

# Waiting Room

One moment please, while we wait for people to join

Song by artist:

[Khruangbin - Two Fish and an Elephant](#)

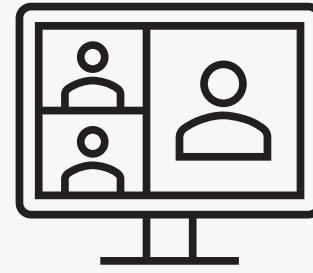
Please use the QR code to check-in:  
[Name and Organization](#)



# Meeting Logistics

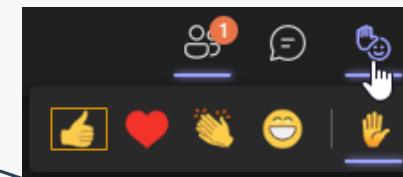
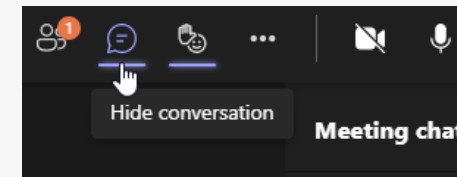
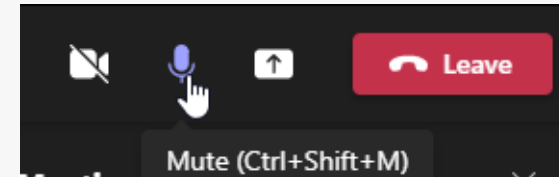
## Teams Meeting

- Please click the meeting link sent to your email or [Click here to join the meeting](#)
  - +1 971-277-2317 (dial this number into your phone for best results)
  - PW: 885 018 032#
- Please use **Microsoft Edge** or **Google Chrome** with Teams as it will give you the best experience



## During the presentation:

- All attendees will be muted; to unmute yourself via computer, click on the microphone that appears on the screen when you move your mouse
- To unmute yourself over the phone, **press \*6**
- If you call in using your phone in addition to joining via the online link, please make sure to **mute your computer audio**
- Use the chat feature to share your comments and questions.
- Raise your hand icon to let us know you have a question



# Quick Updates!

Please visit us at [www.portlandgeneral.com/dsp](http://www.portlandgeneral.com/dsp)

You can email us at: [DSP@pgn.com](mailto:DSP@pgn.com)

[Online Feedback Form](#)

## Important dates in 2022:

- OPUC procedural dates
  - **Thursday, Feb 24** – Special Public Meeting:
    - IOUs present DSP Part 1,
    - Staff make recommendation to the Commission, and
    - Commission considers Acceptance of Part 1 filings
- OPUC DSP-Part 2 Technical Working Group dates
  - **Thursdays Jan 20 / Feb 3 / Mar 24 / Apr 14 / May 19 / Jun 16 (1-3 pm)**
- DSP Part 2 filing date
  - **Monday, Aug 15**

# DSP Partners Mailing List

We will be cleaning our DSP Partners Mailing list



You will receive a series of three emails  
to opt-out of the mailing list

~~November 2021~~

~~December 2021~~

January 2022



**DSP Mailing list: [Sign-up form](#) / [Opt-out form](#)**

# Change in Dates Notice – Mark Your Calendars

## **DSP Partnership Workshop - August 2022**

- Previously scheduled for August 10, 2022
- **New Date:** August 3, 2022

## **DSP Sub-Workshops**

- Previously schedule below on slide 6
- **New Dates:** TBD
  - Why: Hiring new resources, engaging CBOs for their expertise, Cost-effectiveness (NSPM), ETO grants, NWS

# DRAFT - Community Engagement for Non-wire Solutions (NWS) Pilot Project Proposals

*Based on December 2021 DSP Partnership Meeting*

Steps	Timeline	Audience
1 <b>Education &amp; Listening Session</b> Defining NWS, location, solution types, process, implementation	December 8, 2021	All - Partner Workshop
2 <b>Non-wires Technical Education &amp; Listening Session</b> Draft criteria for prioritizing projects and screening of NWS	January 12, 2022	All - Partner Workshop
3 <b>Community Workshop Brainstorming</b> Development of community definitions and priority areas	January 31, 2022	All
4 <b>Non-wires Technical Reiteration Session</b> Draft final criteria for prioritizing projects and screening of NWS	February 9, 2022	All - Partner Workshop
5 <b>Community Workshop Education</b> Identification of existing projects with analyses identifying opportunities for NWS	February 28, 2022	EJC
6 <b>Non-wires Technical Listening Session</b> Identification of existing projects with analyses identifying opportunities for NWS	March 9, 2022	All - Partner Workshop
7 <b>Community Workshop Brainstorming</b> Finalization of prioritized project list - ACTION REQUESTED	March 31, 2022	EJC
8 <b>Non-wires Technical Information Session</b> Notice of finalization prioritized project list	April 13, 2022	All - Partner Workshop
9 <b>Community Workshop Brainstorming</b> Identification of pilot projects with analyses identifying opportunities	April 29, 2022	EJC
10 <b>Non-wires Technical Non-wires Technical Information Session</b> Identification of pilot projects with analyses identifying opportunities	May 11, 2022	All - Partner Workshop
11 <b>Community Workshop Recommendation</b> Recommended two pilots concepts - ACTION REQUESTED	May 20, 2022	EJC
12 <b>Non-wires Technical Information &amp; Feedback Session</b> Final recommended two pilots concepts	June 8, 2022	All - Partner Workshop

# Agenda

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9:00 – 9:20 am – **Opening Remarks** (20 min)

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9:20 – 9:35 am – DSP Part Two Updates: **Community Engagement** (15 min)

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9:35 – 9:55 am – DSP Part One Updates: **Solar Innovation & Community Partnership** (20 min)

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9:55 – 10:15 am – DSP Part One Updates: **Hosting Capacity Analysis** (20 min)

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10:15 – 10:35 am – **Equitable Deployment of DERs & Non-wires Solutions** (20 min)

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10:35 – 10:45 am – **Break** (10 min)

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10:45 – 11:05 am – **Cost Effectiveness: PGE DERs Research Update** (20 min)

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11:05 – 11:55 am – **DER Forecast Updates** (50 min)

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11:55 am – 12:00 pm – **Next Steps and Open Questions & Comments** (5 min)

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# Operating Agreements

Establishing norms with our communities is foundational to building trust.

To create a **safe space**, we establish **common agreements** such as **respect** and **inclusivity**.

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

**Stay Engaged**

**Experience Discomfort**

**Speak your Truth**  
**(knowing it's only part of the truth)**

**Expect and Accept Non-closure**

**Share the Airtime. Step up, Step back.**



[The courageous conversations framework](#)

By Glenn Singleton and Curtis Linton



# DSP Part Two Framing

**Angela Long**, Distributed Resources Planning, Manager



# DSP Part Two Requirements Summary

**Due August 15, 2022**

## Forecasting of Load Growth, EV/DER Adoption

- Describe **current state for Load Forecast** - process, tools, data
- DER/EV:
  - Forecast methodology and geographic allocation
  - **Adoption by substation** - high/med/low scenarios
  - Forecast of load growth and adoption




## Grid Needs Analysis

- Document process to assess grid adequacy and identify grid needs
- Discuss criteria used to assess reliability and risk - methods and modeling tools used
- **Present prioritized constraints publicly**, including prioritization criteria and timeline to resolve constraints



## Solution Identification

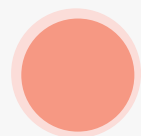
- Document process for identifying the range of solutions to address grid needs
- **For each need, describe the data used to support investment decisions**
- For large projects, describe process for engaging communities and getting input
- **Propose 2 NWS pilot projects**



## Near-term Action Plan (2-4yrs)

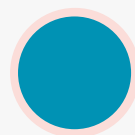
- Provide 2-4 yr. plan to address grid needs
- **Disclose planned spending, timeline and recovery mechanism**
- Discuss relationship between planned investments
- Discuss pilots being conducted to enhance the grid

# Goals of DSP Part Two



## Community Engagement

- Two-way flow of information
- Co-created education material
- Continued partnerships with community experts



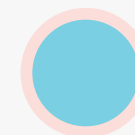
## Metrics & Data

- Resilience metrics for customer and utility
- Socio-economics & Demographics
- Cost-benefit analysis



## DER Resource Planning

- Climate risk modeling
- Decarbonization
- NWS, Locational
- DEI/Equity
- Estimated impacts of electrification adoption



## Portfolio Analysis

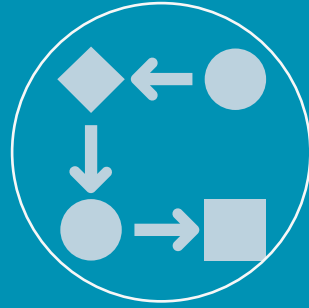
- Cost-effective DER
- Environmental and social justice community
- Resilience/Outage
- High DER adoption

# High Level - Project Timeline



**Planning:**  
Developing the approach to address Part 2 requirements

Oct - Dec 2021



**Executing:**  
Co-creating an inclusive Distribution Planning process

Jan - May 2022



**Reporting:**  
Documenting the process changes and the plan to enact them

Jun - Aug 2022



Filing DSP Part 2

Aug 15, 2022

# Community Engagement

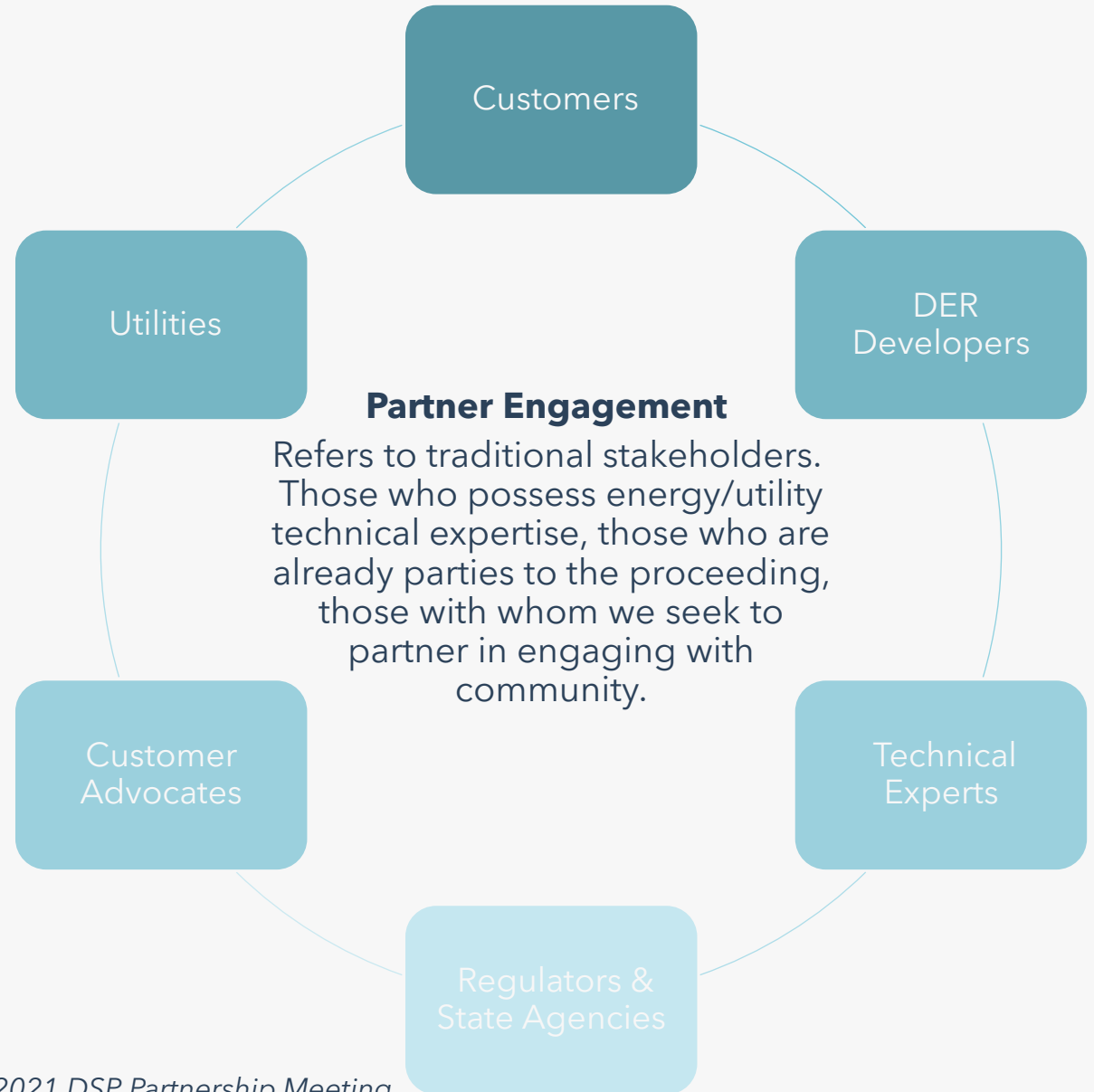
**Jenn Latu**, Diversity Equity & Inclusion,  
Principal Diversity Consultant



# Our Engagement

## Community Engagement Definition

In the context of the DSP, community engagement refers to the education and outreach to non-traditional stakeholders; those who have not historically had a seat at the table, those who have not historically been provided access or granted procedural equity, those who represent the Environmental Justice community.



*Based on April 2021 DSP Partnership Meeting*



# Engaging Our Communities

Our objective is to foster **procedural equity and ensure diversity of voice** in the DSP planning process.

To accomplish this, we will continue to partner with Community-based Organizations (**CBOs**) and **other organizations that have longstanding relationships and establish trust in environmental justice communities** to:

- Co-develop solutions for NWA pilot projects
- Co-create community workshops to identify community energy needs, desires, barriers and interest in clean energy planning and projects
- Co-develop community education around key DSP practices and relevant energy related concepts

# Where Are We?

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## **CBO Engagement**

Met with Community Energy Project (CEP) to discuss their DSP Part 1 comments

In conversations to collaborate with CEP creating energy related education materials

Working on leveraging ETO grant for CBOs, by matching funds for potentially 3 CBOs

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## **Hiring**

Reviewing applications for Community Engagement & DEI Manager/Coordinator

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## **Using Equity Tools**

Purchased Greenlink Equity Mapping (GEM) data access

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Low-Income Affordability Data (LEAD) Tool

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# DSP Engagement: Solar Innovation & Community Partnership

**Kathy Wagner**, Product Development,  
Senior Product Developer



# A Brighter Future Together



## Solar is our customers' preferred energy source

### Vibrant solar market

We all support continued growth

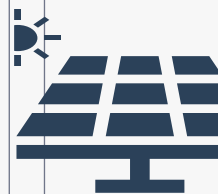
PGE is committed to **reducing emissions** associated with the power we serve to customers by 80% by 2030 (net zero emissions by 2040) - HB 2021

**Customer-sited solar** is **key** to us **reaching** these **goals**



### It's going to take all of us

- Local communities & stakeholders co-create solutions with an eye toward equity & resilience



### Near-term

- Co-create solutions that **close the gaps & accelerate the equitable adoption of solar**, particularly for income qualified customers



**Innovation, customer-centric design, and partnership**

# High-Level Process Overview



## Ideation

Define customer-inspired product solutions informed by customer/market research & current offerings

Q1 - Q2 '22



## Socialization

Share product ideas with broader stakeholder groups & target customers, refine ideas



## Finalization

Finalize products, adoption goals, secure final stakeholder endorsement, submit tariff

Q3 '22



## Realization

Complete development, ensure market readiness, identify early adopters

Q4 '22



## Introduction

Product roll-out, early adopter support, ecosystem feedback

Q1 '23

# Next Steps – Q1 '22

Please send your feedback to  
Kathy Wagner  
[Kathy.wagner@pgn.com](mailto:Kathy.wagner@pgn.com)

## Formation Jan-Feb '22

- Identify and engage stakeholder (DSP, others)
- Agree to participation in planning, ideation and review workshops
- Commit to 2-3 hours per month through August '22
- Align on schedule and desired co-development outcomes

## Ideation Jan-March '22

- Development Plan Update - Jan/Feb (TBD): Schedule, workshops, co-developers, etc.
- Customer research - March (TBD): We want to hear from the people in our communities who are currently participating in, or who could benefit from solar
- Ideation workshops - March (TBD): Working together, we'll identify gaps, opportunities and potential product concepts

# Solar Innovation & Community Partnership



Please contact Kathy Wagner [kathy.wagner@pgn.com](mailto:kathy.wagner@pgn.com)

With feedback, and/or if interested in participating in co-development workshops

# DSP Part One Updates: Hosting Capacity Analysis

Joe Boyles, Distributed Resources Planning



# Today's objective

Review and confirm next steps with respect to Hosting Capacity Analysis (HCA)

# Acknowledgement of DSP Part One – 12.3.21 Written Public Comments

## Community Engagement

- “PGE has the power to change the tone and culture of those spaces and build trust with the entities with which they want to work.” BUT...
- It is not clear how we incorporated feedback and what changed in our thinking due to the partner input it received
- Our intent was clear but lacked action

## Hosting Capacity Analysis (HCA)

- We are moving too fast
- We need to have more discussion data is needed (e.g., day-time minimum load, socioeconomics and demographics
- RVOS is not the right cost-effectiveness tool
- Map should be updated to reflect use cases and partner feedback

## Modernized Grid

- Spending should be focused on equity
- Discuss on spending is needed, specifically, if we expect costs to continue to rise in the future
- Discuss on “aging” investments is needed
- Need to ensure the system can accommodate EV impacts
- Need to discuss cost-effectiveness work approach

## IRP and DSP Coordination

- DSP and IRP should be consolidated
- Load forecasting approach needs updated

## Resilience

- Discuss on “hardening” investments is needed

## Cybersecurity

- There are still data concerns that need addressed



# PGE HCA Plan Revisited

## Process

- Identify stakeholders who want to participate in the review and feedback process
- Review HCA plan with stakeholders
- Use IREC's whitepaper\* as a guide
- Review results of each step with stakeholders and take feedback

## Learning Objectives

- Level of effort required to produce HCA inputs
- Understanding of data quality
- Experience with DRIVE
- Results validation effort and effectiveness
- Effective presentation of results

## Evolution

- Refine the DG Evaluation map - improve and add EJ data layers
- Increase access to data
- Add DERs beyond DG
- Update HCA results based on defined triggers
- Refresh data on a regular cadence, e.g., update monthly the installed/ queued generation data

\* <https://irecusa.org/resources/key-decisions-for-hosting-capacity-analyses/>

# Next Steps

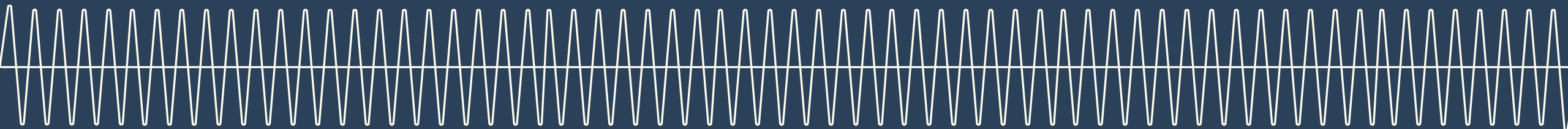
1. Current map will be refined to **incorporate equity** indicators and other related data sets

2. Adopt a “no regrets” approach to advancing HCA – make sure near-term investments build toward future

3. Engage Technical Working Group (TWG)

# Moving Toward a Future Distribution Planning Process

*Part Two*





# Equitable deployment of DERs and non-wires solutions

**Nihit Shah**, Distributed Resource Planning,  
Senior Analyst

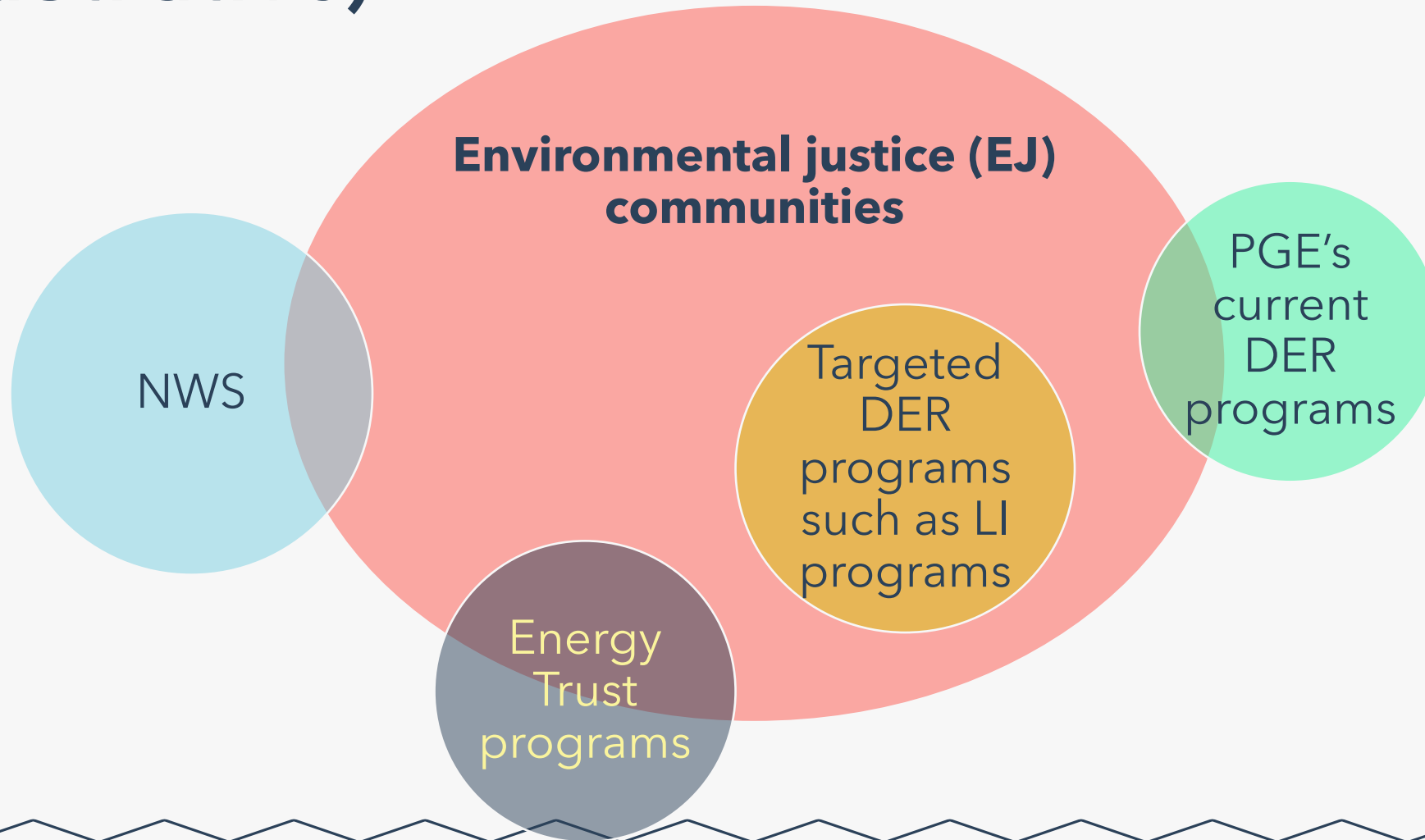


# Today's objective

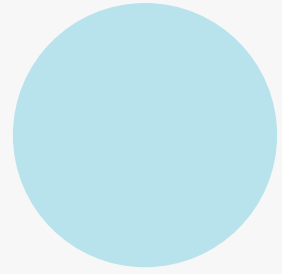
Sharing a broader look at how DERs can assist environmental justice (EJ) communities

Sharing how PGE is expanding its decision making to include equity in NWS projects

# Overlap of EJ impact and DER adoption (illustrative)



# Equity lens in NWS decision making

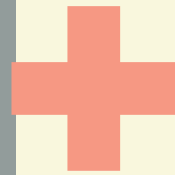


## Potential decision-making process for NWS projects

### Current decision-making process

#### Risk based benefit-cost analysis

- Documented in UE 319, exhibit 800



#### DER economic analysis

- Includes:
  - Non-energy impacts
  - Locational distribution value



### Co-developed metric

#### Equity analysis

- Using the co-developed equity metrics to determine equity impacts of an NWS to communities in a specific geography

# Equity in targeted DER programs



## Ideation

Co-develop equity metrics to define success for these programs



## Socialization

Demonstration effectiveness of metric



## Finalization

Regulatory approval of equity metric and associated funding



## Realization

Programs designed to explicitly address EJ communities



## Introduction

Development of new tariffs to roll out these program





# Next steps

PGE will email its draft NWS process to partners for comment in February



Co-develop the equity lens/metric with CBO partners beginning in February



PGE will integrate equity lens/metric into DER decision making by June

# Take-aways

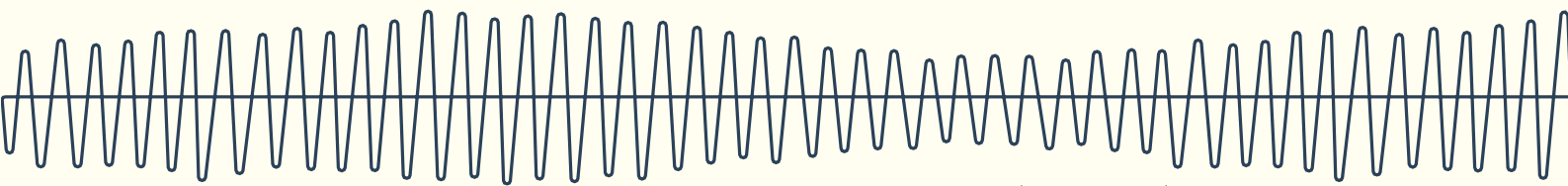
Non-wires solutions can assist EJCs, but do not explicitly target EJCs

PGE will co-develop equity metrics with community partners

PGE will work with community partners, ETO and the OPUC to develop targeted DER programs

# 5 Minute Break





# Cost Effectiveness (CE): PGE Distributed Energy Resources (DERs) Valuation Research Update

**Bachir Salpagarov**, Distributed Resource Planning,  
Strategy and Planning Analyst



# Enhancing Cost-Effectiveness (CE) Analysis



In 2021 PGE engaged with third party consultants Applied Energy Group (AEG) and Cadmus. Through these engagements we are looking to:



Review our current CE methodology and inputs



Perform gap analysis and valuation research



Refine and develop CE methodology and inputs



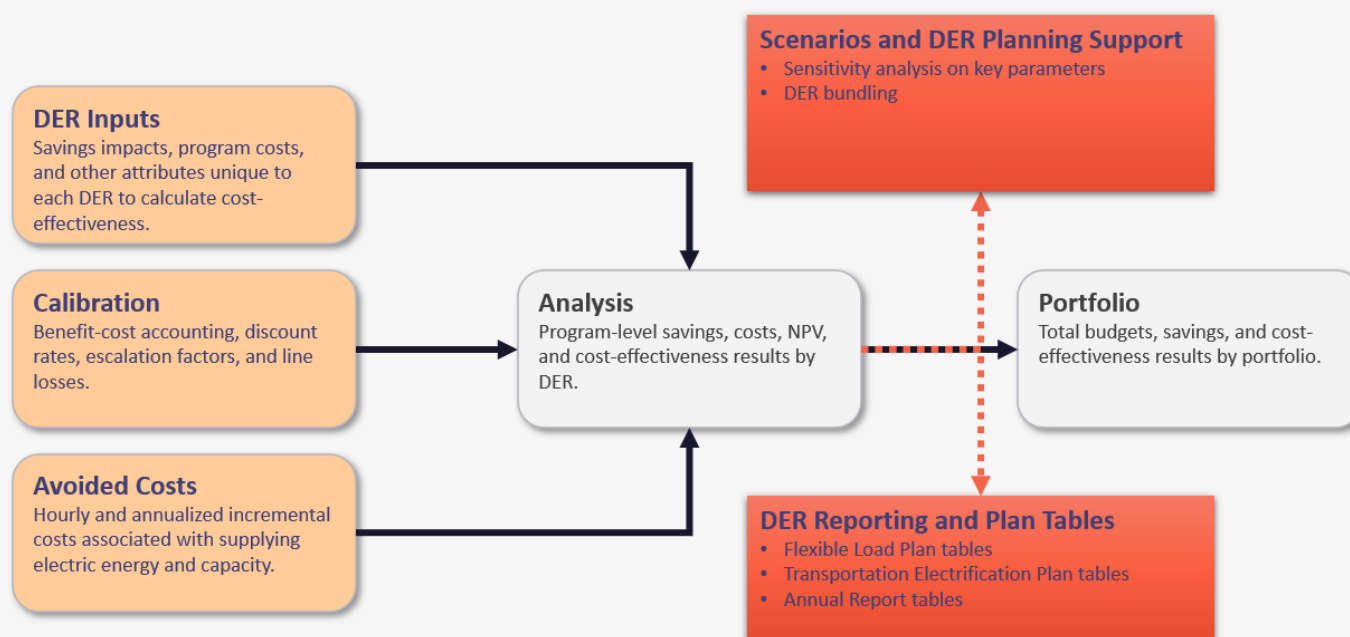
Prioritize non-energy impacts (NEIs) for customers and society

# AEG: Energy Impacts and CE Tool

Refine and update PGE's current inputs, assumptions and methodologies to assess DER cost-effectiveness and develop a DER Cost Effectiveness Modeling Tool.

## PGE Model Use-Case

Outputs



# Cadmus: Non-Energy Impacts (NEI)

- Host Customer NEI's
- Low Income NEI's
- Societal Impacts

## NEIs by Perspective and Product Type

Host Customer Impacts	DR	DG - Customer	DG - Utility	Storage - Customer	Storage - Utility	EV Controls	EV Proliferation
<b>Host Customer NEIs</b>							
Value of Service Lost							
Transaction costs							
Asset value							
Productivity							
Economic well-being							
Comfort							
Health & safety							
Empowerment and control							
Satisfaction and pride							
<b>Low-Income NEIs</b>							
Reduce forced mobility							
Reduced arrearages							
Reduced disconnections / collections							

Societal Impacts	DR	DG - Customer	DG - Utility	Storage - Customer	Storage - Utility	EV Controls	EV Proliferation
<b>Societal Impacts</b>							
Resilience							
GHG Emissions							
Other Environmental							
Economic and Jobs							
Public Health							
Low Income (Society)							
Energy Security							

See NEIs Matrix for added detail

■ Higher potential for impact  
■ Lower potential for impact  
■ Prioritized for review

# Continued work on CE

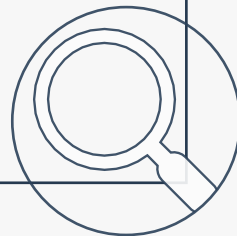
- Enhance CE tool to perform analyses on current DER programs & proposed NWS projects

CE Tool



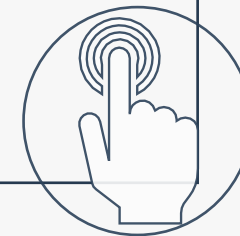
- Develop values for costs and benefits (energy and non-energy benefits)

Value & Methodology



- Optimization work between asset deferral and other grid services

Optimization





# Working Sessions Planned

## NSPM

National Standard Practice Manual (NSPM)

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- Invited NSPM co-authors to present high-level overview for applying DER cost-benefit methods to DSP (planned for February or March)
- Tim Woolf from **Synapse Energy and Economics** and Julie Michals from **E4TheFuture** to present on NSPM and methods, tools and resources for estimating cost-benefit of DER's

## Subgroups

PGE led working groups

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- Technical workshops to further discuss (March-May):
  - ✓ Cost-effectiveness framework
  - ✓ PGE specific inputs
  - ✓ Applications (NWS, TE, Flex Load)
  - ✓ Other ?

## Partnership Meetings

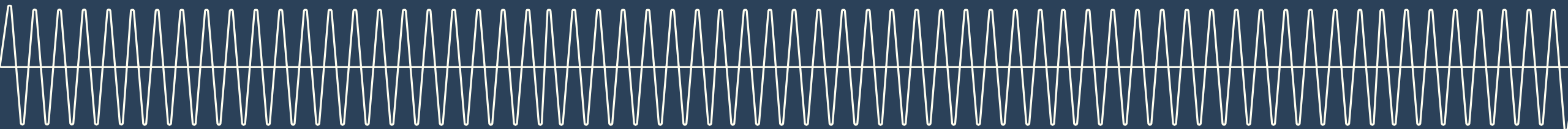
PGE to summarize efforts monthly to larger group

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- Report back to entire group at monthly partner workshops

# DER Forecast Updates

**Andy Eiden**, Distributed Resource Planning,  
Principal Planning & Strategy Analyst



# DSP Guidelines for DER Forecasting

Per the OPUC Guidelines, Section 5.2 outlines initial requirements for **Forecasting of load growth, DER adoption, and EV adoption.** Utilities are to document:

- A) Discussion of current utility processes for distribution system load growth forecasting
- B) Forecast of DER adoption and EV adoption by substation
- C) Results of forecasting load growth, DER adoption, and EV adoption

Today we will focus on **our progress for items A & B** and leave discussion of locational forecasting results for future partner meetings.

# Corporate load forecast components and update schedule

## Near Term (1-5 Years)

- 25 regression-based monthly energy deliveries models
- Business cycle influences energy deliveries
- Individually forecasts ~25 large customer
- Explicitly removes incremental energy efficiency
- Updated as frequently as every quarter

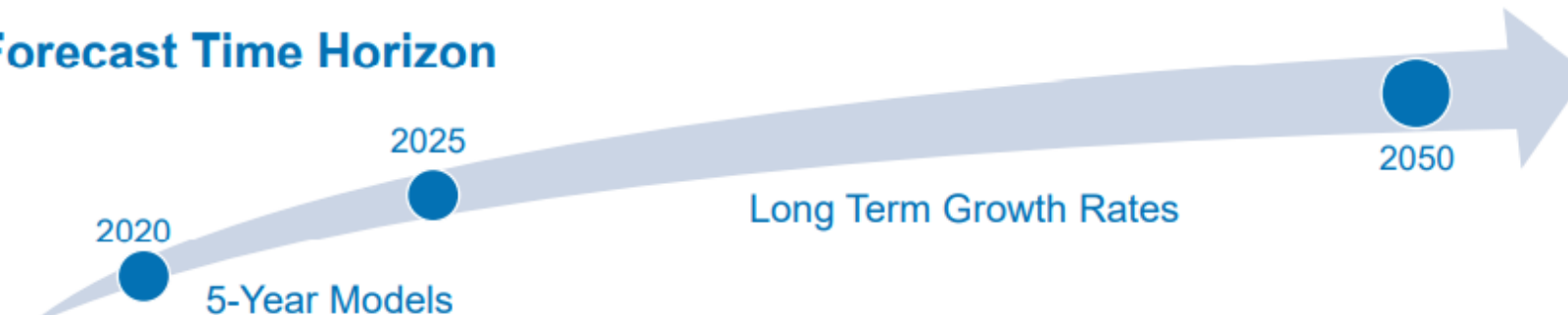
## Long Term (5+ Years)

- Convergence to long term growth rates, agnostic to business cycle and specific customer growth
- Three aggregated customer class models
- Assumes energy efficiency is embedded in growth rates
- Growth rates are appended to near term model output
- Updated for IRP Cycle

## Peak Demand

- Model spans full time horizon, near term and long term
- Average energy is a model input
- Updated annually

### Forecast Time Horizon



# Distribution planning current practice

System-wide load updates occur annually in April, and informs continuous planning efforts to monitor new load requests, local developments, etc.

Planners track and integrate a variety of information that informs locational load growth assumptions, including:

- Local building permit activity
- Zoning policy changes
- New service requests
- Existing customer expansion plans

Bottom-up load additions tracked and associated with existing equipment that could serve the load

- If new load growth would exceed existing capacity, we investigate options to reconfigure the loading on existing equipment to reliably accommodate the new load
- Potentially would initiate a new project to add system capacity

# Current load growth disaggregation

Currently, we calibrate the **corporate load forecast** to the historic trends and past peak loads of each substation, adjusting for any known customer additions.

After accounting for **known/anticipated customer growth**, we allocate the remaining top-down load growth from the corporate load forecast on a proportional basis according to a 5-year historical trend of load growth on each feeder.

We are currently **reviewing** this **process** and aiming to **make some improvements** that increase our accuracy and ability to pair the expected load growth with a granular DER forecast.

## Key updates we are working through:

- Improving the characterization of bottom-up known load additions to capture customer segment, and number of new customers (e.g., assigning 8760 load shapes to residential versus just peak MW)
- Calibrating growth from corporate load forecast based on specific customer mix on each feeder, as opposed to evenly across all feeders
- Adding weather normalization to the disaggregated load forecast to enhance ability to test constraints and potential solutions weather-based planning scenarios

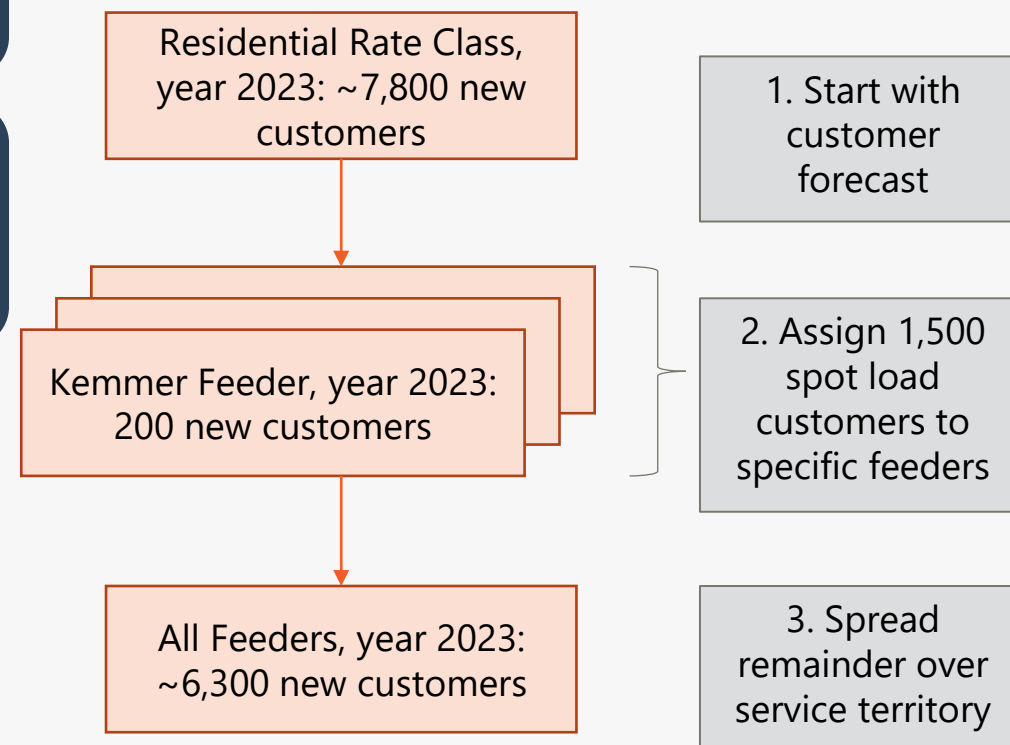
# Example of top-down calibration

Key improvement here is to **establish connection** between granular, revenue-class level forecast at Corporate load forecast level, with the bottom-up known additions captured by distribution planning

In the past, we were looking at peak MW added to the distribution system and did not capture 8760 new load additions (didn't need to)

- New process is moving towards an integrated approach with the DER forecast
- We will assign new known customers in AdopDER model specific to each feeder
- Spread the remainder of revenue class-level customer forecast proportionally across other feeders

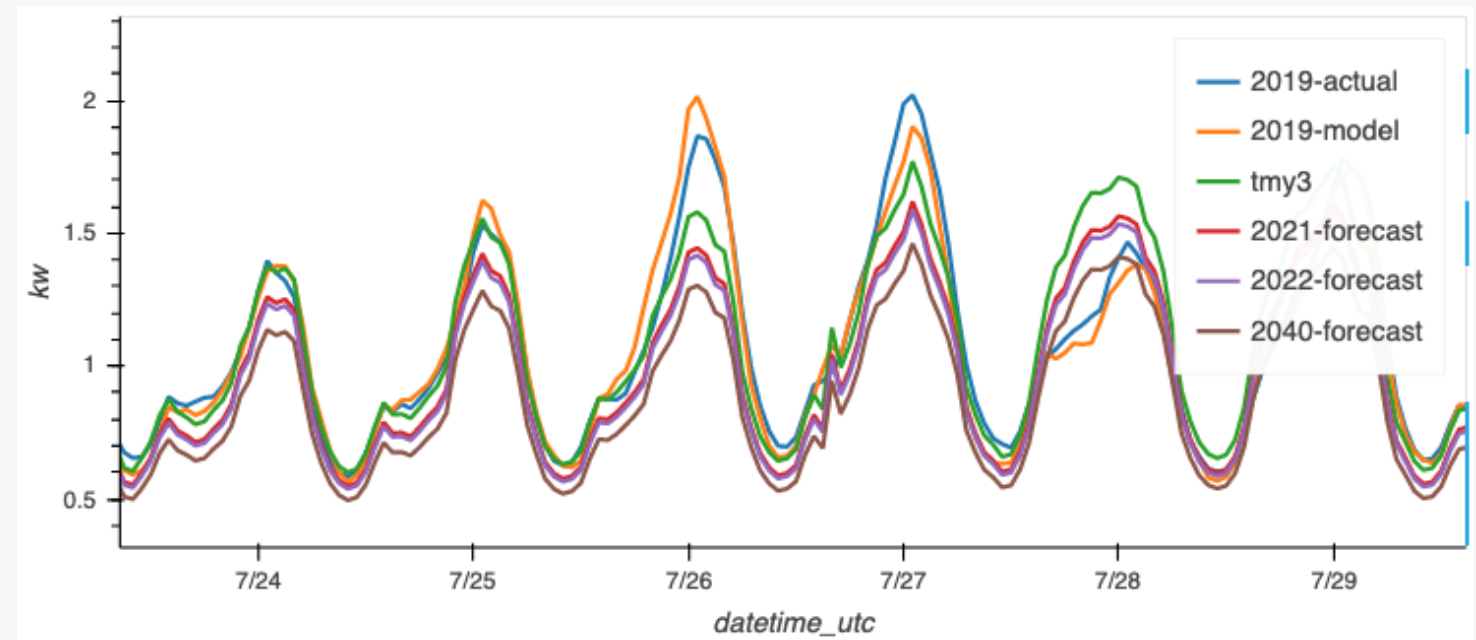
## Illustration of Spot Load Allocation



# Example – creating weather normalized load shapes

Hourly consumption data from 2019 is modeled with CalTRACK, then forecast against the Typical Meteorological Year (TMY3) data for the nearest qualified NOAA weather data set.

Future years are modeled using the actual calendar days and TMY3 weather and scaled with PGE's revenue-class load growth forecast.





# Locational DER Forecasting

# DER and Flex Load Study with DSP Part I

PGE is required to include forecasted demand-side resources in the IRP and DSP

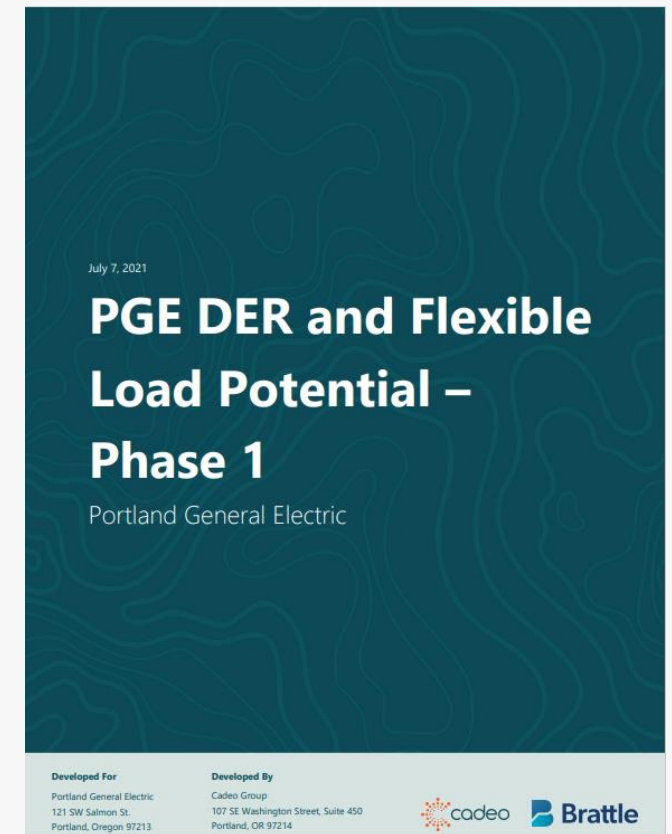
- IRP has long history of forecasting DR and EE
- DSP forecast is new this year as result of UM 2005

Study covers forecast of the following distributed energy resources (DERs)

- Energy efficiency (done by Energy Trust)
- Demand response / flex loads
- Distributed rooftop PV
- Distributed battery storage
- Electric vehicles and charging needs

Full study available online as Appendix G to the DSP Part I, available at:

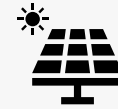
<https://portlandgeneral.com/about/who-we-are/resource-planning/distribution-system-planning>



# This study informs DER adoption for PGE DSP

Cadeo developed AdopDER model in 2020-2021 to simulate the load impacts from the co-adoption of 40+ distributed energy resources in PGE service area between 2021 and 2050

Examples



## Two project phases

### Phase 1

- **Service territory** technical, economic, achievable potential study for PGE IRP
- Measure feasibility varies by customer
- Adoption probability varies by DER and time, but not by premise

### Phase 2

- **Locational** technical, economic, achievable potential
- Measure feasibility varies by customer
- Adoption probability varies by DER, time, and premise



# Adoption propensity methodology

Premise-specific measure adoption probability with statistical and heuristic models

Statistical models where sufficient data exists, heuristic elsewhere

## Statistical Model

- EV LDV (Res, non-Res Fleet)
- Solar PV (Res, non-Res)

## Heuristic Model

- EV Charging
- BTM Storage (Res, non-Res)
- Microgrid

# We use a structured framework for statistical modeling

For all DER types modeled with statistical modeling approach, we follow the below steps to:



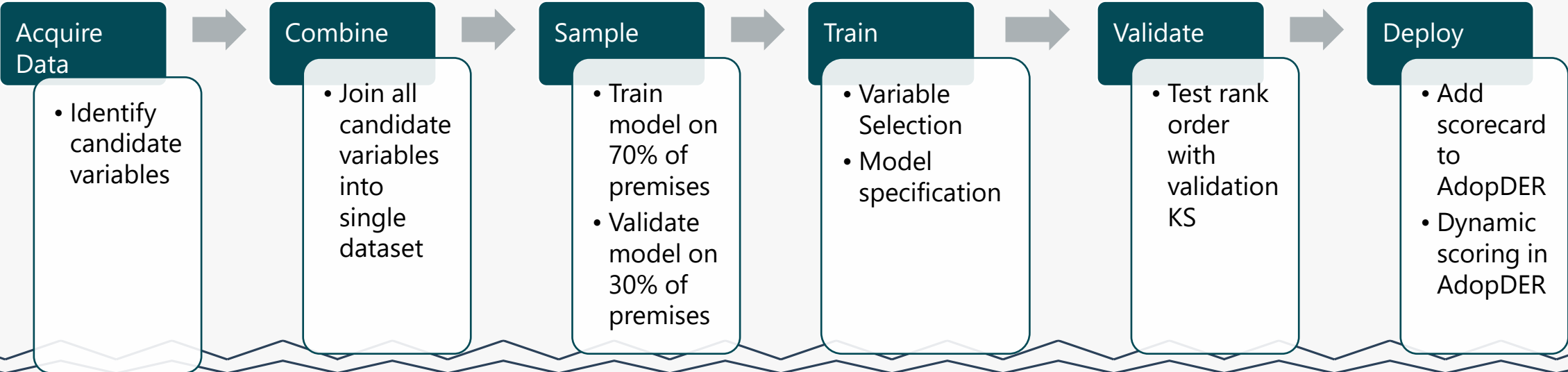
select variables



test the strength of the model, and



apply to the full population



# Model selection and validation uses an empirical process

- Example of **statistical** model selection and validation for residential solar.
- Similar process for other models.

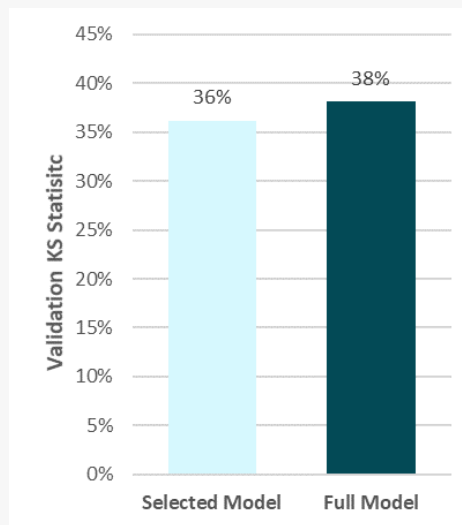
## Univariate Screening and Model Selection: Res Solar

Variable	Information Value
building_type	0.788
ct_med_hh_inc	0.637
ct_num_solar_adopt	0.554
ct_tot_pop	0.492
HomeOwnerRenterPremPlusAX	0.438
ct_num_bev_adopt	0.365
xEstimatedIncomePremPlus	0.327
ch_num_vehicles	0.302
AgeCustName	0.256
AX_Score_GreenAffinity	0.242
consump_last_12_mos	0.240
ct_pv_kw_median	0.231
vintage	0.176
AX_Score_TechPropensity	0.084
has_battery	0.058
ct_avg_energy_burden_pct	0.040
ct_urban_rural	0.014
psps_zone	0.011

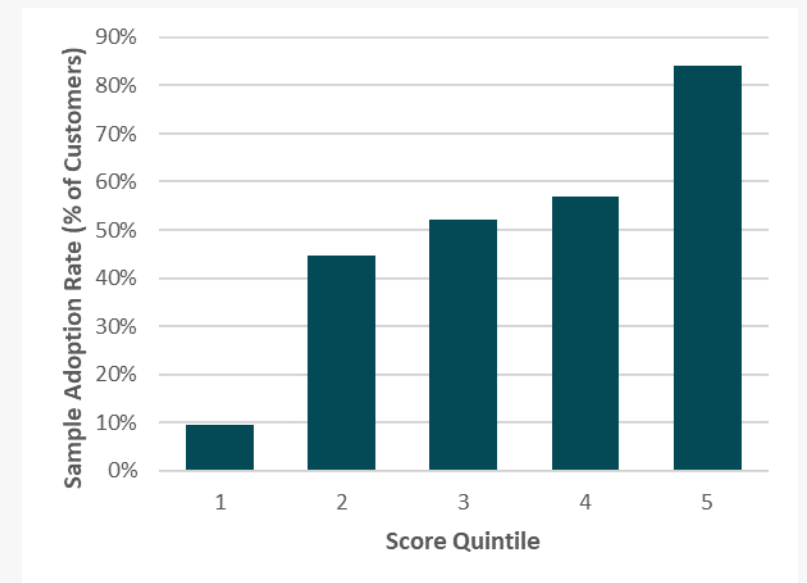
Selected Variable

Fails Univariate Screen

## K-S Fit Statistics: Res Solar



## Validation Sample Adoption Rate by Score Quintile: Res Solar



Selected model = model with blue shaded variables in univariate screening table

Website link: <https://www.solar.com>

# We use statistical “scorecards” to rank-order adoption probability

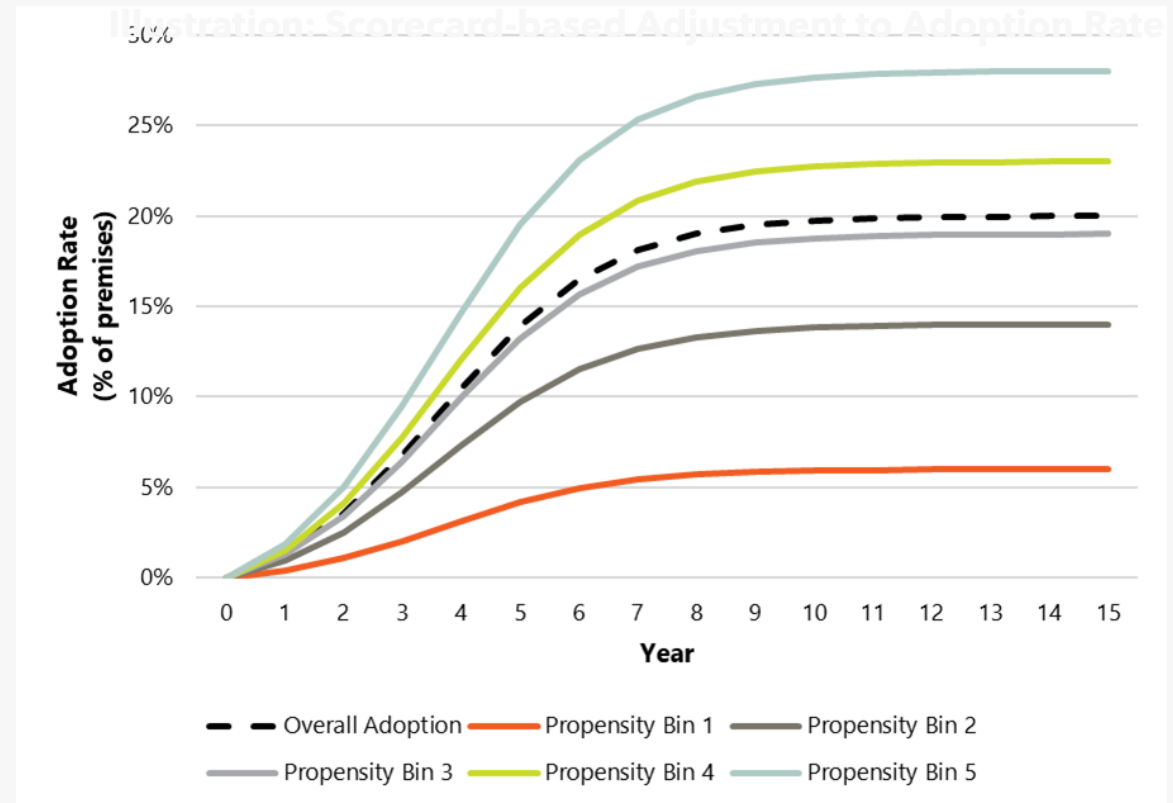
- Scorecard is a transformation of logistic regression coefficients
- More points = Higher adoption probability
- Model scoring is simple, fast – important when done at AdoptDER scale

**Model Scorecard: Residential Solar**

Variable	Bin	Score Points
basepoints		493
building_type	MF	-325
	MH%,%SF	31
ct_med_hh_inc	missing	-17
	[-Inf,40000)	-26
	[40000,50000)	-13
	[50000,65000)	-2
	[65000, Inf)	7
ct_num_solar_adopt	missing	-80
	[-Inf,10)	-169
	[10,20)	-64
	[20,25)	-25
	[25,75)	22
	[75, Inf)	95
HomeOwnerRenterPremPlusAX	missing	-97
	O	34
	R	-112

# AdopDER uses scorecards to adjust adoption probability

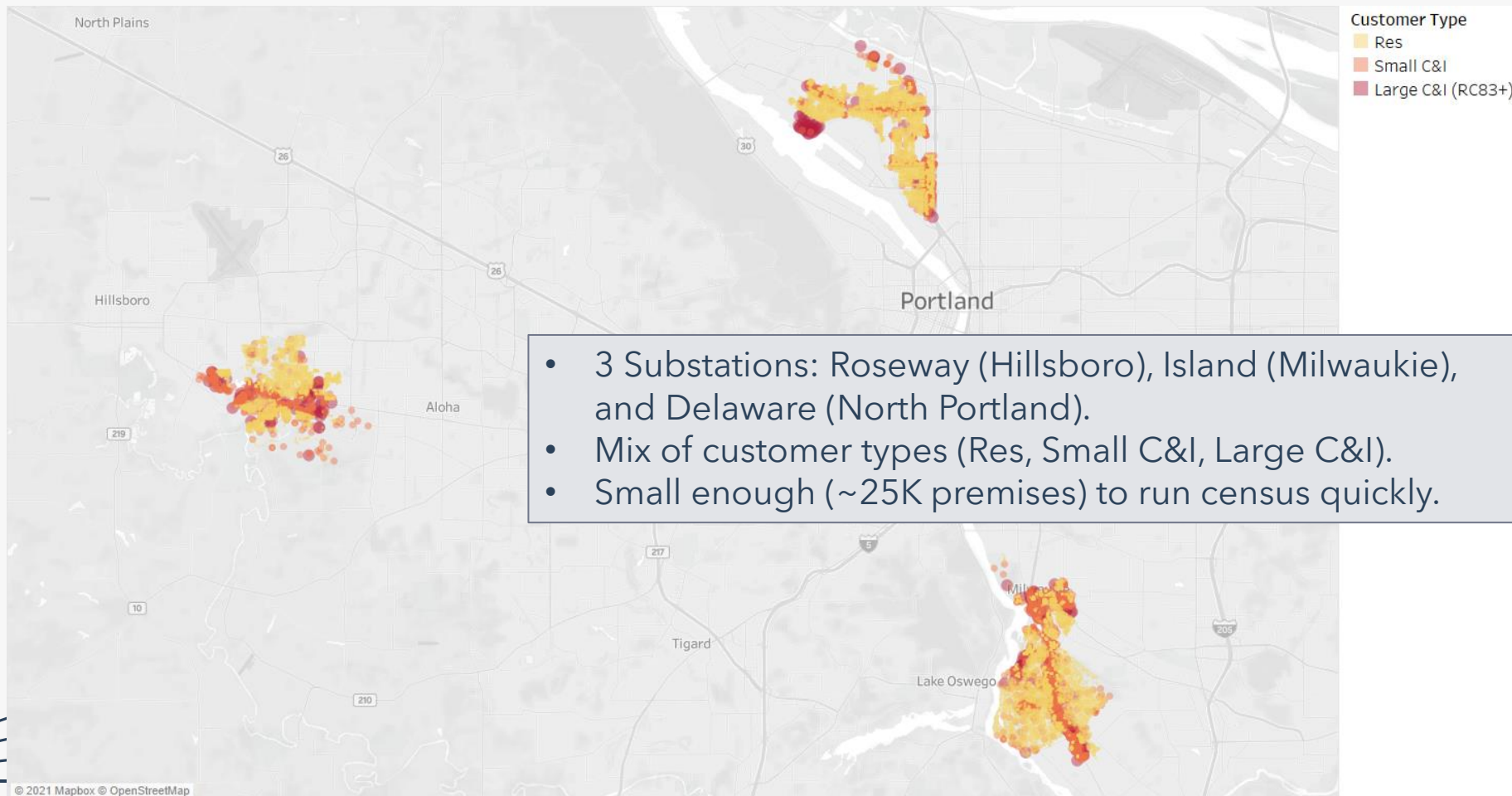
- Add variables (statistical and heuristic) to AdopDER customer input files
- For each year, premise, and measure, we use a function to
  - Calculate score from scorecard
  - Assign each score to a quantile-based bin
  - Adjust adoption probability





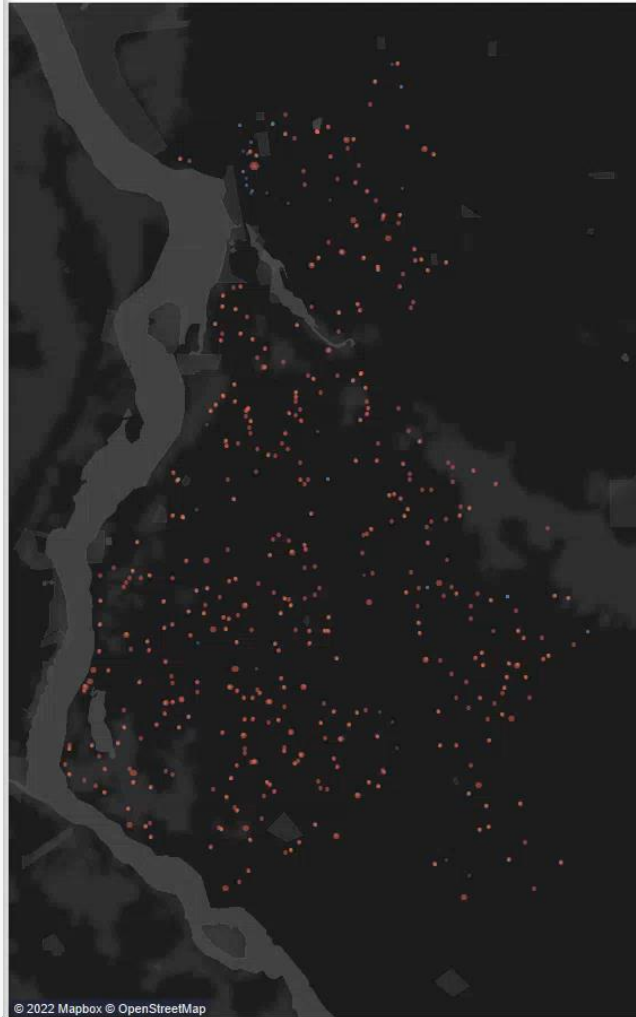
# Using PGE Test Beds to test locational adoption and load impacts

## Testbed Substations for Phase 2 AdopDER testing

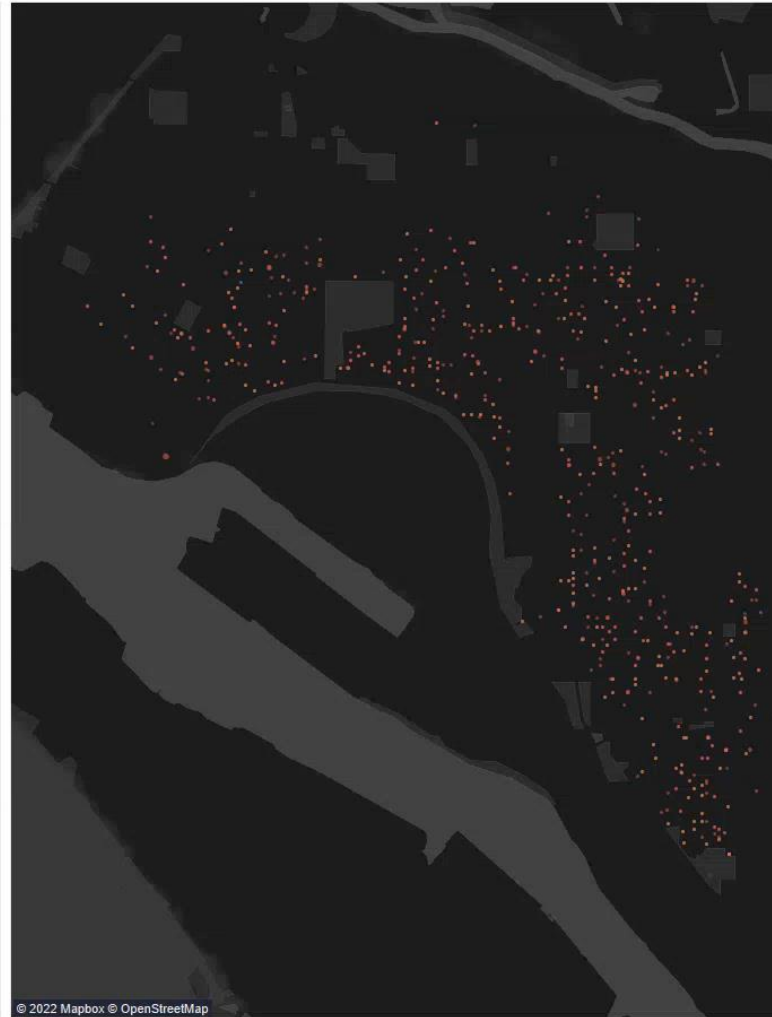


# Locational EV and EVSE adoption

Island - 2022



Delaware- 2022



Roseway- 2022



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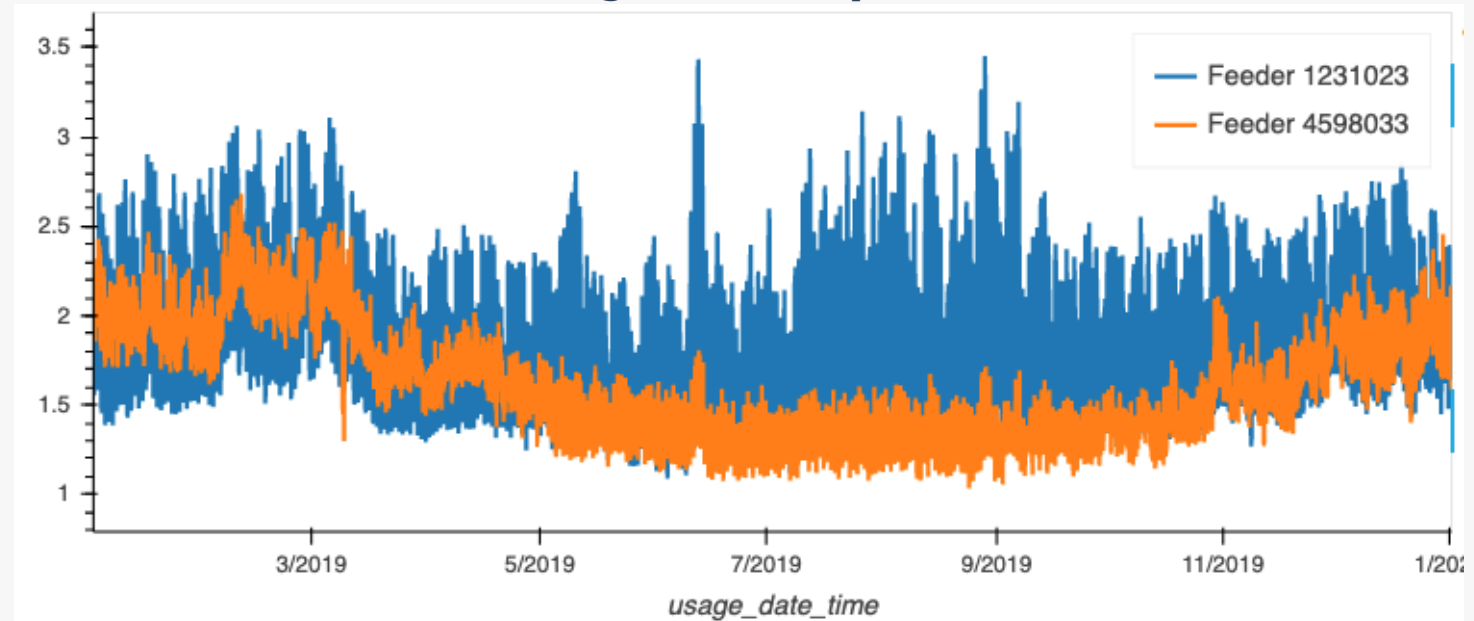
© 2022 Mapbox © OpenStreetMap

LDV L1 Res L2 MDHDV Nonres/Public L2 DCQC DLC

# Gross and net loadshapes for each feeder

- Residential and small commercial rate class loadshapes are modeled using a 10% sample of meters on each feeder (minimum sample size of 300 meters)
- Larger customers are modeled individually (census).
- Then we apply load impacts by DER type and level of adoption to get a net load shape

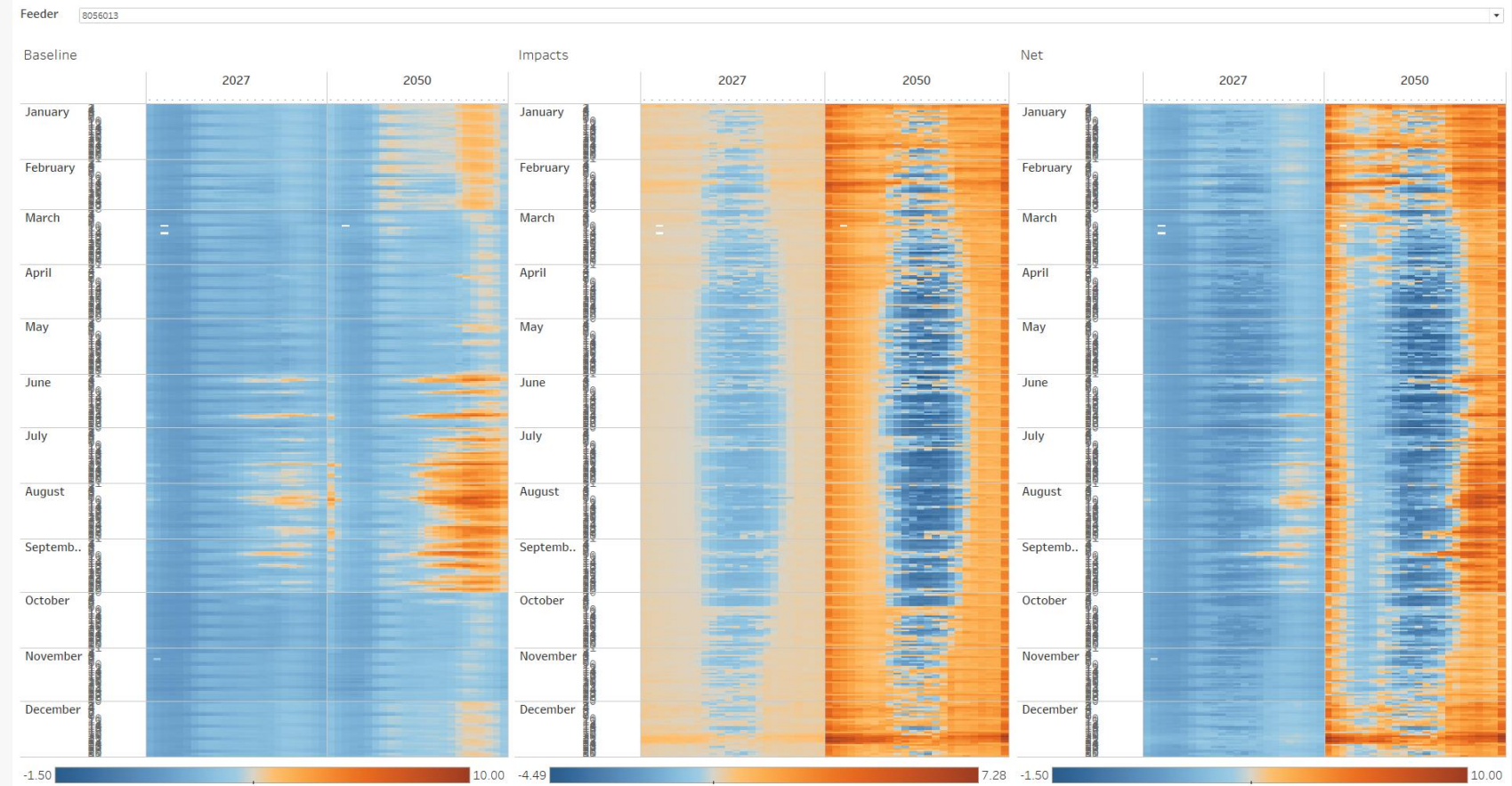
**Small commercial gross load profiles for two feeders**



# Baseline, DER, and net load impacts

Chart to the right shows the annual hourly (8760) load at the feeder-level for a feeder in Hillsboro

Baseline load growth (left), DER impact (center), and net load (right) for years 2027 and 2050



# Upcoming work for AdopDER

- Conduct quality control on locational results
- Scale the results to entire PGE service area
- Integrate results into distribution planning and IRP workflow
- Develop modules within AdopDER to account for equity, resiliency, and environmental factors
  - Intention is to identify resource potential for different customer groups
  - Results will inform product development efforts and program outreach
  - Metrics used will reflect NWS equity lens conversations

# Next Steps

# DRAFT Agenda for 2022

## February

- DSP Updates:
  - Community Engagement
  - Product Development
  - HCA
- DER Forecasting & Adoption
- Current & Future Grid Needs Identification Process
- NWS

## March

- DSP Updates
- DER Forecasting & Adoption
- Current & Future Grid Needs Identification Process
- NWS
- Interconnection
- Community Engagement

## April

- DSP Updates
- DER Forecasting & Adoption (Andy - 45 min update on AdopDER)
- NWS
- Community Engagement

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**Let's  
meet the  
future  
together.**

