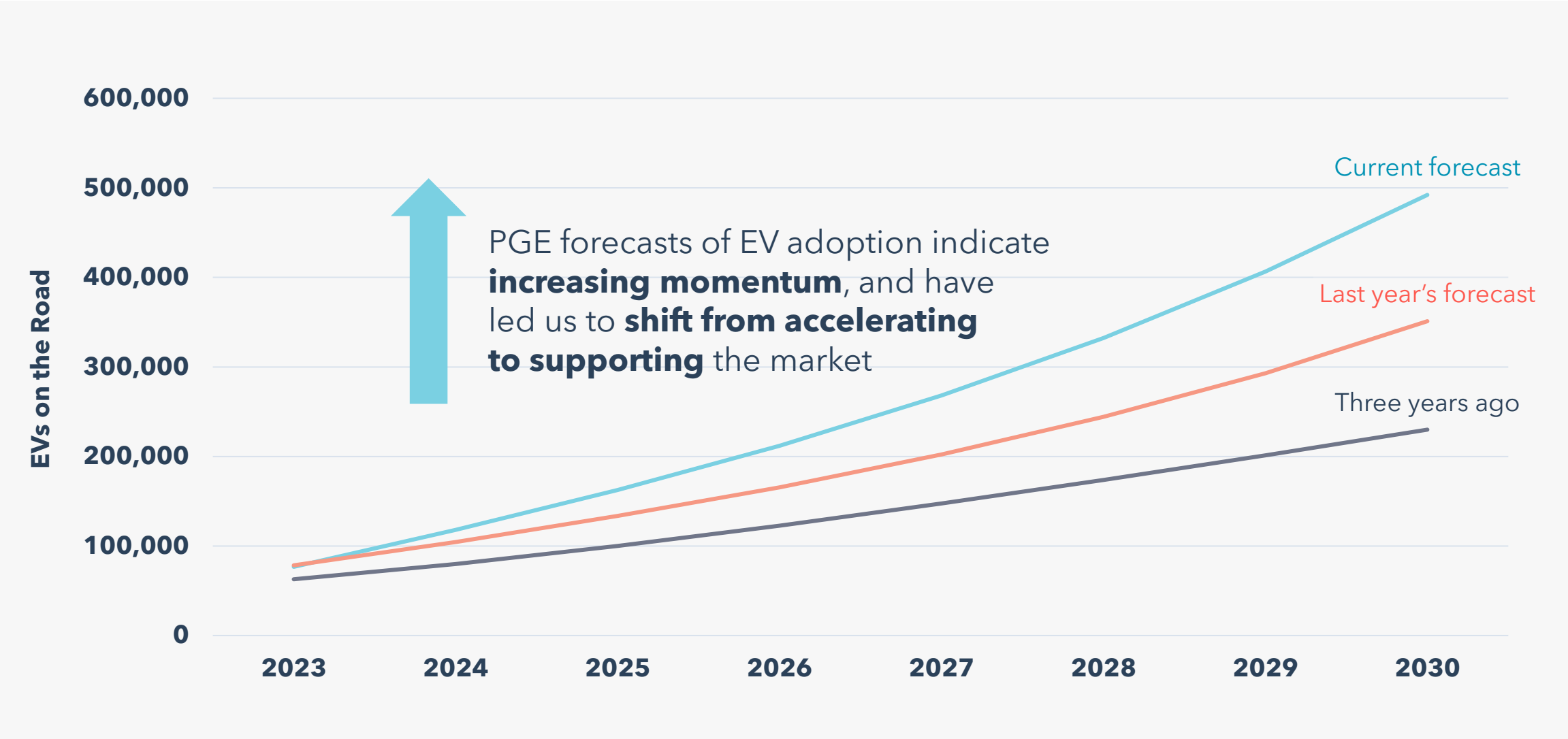




PGE's Role in an Evolving Market

ELYSSIA LAWRENCE, PGE

What has changed



PGE's TE Strategy

Long term evolution of our programs-based approach to traditional rates and tariffs

Planning

Update forecasting capability to provide additional insight into load, location, and impact by feeder and customer type



Utility Infrastructure

Provide make-ready infrastructure to the market



Coordinate Load Siting

Site larger loads (e.g., medium-to-heavy duty and fleets) at feeders and substations with headroom



Manage TE Load

Assure smart and managed charging. Operate as a flex load portfolio and Virtual Power Plan (VPP)

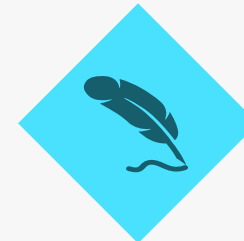


Structure TE Rates/Tariff

Develop rates that incent charging behavior that supports grid health, investment load siting and meets policy mandates



Current TE Activities



Federal

Grant coordination with communities, ODOT, and ODOE



Grid

Forecasting and planning; grid modernization; rate and tariff design



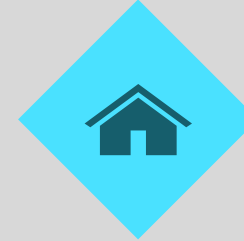
Equitable Access to Charging

Serve unique loads and market needs via grants and grid investment



Business

Make-ready and load management



Residential

Load management and transportation electrification

Electrification and Load Management

Proposed Transportation Electrification Portfolio



Infrastructure

- Make-ready programs
 - Multi-family (plus rebate for underserved)
 - Business-Workplace/Public (plus partial rebate for chargers)
 - Heavy Duty Charging
 - Fleet
- Municipal Charging Collaboration (support equitable charging)
- Portfolio Enablement (modeling, Fed grant \$, budget/data analyst)



Managed Charging

- Residential Smart Charging Pilot
- Fleet Partner Managed Charging

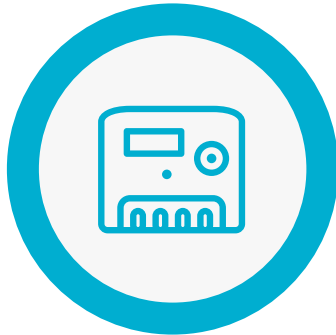


Future Rates/Tariffs

- Portfolio Enablement (modeling, budget/ data analyst)
- Make-ready programs leading to LEA and rate/tariff design
- Clean Fuels Emerging Technology to try out new technology leading to rate design

Funding Mechanisms

Transportation Electrification programs and infrastructure measures have multiple fundings mechanisms to maximize the ability to support customers' transition to EVs



Capital Expenditures (CapEX)

Rate base funds to build infrastructure or purchase assets



Deferral/Operating Expenditures (OpEX)

Rate base funds for operations and maintenance



Monthly Meter Charge (MMC)

A legislatively required charge included in customer rates to support transportation electrification (0.25% of total revenues)



Clean Fuels Program (CFP)

Funds from a DEQ program that PGE administers for our residential customers
Not included in customer rates

A photograph of an electric vehicle charging station with several cars plugged in, set against a dark blue background. The image is partially obscured by the text on the right.

Clean Fuels Program

EVA DECESARO, PGE

What is the Clean Fuels Program (CFP)?

CFP is an Oregon DEQ program to reduce the carbon intensity of transportation fuels

- DEQ quantifies the carbon intensity of fuel sources and sets a yearly target
- Fuels producing emissions above the standard (like diesel) create deficits and fuels with emissions below the standard generate credits
- Parties that generate deficits purchase credits to comply

PGE participates in this program and generates credits

PGE's revenue from these credits is used to benefit residential customers and underserved communities



Clean Fuels Program – TE Plan Proposal



Continue Successful Programing

- Drive Change Fund
- Electric School Bus Fund
- Education and Outreach
- Emerging Technology




Support TE Portfolio

- Deploy CFP funds across PGE's TE portfolio to support equitable deployment of TE infrastructure to benefit residential customers (Muni, Multi-family)
- TE Portfolio support is estimated at 10% of overall CFP forecasted budget



Continue Portfolio Approach

- The portfolio directionally shows how CFP funds will be used toward the established portfolio categories
- Fund amounts in the TE Plan will be forecasts for 2024 and 2025 therefore subject to various uncertainties

A photograph of an electric vehicle charging station with several cars plugged in, set against a dark blue background.

Proposed 2023-25 Transportation Electrification Portfolio Revision

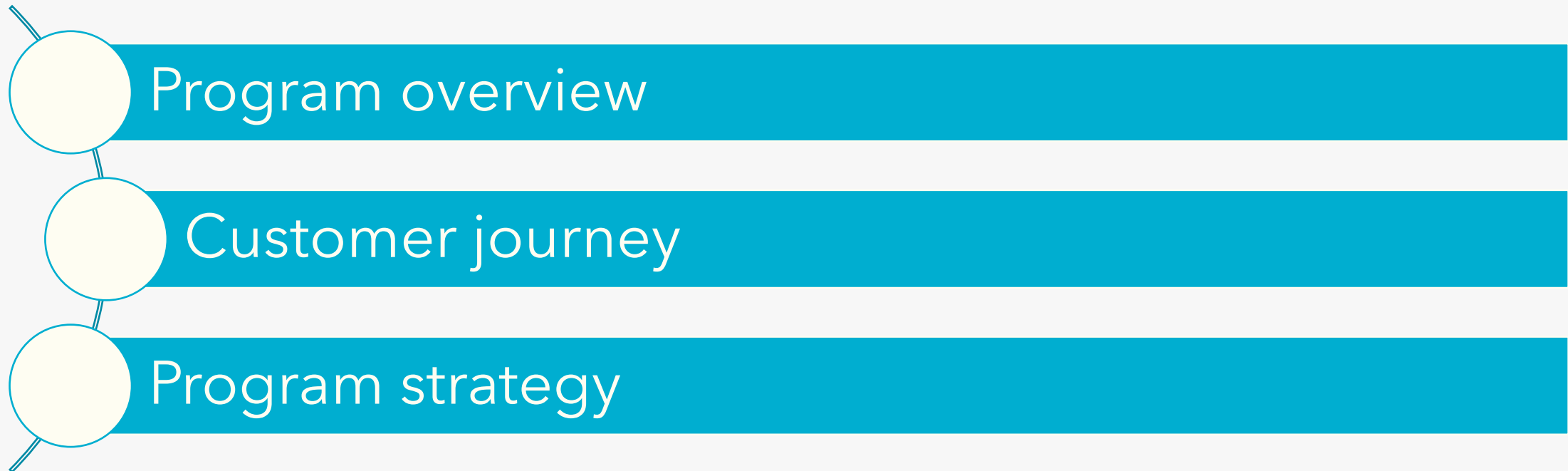
RESIDENTIAL: CAL CONRAD, PGE

MUNI: ANIK SHRESTHA, PGE

MULTI-FAMILY: DARREN SPENCER, PGE

FLEET: STEFANIE REITER, PGE

Outline by Program



**2023-25
Transportation Electrification
Portfolio Revision**

**Residential
Cal Conrad, PGE**

Residential EV Smart Charge Pilot Overview

	Approved	2023 TE Plan	Total
CapEX			
MMC	2.65 ¹	1.75	4.39
Deferral/O&M	1.68		1.68
CFP			
Total	4.33	1.75	6.07

(in \$MM)

Description	\$300 rebate towards purchase and installation of qualified L2 at-home charger (\$1,000 income-qualified rebate)
	\$50 rebate for Tesla drivers with non-qualified chargers
What has changed	Pilot extended; enrollment cap expanded
	Charger incentive decreased from \$500 to \$300
	Creation of managed charging program
Load management	\$25 seasonal incentive (six-month season; Oct-Mar, Apr-Sep) for allowing PGE to pause EV charging during peak loads
Target market	Residential EV ² drivers residing in single family homes
Funding	2022 MMC ³ funds panel upgrade rebates & trade ally network development

1. Proposing shifting spend on pilot from deferral to MMC in 2024 until the pilot completes.

2. Electric Vehicle (EV)

3. Monthly Meter Charge (MMC)

Residential EV Smart Charging Customer Journey



Customer (Residential EV¹ driver)

Wants to install an at-home Level 2 charger

Learns of the pilot through targeted marketing

Purchases a qualified Level 2 charger
(Tesla drivers apply through telematics (evPulse) and join the Smart Charge Pilot)

Gets an installation quote through the trade ally network

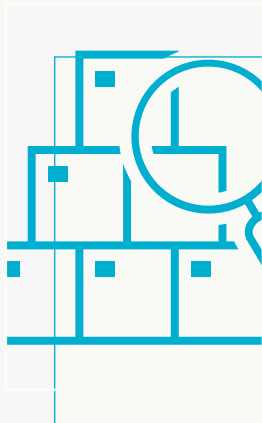
Gets their charger installed

Goes to portlandgeneral.com and applies for the pilot

Once enrolled, receives their charger rebate **(\$300)**
within 4-6 weeks

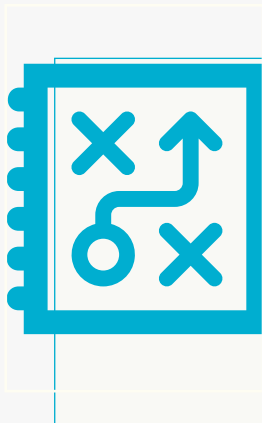
Participates in Smart Charge events & receives \$25 on-bill
credit at the end of the six-month season (Oct-Mar, Apr-Sep)

Residential EV Smart Charging Long Term Strategy



Use findings from Testbed EV charging study to better understand vehicle telematics capability

- Measure effectiveness of telematics managed charging vs. current smart charging activity
- Determine changes needed from Testbed study to scale to program



Gather data from the current activity to inform future rate design of managed charging

- Time of Day impact on event calling and shifting charging load
- Determine if there is a need for an EV-specific time of day rate/tariff
- Ability to control load to reduce impact to the grid

**2023-25
Transportation Electrification
Portfolio Revision**

**Muni
Anik Shrestha, PGE**

Municipal Charging Collaboration Overview

	Approved	2023 TE Plan	Total
CapEX	0.43		0.43
MMC	4.80	6.27	11.07
Deferral/ O&M			
CFP			
Total	5.23	6.27	11.50

(in \$MM)

Description	Collaborate with municipalities on equitable access to public L2 charging infrastructure in underserved communities
	Deploy chargers more cost-efficiently via existing utility right-of-way assets. Informs potential private partnerships
What has changed	Refocus from broader ownership of L2 infrastructure to helping provide infrastructure in underserved communities
	Remove DCFC ¹ ports
Load management	Schedule 50 rate, with time of use and +\$0.19/ kWh at peak usage (3 to 8 PM weekdays, like TOD ² rate)
Target market	+80 L2 ports focused on underserved communities (additional to 60 and 100 ports in the 2022-3 MMC budgets)
	Total 240 L2 ports = 12% of the total public L2 ports TEINA ³ indicates needed by 2025

1. Direct Current Fast Charging (DCFC)

2. Time of Day (TOD)

3. Transportation Electrification Infrastructure Needs Analysis (TEINA)

Municipal Charging Collaboration Customer Journey



PGE reaches out to **Municipality** about the PGE program

Municipality expresses interest in program

Municipality provides target neighborhoods or areas

PGE conducts preliminary assessment of viable locations

Municipality signs agreement

PGE shares viable locations with **Municipality**

Municipality conducts community outreach with PGE support

Municipality and PGE agree upon final locations

Project proceeds through build & enablement

Municipality marks off an "EV parking only" space & appropriate signage at each location

Chargers online, EV drivers take service

PGE maintains pole chargers, exploring options for pedestal chargers

Municipal Charging Collaboration Customer Journey



EV Driver:

Finds a neighborhood charger near them via PGE's website, Plugshare, or Chargeway

Reviews instructions on the pole or charger

Scans the QR code to initiate session

Plugs in their vehicle to start their charging session

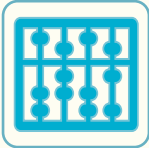
Is charged the Schedule 50 rate for their session

Can monitor charging progress via vendor app

Unplugs their vehicle when the charging session is finished

Leaves the charger and parking spot so others may utilize the charger

Municipal Charging Collaboration Long Term Strategy



Use charging data to determine appropriate rate design



Investigate potential private partnership for municipal charging and any tariff or rate impacts



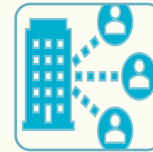
Develop sustainable long-term approach for charging for those without access to off-street charging

Where and how to site these chargers to best serve underserved communities



Understand interplay with multi-family, single family residential, and underserved communities and how municipal charging program can meet those needs

Explore differentiated charging rates for low-income using these public chargers



Identify PGE's mid- and long-term role in municipal and pole charging



Explore flex load opportunities with these types of chargers



Identify ways to reduce make-ready and charger installation costs for municipal, pedestal, and pole charging



Improve customer experience for end-user (reliability, dwell-time, charging etiquette)

10 min Break

**2023-25
Transportation Electrification
Portfolio Revision**

**Multi-family and
Commercial Make-Ready
Darren Spencer, PGE**



Multi-family & Commercial Make-Ready Overview

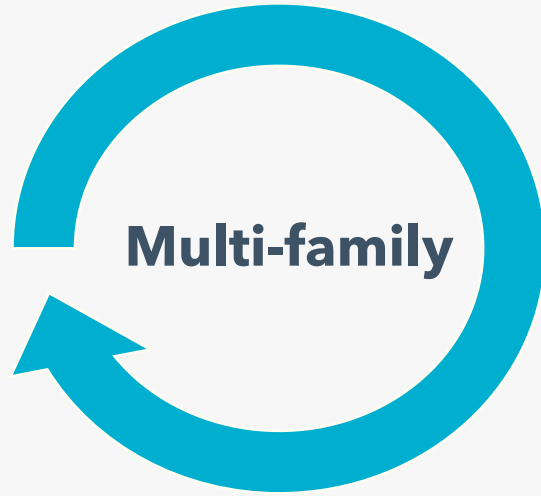
	Approved	2023 TE Plan	Total
CapEX	1.85		1.85
MMC	0.84		0.84
Deferral/O&M			
CFP		4.53	4.53
Total	2.70	4.53	7.22

(in \$MM)

Description	Support EV ¹ ownership and charging access for commercial and multi-family properties
	PGE constructs make-ready Customer owns/maintains chargers and receives rebate on purchase of qualified chargers
What has changed	More support for EVSE ² deployment to the underserved MF ³ segment
	Reduced ports from +1,000 to 200 based on PGE and TEINA ⁴ data showing that demand in underserved/low-to-medium income multi-family market is still developing
	Focus on workplace, commercial, and multi-family segments (funded by 2023 MMC, with additional funding in this proposal for multi-family)
Load management	Chargers able to respond to pricing or DR ⁵ signals, but not subject to Schedule 50
	Provides data on multi-family charging profiles to develop the appropriate rate or future load management offering
Target market	Workplace/commercial: 60 ports
	Multi-family: 140 ports

1. Electric Vehicle (EV)
2. Electric Vehicle Supply Equipment (EVSE)
3. Multi-Family (MF)
4. Transportation Electrification Infrastructure Needs Analysis (TEINA)
5. Demand Response (DR)

Multi-family Make-Ready Customer Journey



PGE partners with **CBO's¹, Housing Bureaus, & Local Non-Profits** to identify potential sites

PGE Technical Outreach Team engages property to determine interest & feasibility

Customer (building owner) submits application

PGE conducts preliminary engineering assessment & site walk to develop engineering scope & cost estimate

Preliminary design approval; fund reservation

Final design approval

Make-ready installation

EVSE² installation and commissioning

Chargers online, EV³ drivers take service

Customer responsible for data transmission, pricing, associated data fees, and ongoing maintenance

1. Community Based Organizations (CBOs)
2. Electric Vehicle Service Equipment (EVSE)
3. Electric Vehicle (EV)

Business/Multi-family Make-Ready Long Term Strategy

Short Term Strategy



Gather data from 2023 program to determine if different rates/tariff should be created based on use type of public, workplace, multi-family or a mixture of all three



Deploy charging infrastructure at a scope, scale and cost aligned with needs of multi-family market



Identify opportunities to optimize program to increase effectiveness and reduce costs



Support deployment of charging infrastructure which is responsive to demand response/load management capabilities

Long Term Strategy



Determine the right rate and tariff structure to support installation & charging for various commercial & multi-family charging needs



Optimize vehicle charging at multi-family locations to improve grid responsiveness



Reduce barriers to EV¹ ownership for low to medium income residents by supporting expanded access to EV charging at multi-family locations

**2023-25
Transportation Electrification
Portfolio Revision**

**Fleet
Stefanie Reiter, PGE**

Fleet Partner Overview

	Approved	2023 TE Plan	Total
CapEX	7.08	7.52	14.60
MMC	0.83		0.83
Deferral/O&M	0.74	1.95	2.69
CFP			
Total	8.65	9.46	18.12

(in \$MM)

Description	Provide free upfront planning and technical services to reduce the complexity of planning for fleet electrification												
	Provide custom incentives ¹ to help lower the costs of building electric fleet depots												
	Better understand how fleet size and load profiles impact the grid												
	Networked EV charging for future managed charging and demand response programs												
What has changed	Reduce incentives by 50% & lower maximum incentive cap, improving cost effectiveness and reaching more customers, sites & ports												
	<table border="1"> <thead> <tr> <th></th> <th>Original Pilot</th> <th>Expansion of Pilot</th> </tr> </thead> <tbody> <tr> <td>Incentive Levels</td> <td>Year 5 usage * LEA * 15</td> <td>Year 5 usage * LEA * 7.5</td> </tr> <tr> <td>Maximum Incentive</td> <td>\$750,000</td> <td>\$400,000</td> </tr> <tr> <td>Total Ports</td> <td>~450 ports</td> <td>~500 ports</td> </tr> </tbody> </table>		Original Pilot	Expansion of Pilot	Incentive Levels	Year 5 usage * LEA * 15	Year 5 usage * LEA * 7.5	Maximum Incentive	\$750,000	\$400,000	Total Ports	~450 ports	~500 ports
		Original Pilot	Expansion of Pilot										
	Incentive Levels	Year 5 usage * LEA * 15	Year 5 usage * LEA * 7.5										
Maximum Incentive	\$750,000	\$400,000											
Total Ports	~450 ports	~500 ports											
Load management	Require installed chargers be qualified & networked, with ability to perform demand response												
	Participants expected to participate in future PGE demand response programs												
Target market	Non-residential fleets, with ~450 ports (2021-24), an additional ~500 ports (2024-25), for a total of ~950 make-ready ports ²												

Fleet Partner Customer Journey



Customer is interested in fleet electrification & learns of program through PGE Business Outreach, emails, LinkedIn, or web search

Customer applies via website application

PGE sets up kick-off meeting, gives customer a thorough program overview

Customer confirms number of vehicles & chargers they are interested in

PGE provides free Fleet Partner Study that includes all the information a customer needs to electrify their fleet

Customer commits to Build phase of program, submits Reservation Form

PGE completes final designs

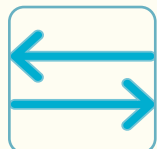
Customer approves final designs, signs Enrollment Package, includes 10-year energy commitment

PGE completes construction of make-ready infrastructure

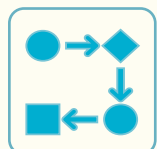
Customer installs charger(s), EV¹ drivers take service

PGE receives charging session data that will help inform future grid planning

Fleet Long Term Strategy



Pivot from accelerating to supporting fleet electrification



Continue outreach & education, learn about target market size, timing, budgeting, incentives, construction, fleet size/port counts, energy commitments, and load profiles



Third-party evaluation to help inform future fleet electrification strategies



Expansion Pilot Strategy Shifts

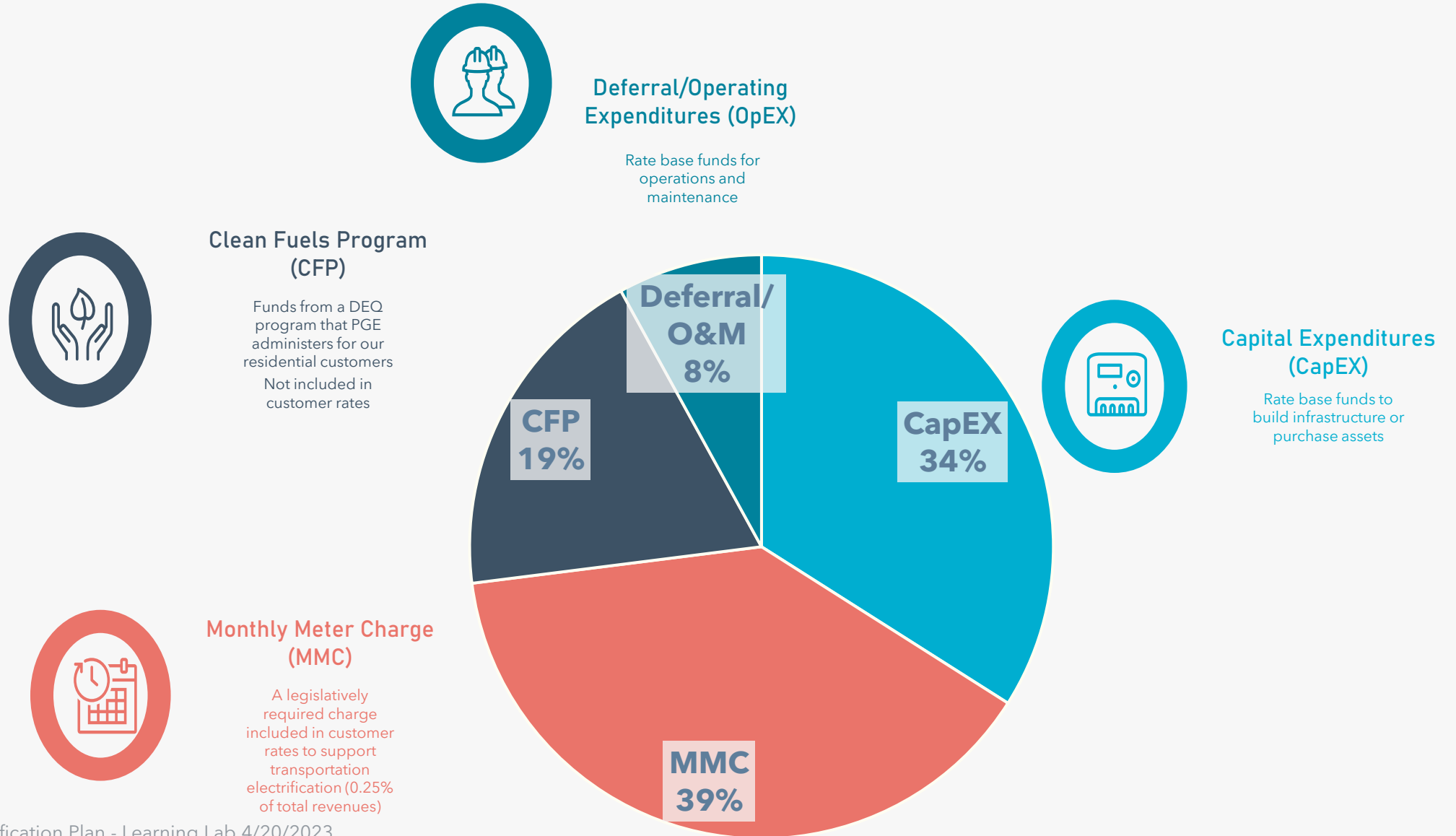
- Stretch dollars to assist pipeline of customers, make program cost effective and assist grid operations with planning for new load
- Use learnings about load profiles to create new tariff and rate designs
- Research, development, and testing of flexible load tools, software, and programs to create a cost effective, customer friendly, and grid supporting flex load program(s)
- Understand PGE's make-ready requirements
- Understand and plan for system impacts of large fleet electrification
- Set expectations, process, and procedures to engage and direct fleet customers ahead of electrification

A photograph of an electric vehicle charging station. In the foreground, a black charging cable is plugged into a station with a glowing green light. In the background, several white electric vehicles are parked in a row, also connected to charging stations. The scene is outdoors on a paved area.

TE Budget

ELYSSIA LAWRENCE, PGE

Proposed Incremental 2023 TE Portfolio Budget





Proposed TE Portfolio Budget

Activities Funded through Customer Rates

	Approved	New	Total
Municipal Charging Collaboration	\$5.23	\$6.27	\$11.50
Residential Smart Charging pilot	\$4.33	\$1.75	\$6.07
Business & Multi-Family MR & Rebates	\$2.70	[\$4.53 ¹]	\$2.70
Heavy Duty Charging	\$10.00		\$10.00
Business EV Charging Rebates	\$2.79		\$2.79
Affordable Housing MMC Grant Program	\$1.00		\$1.00
Fleet Partner Pilot Phase 1 (2021-2024)	\$7.82		\$7.82
Fleet Partner Pilot Phase 2 (2024-2025)		\$9.46	\$9.46
Fleet Partner Managed Charging & Rebate	\$0.83		\$0.83
Portfolio Enablement (modeling, Fed \$)	\$0.60	\$1.68	\$2.28
Customer Rate Total	\$35.29	\$19.16	\$54.45

(in \$MM)

Combination of previously-approved TEP and MMC

Incremental 2023 TEP funding request

Activities Funded through Clean Fuels Program (CFP)

	2023	2024-2025	Total
Grants/Infrastructure	\$9.05	\$21.22	\$30.28
Multi-family Make Ready & Rebates ¹		\$4.53	\$4.53
Education & Outreach	\$1.18	\$3.51	\$4.69
Emerging Technology	\$0.58	\$1.76	\$2.34
Admin	\$0.91	\$2.84	\$3.75
Clean Fuels Program Total	\$11.72	\$33.86	\$45.59²

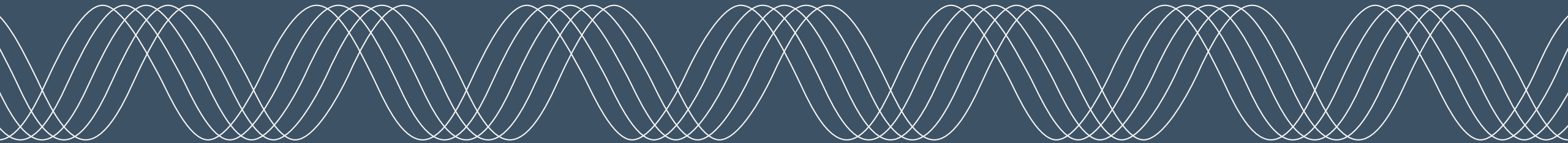
(in \$MM)

1. CFP funded program shown in parenthesis in customer rate section to show pilot continuity, but dollars are not included in customer rates
2. 2024-2025 CFP dollars are only a forecast. Funding amounts depend on credit generation and proceeds from credit sales and are subject to market and regulatory risk.

Questions/ Comments



Next Steps & Closing Remarks



Next Steps & Closing Remarks



TE Plan draft filing June 1; final filing due August 25



Meeting Materials (slides and video) will be posted in a week to our TEP website at [Transportation Electrification Planning \(TEP\) | Portland General Electric](#)



For more information or if you have questions, please email us at TEP@pgn.com or via [Feedback-Form](#)



After TEP Draft filing you can submit comments via [Docket UM 2033](#)

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kind of energy

Appendix



Key Terms



- **Capital Expenditures (CapEx)** - the company's capital expenditures
- **Deferral** - a regulatory filing made for the purpose of tracking costs associated with A) an unusual or extraordinary event that is not otherwise addressed within PGE's cost structure, or B) an approved or acknowledged program or pilot
- **Demand response (DR)** - Changes in [energy] usage by end-use customers from their normal consumption patterns in response to changes in the price of [energy] over time, or to incentive payments designed to induce lower [energy] use at times of high wholesale market prices or when system reliability is jeopardized.
- **Electric load** - total usage of electricity on PGE's system at any point in time
- **Electric Vehicle (EV)** could be passenger vehicles to medium- or heavy-duty vehicles
- **Flexible load (Flex Load)** - a dynamic form of DR capable of providing valuable grid balancing services. Grid balancing services are necessary for integrating high levels of renewable or variable energy resources. To supply grid balancing services, these demand-side resources must be available to grid operators throughout the day and capable of supplying several different types of energy products beyond peak load shifting.
- **Load** - combined demand for electricity placed on the system
- **Load growth** - increase in use of electricity on PGE's system (e.g., due to population growth, or adoption of EVs)
- **Load shape** - how electricity use changes throughout the day, which can change by customer type, season, type of load (e.g., EV)
- **Load shift** - shifting usage from on-peak to off-peak periods
- **Make-ready** - infrastructure to connect EVSE to the electric grid
- **Managed charging** - extension of smart charging scheduling at desired times to reduce cost and grid impacts
- **Non-wires Solutions (NWS)** - using distributed energy resources (e.g., EVs) grid constraints s reliably, resiliently, and affordably while also supporting environmental and energy justice goals, particularly for historically underrepresented communities
- **On-peak** - the period when customer demand is higher than normal. System costs are higher than average and reliability issues may be present
- **Operations and Maintenance (O&M)** - the company's operations and maintenance expenses
- **Pricing signal** - change in price of good or service (e.g., electricity) which indicates that supply or demand should be adjusted
- **Smart charging** - remote management of EV charging
- **Tariff** - a listing of the rates, charges, and other terms of service for a utility customer class, as approved by the regulator
- **Telematics** - a method of monitoring and managing cars by using data from vehicle onboard diagnostics and GPS vehicle tracking. Allows operational decision-making based on historical data and the dispatch of vehicles using real-time vehicle data
- **Time-of-Day (TOD)** the price of energy varies based on the time of day. Peak hours vary by rate class, but are generally defined as the hours between 4-9PM. By shifting some electricity usage to non-peak hours when energy costs less (and is typically less polluting), you can lower your bill and support a healthier environment.

Terms adapted from various internal sources, as well as:

- *The Regulatory Assistance Project. Electricity Regulation In the US: A Guide Second Edition*, available here: <https://www.raponline.org/wp-content/uploads/2016/07/rap-lazar-electricity-regulation-US-june-2016.pdf>
- *PGE's DSP: Part Two filing*, available here https://downloads.ctfassets.net/416ywc1laqmd/2Fr2nVc4FKONetiVZ8aLWM/b209013acfedf1125ceb7ba2940bac71/DSP_Part_2_-_Full_report.pdf