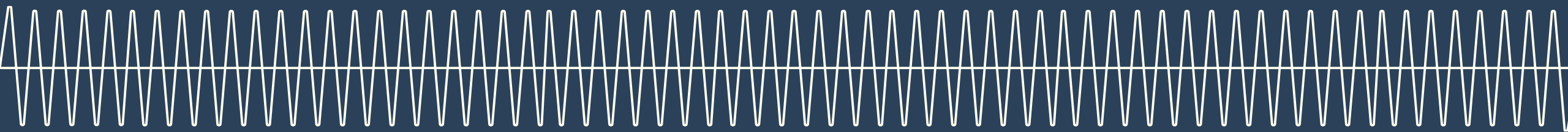
PGE Distribution System Plan Partners Monthly Workshop # 13

March 30, 2022



Waiting Room

One moment please, while we wait for people to join

Song by artist:

Jake Shimabukuro Performing Galloping Seahorses On HiSessions

Please use the QR code to check-in:
Name and Organization

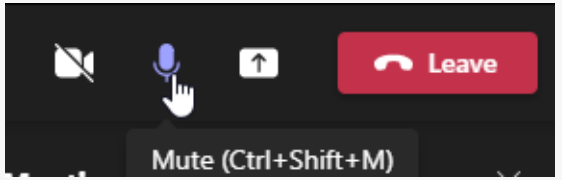
Meeting Logistics

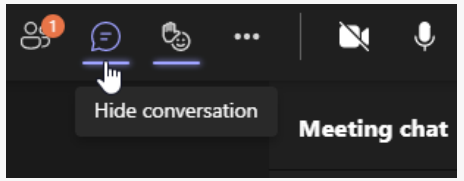
Teams Meeting

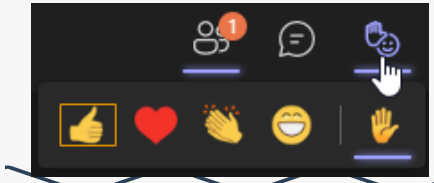
- Please click the meeting link sent to your email or [Click here to join the meeting]
  - +1 971-277-2317 (dial this number into your phone for best results)
  - PW: 885 018 032#
- Please use **Microsoft Edge** or **Google Chrome** with Teams as it will give you the best experience

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

You can email us at: DSP@pgn.com

Online Feedback Form

DSP Mailing list: Sign-up form / Opt-out form

Important dates in 2022:

- OPUC DSP-Part 2 Working Group dates
  - **Thursdays Mar 31, April 21, May 19, June 16 (1-4 pm)**
- PGE DSP Partner Meetings
  - **Wednesdays Apr 27, Jun 1, July 13, Aug 3 (9 am – 12 pm)**
- PGE DSP Community Workshops
  - **Thursday April 7 (1-3 pm), Wednesdays May 5, May 25 (9 -11 am)**
- DSP Part 2 filing date
  - **Monday, Aug 15**

Agenda

9:00 – 9:15 am - **Opening Remarks** (15 min)

9:10 – 9:20 am – **Community Engagement Updates** (10 min)

9:20 – 9:35 am – **Distributed Energy Resources (DERs) & Water Heater Example** (15 min)

9:35 – 9:45 am – **Solar Innovation & Community Partnership Update** (10 min)

9:45 – 9:50 am – Break (5 min)

9:50 -10:50 am – **Current Distribution Planning Process** (60 min)

10:50 – 10:55 am – Break (5 min)

10:55 – 11:55 am – **Non-wires Solutions Project Candidates** (60 min)

11:55 am – 12:00 pm – **Next Steps** (5 min)

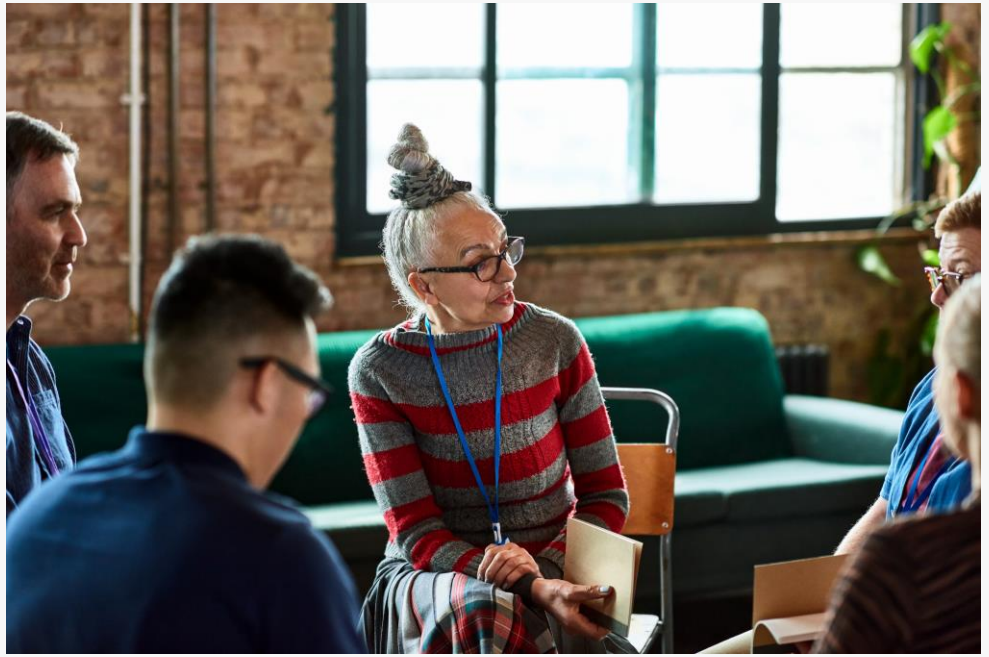
Operating Agreements

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

Community Engagement

Shadia Duery, DSP Project Manager

Where Are We?

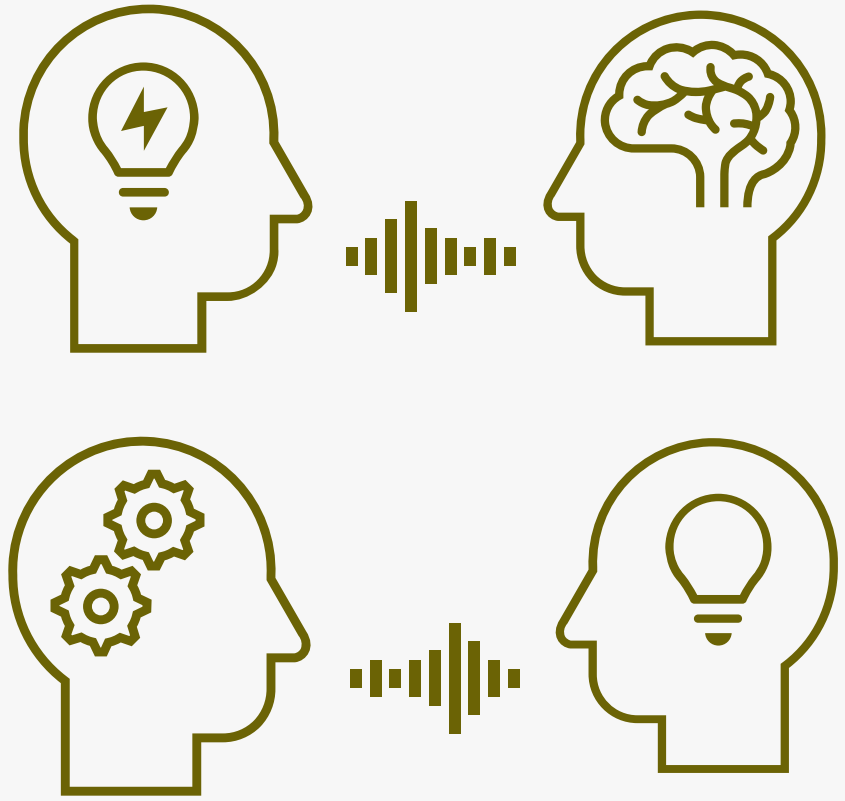
Community Workshops	**Dates and times:** March 16, April 7 from 1-3 pm, May 4 and May 25 from 9-11 am
	Topics to discuss: Equity Data, Community Needs, NWS Pilot Projects
	Audience: Community Based Organizations (CBOs), municipalities, and city gov
CBO Engagement	CEP awarded Energy Trust of Oregon (ETO) Working Together Grant
	Non-wires solutions non-technical materials to be shared in second Community Workshop April 7
Hiring	Hired two Community Engagement & Diversity Equity and Inclusion (DEI) roles

Distributed Energy Resources (DERs) & Water Heater Example

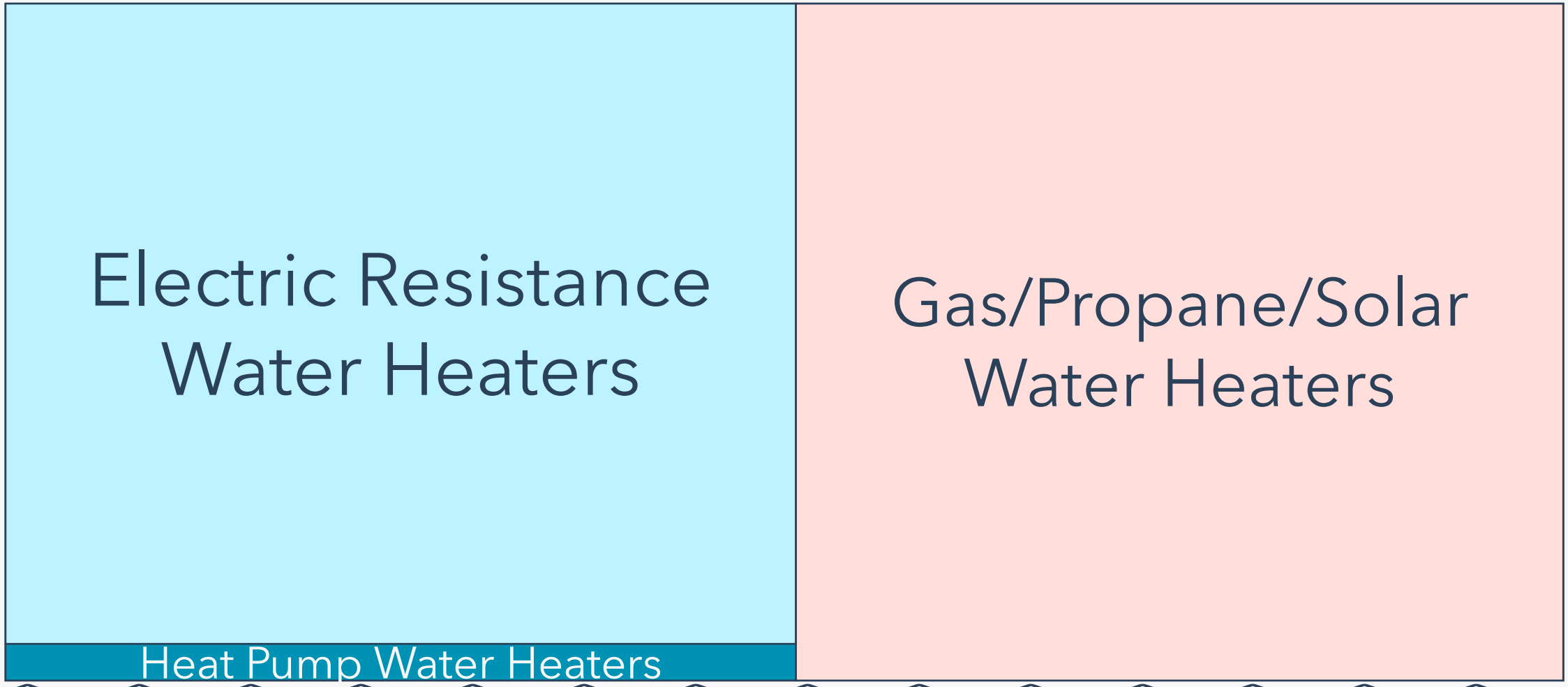
Binh Lu, Product Development, Senior Product Developer

OBJECTIVE

Discuss various design questions to inform the best possible program implementation possible.



CURRENT WATER HEATER MARKET



DISCUSSION TOPIC #1

Heat pump water heater qualification level for the pilot

- ENERGY STAR certified
- Energy Trust qualified (NEEA Tier 3+)
- Heat Pump Water Heater w/Mixing Valve

Design Considerations

- Support more than one solution
- Acquire flexible load from both heat pump water heaters & electric resistance water heaters
- Promote energy efficient options, and coordinate messaging between PGE and Energy Trust
- Design a program that serves all customers

DISCUSSION TOPIC #2

Smart Water Heater Pilot as an opt-out enrollment

Automatically enroll installed water heater customers in the water heater pilot (opt-out design).

Design Considerations

- Applying learnings from MFWH opt-out design
  - Focus customer education on controlling comfort
  - Provide multiple modes for easy opt-out (phone, online, mobile)
  - Potential opt-out options: specific dates or from pilot completely
- Reduces administrative burden to recruit customers into the pilot

DISCUSSION TOPIC #3

Incentives and rewards distribution

Exploration of front-loaded incentives that are provided to the builder or the installer to lower the cost of the installation.

Exploration of value-centered rewards (non-monetary) for participation in the flexible load events.

- Ex. charity donations, etc.

Design Considerations

- Due to the low flexible-load capacity available of water heaters, there are few dollars available to satisfactorily support both installation and flexible load incentives.
- MFWH participants qualify to receive a Chinook Book but not all participants redeem it.

Next Steps

Please contact Binh Lu, binh.lu@pgn.com

With feedback, and/or if interested in participating in design process

1

Incorporate today's feedback.

2

Return to provide design updates in future DSP meetings.

Solar Innovation & Community Partnership

Kathy Wagner, Product Development,
Senior Product Developer

Aligning On a Shared Solar Vision

Ensuring equitable decarbonization & resiliency	
Starts with co-creation of equitable solar solutions for LMI and EJ communities and other programs that support solar adoption and resiliency goals	**It's going to take ALL of us**

PGE has done some initial thinking
We plan to explore those ideas and others as part of a co-creation process with Energy Trust of Oregon, community partners, and key stakeholders

Building a Better Future Together

Collaboration Team

- Jeni Hall, Energy Trust of Oregon
- Angela Crowley-Koch, OSSIA
- Silvia Tanner & Tim Lynch, Multnomah County Office of Sustainability
- Kathy Wagner, Andy Eiden, Jason Zappe, PGE
- Marli Klass, Jeff Bissonnette, Fred Heutte, Northwest Energy Coalition
- Jason Benefit, GM, Neil Kelly Solar
- Oriana Magnera, Verde Northwest

Collaboration Team: 2/25 Kick-Off

What went well:

- We had diverse representation from community organizations, government, ETO, and PGE
- The collaboration team was highly engaged
- PGE had prepared a kick-off activity for the team to inform future research with multi-family developers, tenants, and building managers
- We did capture some valuable pain points as a team that can inform future thinking

Lessons Learned:

- Desire for speed and action got in front of building alignment
- First meeting should have been focused on spending more time on creating shared vision
- We didn't have all the right folks at the table who could speak directly to MF property owner/developer tenant issues (Multi-family NW, Housing Oregon, Community Alliance of Tenants)
- There wasn't clarity regarding proposed process and lead-in to direct customer research
- PGE August timeframe seemed arbitrary and rushed
- PGE's product development process needs to adjust to allow for co-creation

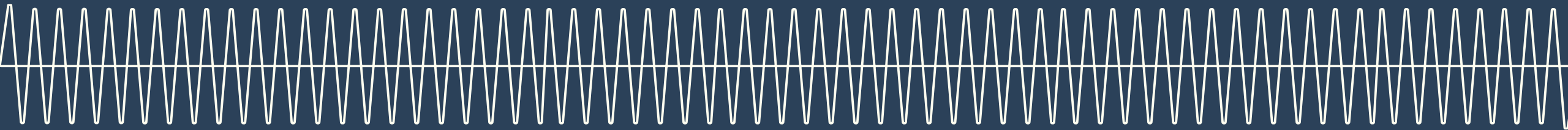
Overall: Slow down and take the time needed to do this important work

5 Minute Break

Current Distribution Planning Process

Jennifer Galaway, Manager, Distribution Planning Engineering

March 30, 2022



Objective

Full transparency into our current distribution system planning process

- Walking through an example project that was planned with the current distribution planning process.

- Provide for meaningful input from partners by exploring our planning process together to determine what data is useful and what questions we could answer that make Grid Needs and Solution Recommendations more accessible.

Distribution Information

Service Territory

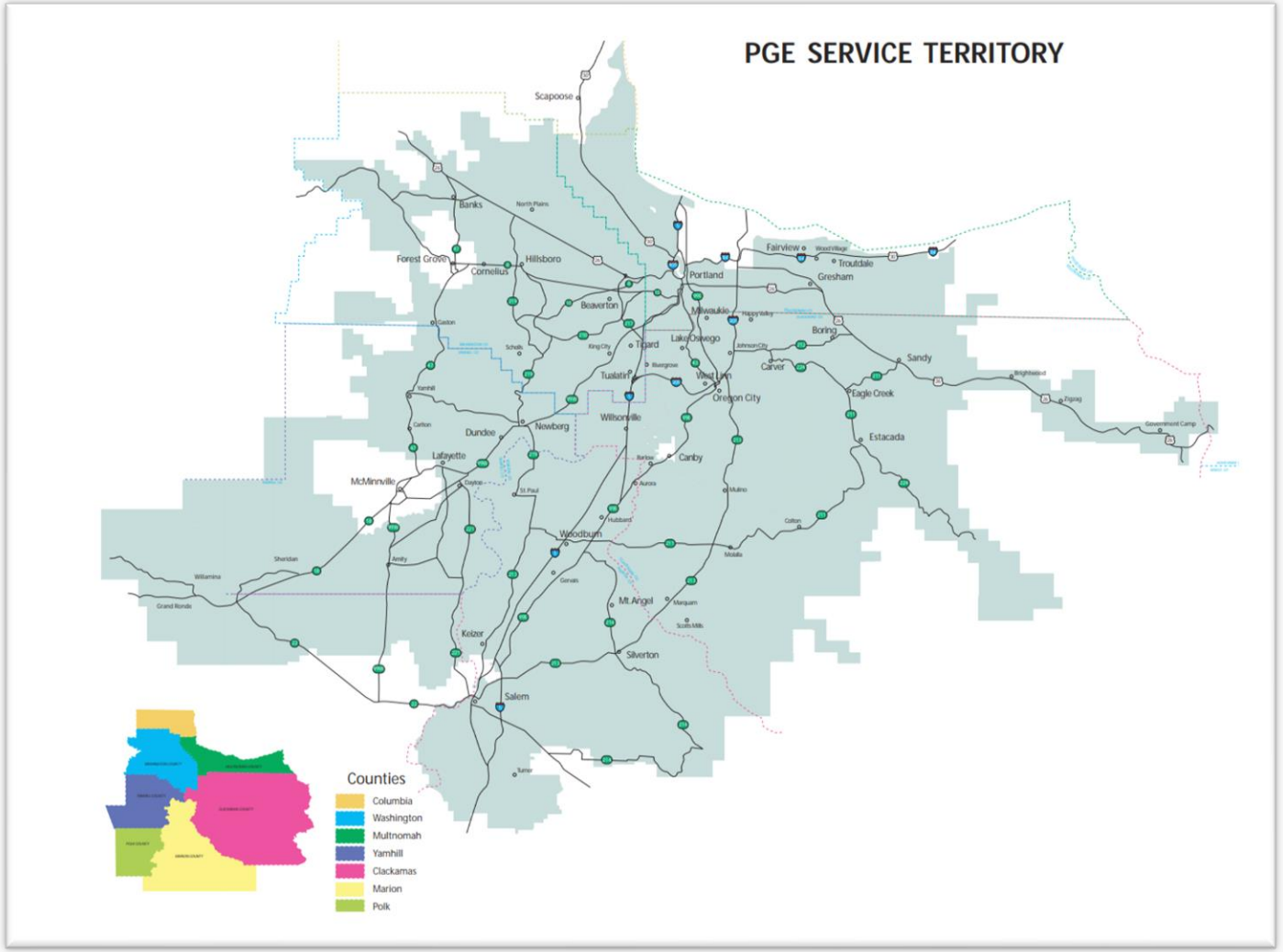
- 1.9 million population
- 4,000 square miles
- ~900,000 customers

Big Equipment

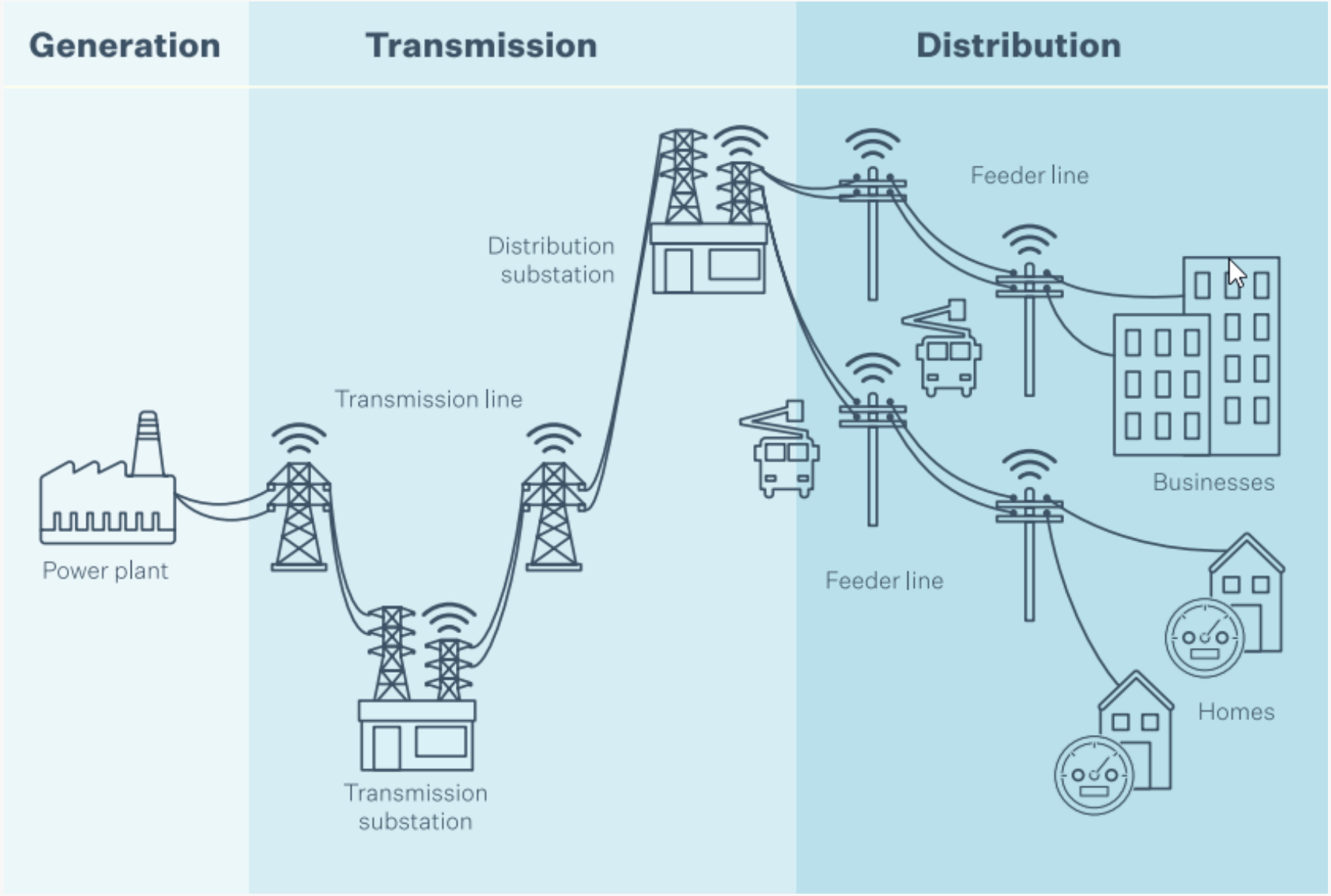
- 153 Substations
- 270 Power Transformers
- 695 Feeders

Net System Peak Load

- Summer: 4,441 MW
- Winter: 4,073 MW



The Grid

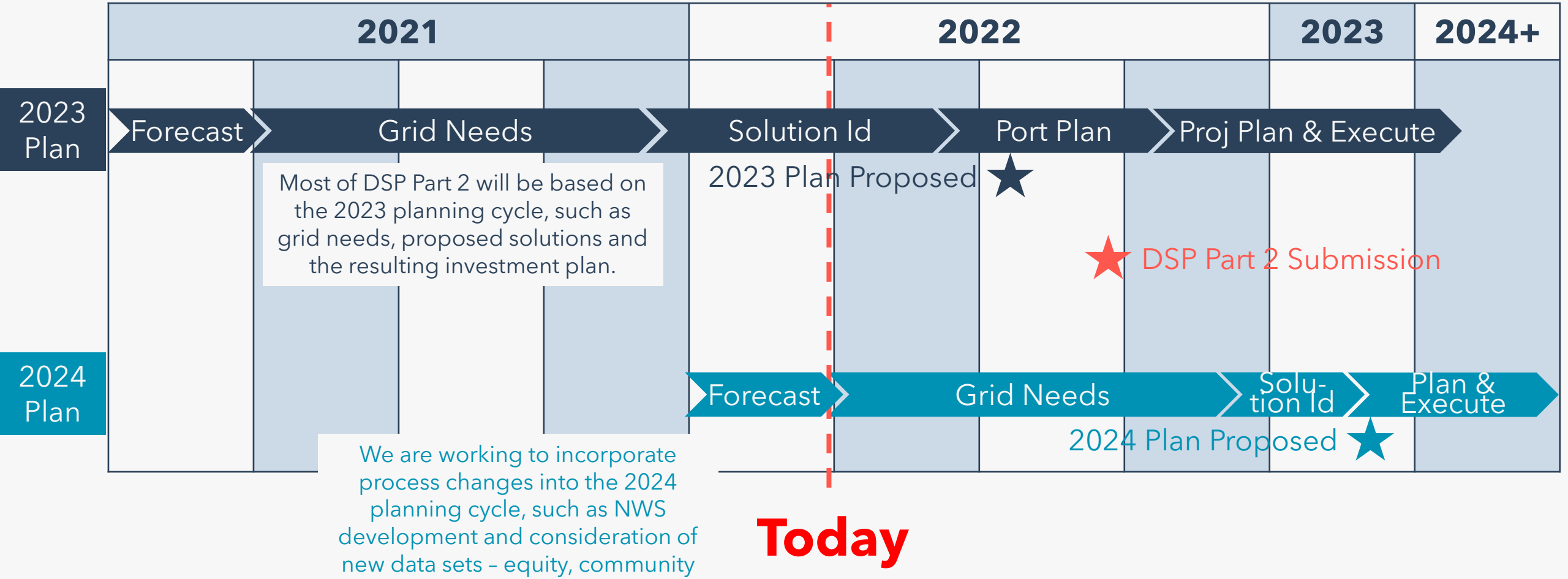

Generation
Transmission
Distribution
Feeder line
Distribution substation
Transmission line
Businesses
Power plant
Feeder line
Homes
Transmission substation

Distribution Planning Expected Results

Goals

- Enhance **safety**
- Increase **reliability**
- Meet **customer needs**
- Meet **standards/requirements**
- Recommend best **solutions**
- **Reduce risk** (likelihood x consequence)

Investment Development Timeline



Guiding Principles

Plan to peak

PGE plans the distribution system to serve customers even at extreme temperatures, at the largest power demand at a given point during a year

Planning criteria for equipment loading

target loading is less than 67% for feeders, less than 80% for transformers to have capacity to move load around on the system

Target system flexibility at both the transformer and feeder level

all load picked up by switching to other equipment for the loss of a single element

Customer-driven projects

take priority, e.g., large housing development, manufacturing facility, industrial park

Ensure new infrastructure is planned for the long-term forecasted load in the area

when PGE implements a project, we aim to not have to do another project on the affected equipment for at least 10 years

The Seven Steps of the Current Planning Process

1 

WHAT IS THE PROBLEM

2 

WHERE IS THE PROBLEM LOCATED

3 

FINDING SOLUTIONS

4 

WHAT ARE THE LIMITATIONS TO THE SOLUTIONS

5 

WHAT ARE THE BENEFITS AND RISKS OF THE SOLUTIONS

6 

ARE THERE ADDITIONAL IMPACTS TO THE SOLUTIONS

7 

RECOMMENDATIONS

Project Overview

Project Name: Rock Creek Substation	
Project Description	Construct a new substation with two 115 kV transmission lines, one distribution transformer, and three 13 kV distribution feeders to provide capacity for new North Bethany community development and system flexibility for existing infrastructure.
Project Timeline	- Washington County developed North Bethany Community Plan in 2012 - Grid Needs Analysis performed in 2013 to determine if existing Bethany substation could be expanded to serve new load; determined a new substation was required - Property Purchase in 2014 - Solution Identification in 2014/15 when location of new substation was determined - Project originally planned to be completed in 2018, actual completion in 2020
Project Cost	$14.3 million for the substation project + $0.54 million for new substation property purchase

Step 1: What is the problem?

Determine **why the system needs to be upgraded to meet future needs (Identification Stage)**

Drivers

- Economic development
- Load growth/Forecasts
- Lumped load additions
- Modernization
- Policy regulatory requirements
- Safety
- Substandard equipment
- Urban growth boundary expansion
- Zoning changes

Identification Tools

Analysis

Feeder Load (System Weak Link Report/Minimum Load): Indicates equipment and conductors approaching certain limits or thresholds

Reliability: Focuses on trouble spots in the distribution system based on historic outage events

Assessment

System Assessments: Indicates potential problematic areas when the system is most stressed

Modeling

Asset Risk Models: Identifies and quantifies risk related to certain equipment

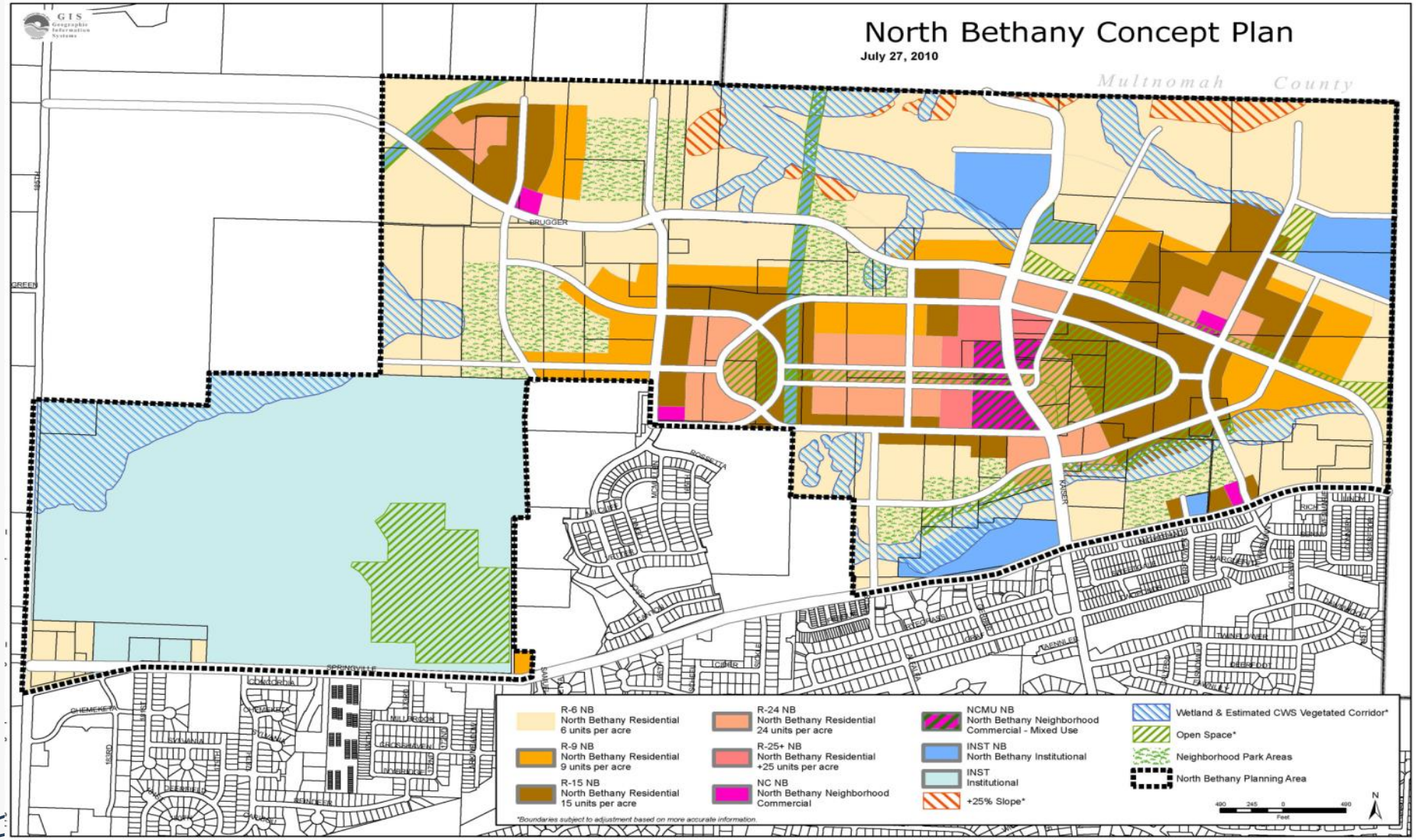
Step 1: Problem identification

Review of area community development plans (City/County Economic Development websites) to determine where load may be added to the system in the future

New large community development in the North Bethany area identified, required a plan to serve the new load

Review of the system peak loading on adjacent substations at the time indicated that there was limited capacity available on existing infrastructure to reliably serve a large new community

New Community Development – North Bethany



Load Forecast – North Bethany

North Bethany Concept Plan - Load Projection			
Residential	**Acres**	**# of Units**	**Total Peak Load (MVA)**
6 units/acre	214.98	1290	5.16
9 units/acre	43.28	390	1.56
15 units/acre	53.24	799	3.19
24 units/acre	34.19	821	3.28
25+ units/acre	5.99	210	0.84
Commercial/Mixed Use	**Acres**	**# of Units**	**Total Peak Load (MVA)**
Commercial	1.72	N/A	0.57
Mixed Use	5.00	N/A	1.67
Institutional Use	**Acres**	**# of Units**	**Total Peak Load (MVA)**
	30.75	N/A	0.46
Totals	**Acres**	**# of Units**	**Peak Load (MVA)**
	389.15	3510	16.73

Load Projections based on similar developments in PGE's service territory:

- Residential load estimated at 0.004 MVA per unit
- Commercial/Mixed Use estimated at 0.33 MVA per acre
- Institutional Use estimated at 0.015 MVA per acre

Step 2: Where is the problem located?

Area affected by the problem

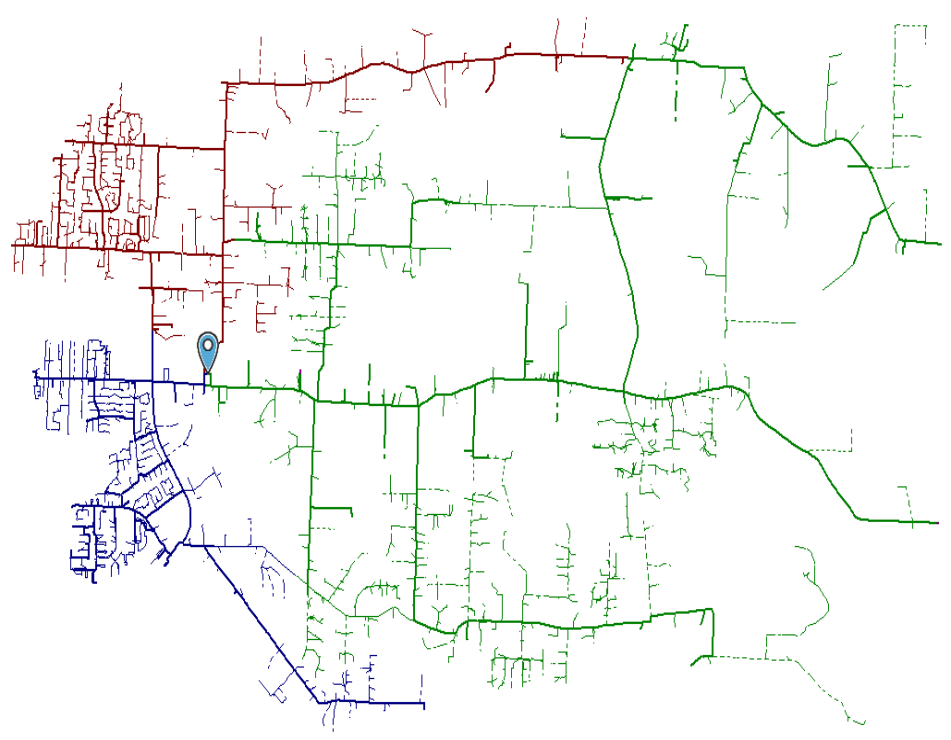
Review:

- Geographic boundaries
- Affected customers
- Contractual obligations
- Approach to contingency analyses

Forecasting parameters

Load profiles/Allocation

Setup models



Step 2: Location-specific considerations

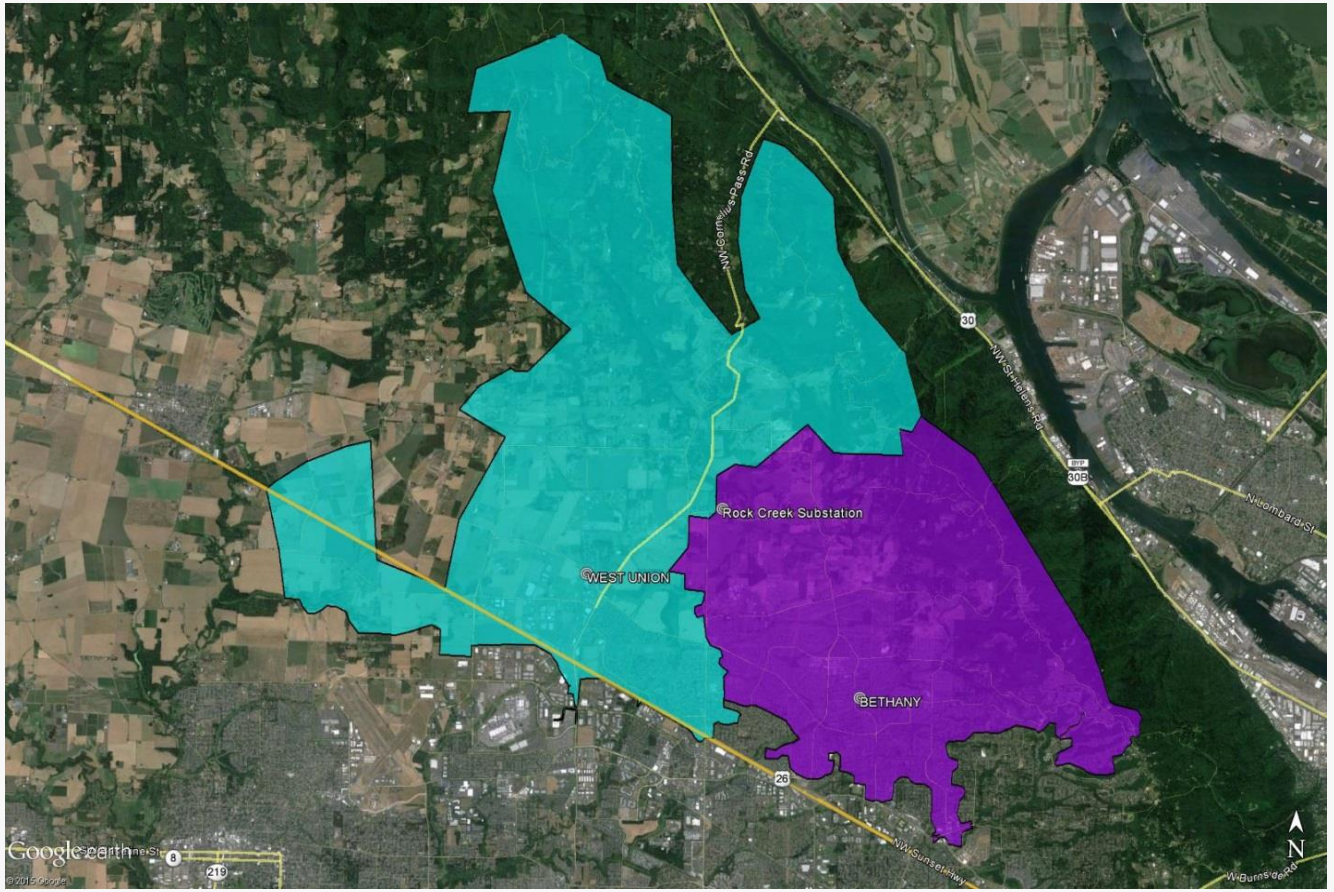
Determine the infrastructure in the focus area that exists today

- Feeders and substation serving the site now – Bethany substation, Bethany-Germantown 13 kV, Bethany-Springville 13 kV
- West Union-Cornelius Pass 13 kV feeder adjacent to the site

Study area includes the Bethany substation and all substations and distribution feeders that tie to the Bethany substation

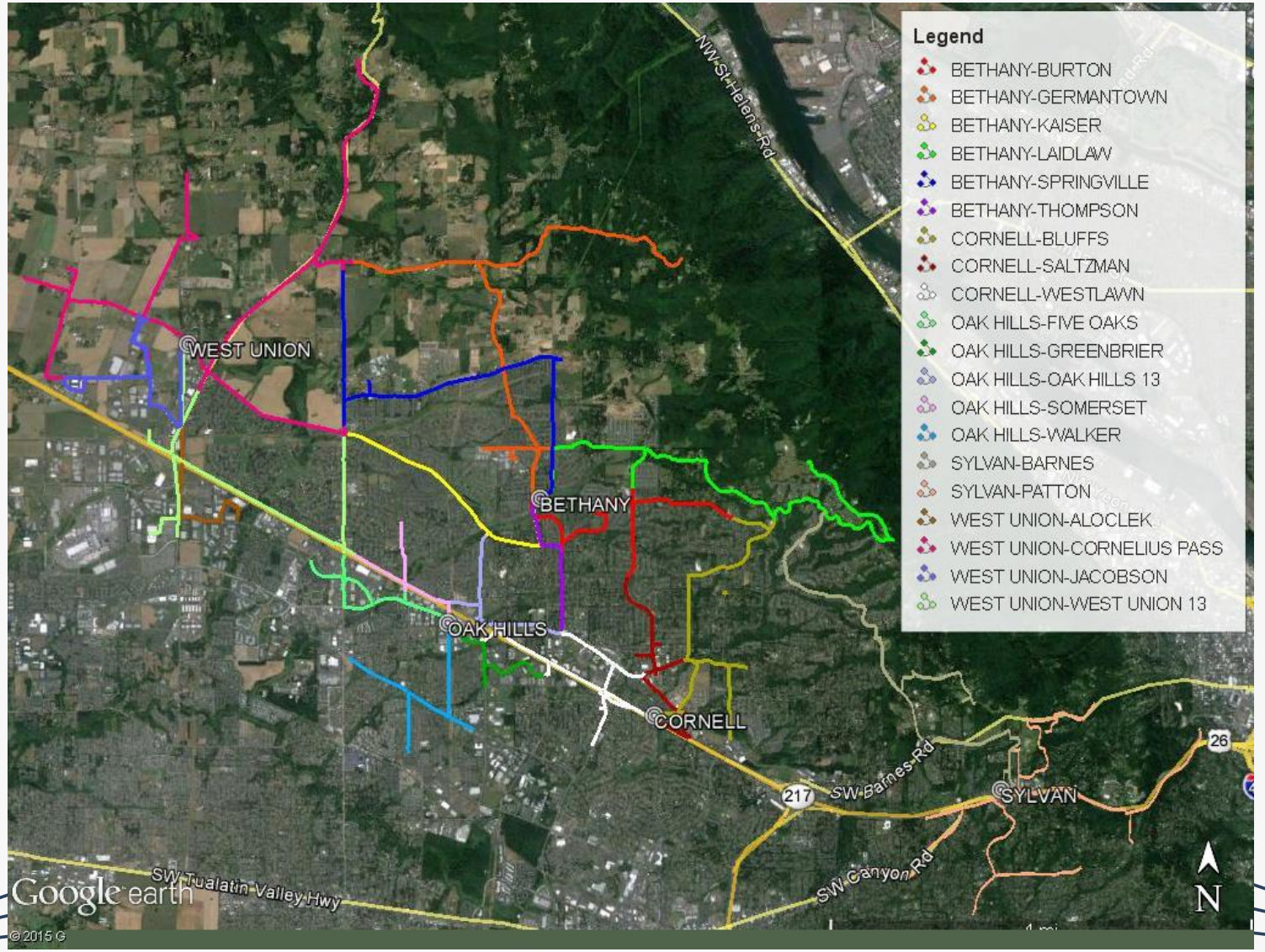
- Cornell substation
- Oak Hills substation
- Sylvan substation
- West Union substation

Step 2: Location-specific considerations



Substation Service Areas – Pre-Project

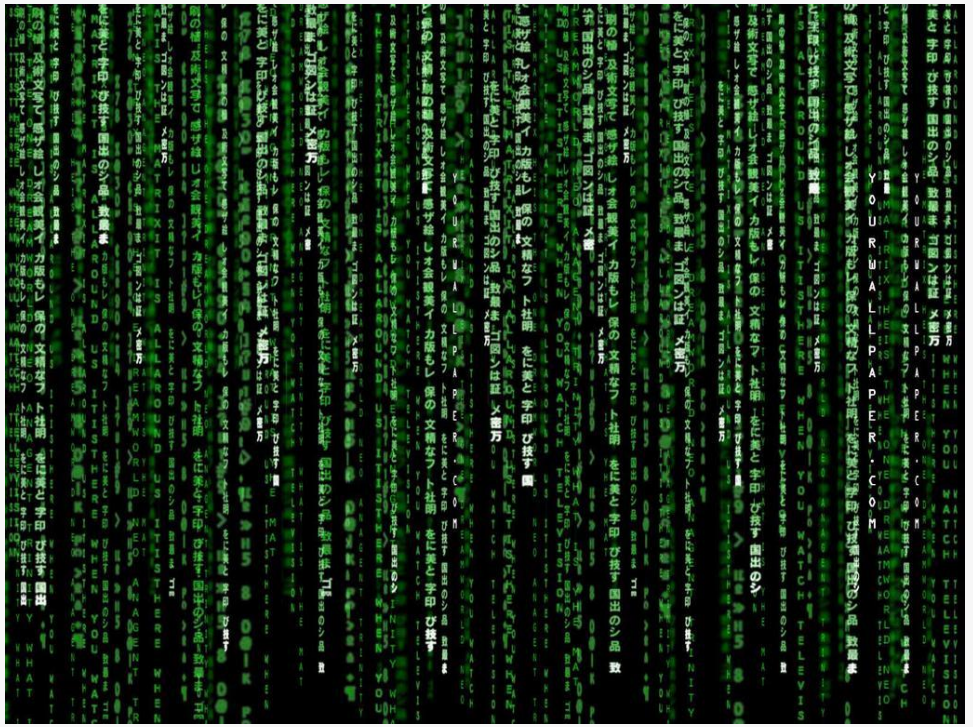
Step 2: Location-specific considerations



Step 3a: Finding Solutions: *Current State Analysis*

Software simulation will further **define severity** of the **problem area** and **identify additional issues**

- Coordination issues
- Conductor loading violations
- Contingency analysis deficiencies
- Faulted equipment violations
- Load balancing / High neutral current
- Protection-related issues
- Voltage violations



Step 3a: Current State Analysis

Base Case condition showed high and low voltages on sections of lines sourced from Sylvan substation and from West Union substation

Primary Cause – high neutral current flows, indicating unbalanced loading on the phases on the lines. Balancing load across phases alleviated the voltage issues.

	Neutral Currents			
	Base Case - No Load Balancing		Base Case - With Load Balancing	
Feeder	**Summer**	**Winter**	**Summer**	**Winter**
Sylvan-Barnes	166.1 A	134.8 A	56.5 A	45.6 A
Sylvan-Patton	112.0 A	99.0 A	31.8 A	28.1 A
West Union-West Union 13	218.5 A	167.4 A	45.2 A	35.4 A
West Union-Cornelius Pass	139.1 A	145.6 A	46.6 A	47.3 A

Step 3a: Current State Analysis

Sources to the area are from the Bethany substation, so performed further analysis to examine the current state of the Bethany substation

Performed N-1 contingency analysis on feeders and transformers at Bethany substation for both peak summer and peak winter loading conditions

- Loss of the Bethany-Germantown feeder would result in 3.3 MVA of unserved load during peak summer conditions – load that can't be switched to another part of the system because it could cause issues elsewhere.
- Loss of Bethany WR1 transformer would result in 6.5 MVA of unserved load during peak summer conditions, 1 MVA during peak winter conditions
- Loss of Bethany WR2 transformer would result in 11.9 MVA of unserved load during peak summer conditions

CONCLUSION: We already are in a state where we cannot pick up all the load in the event of an outage if one were to occur during peak loading conditions.
Adding 16-17 MVA of new load will require a capacity addition.

Step 3b: Finding Solutions: *Solution Analysis*

Traditional

- Plan to peak
- Wired solutions
- Reliability-based
- Emissions agnostic
- Routine analysis
  - ✓ Reconductors
  - ✓ Substations
  - ✓ Voltage Regulators

Non-Traditional

- Plan to cycle(s)
- Non-wires Solutions (NWS)
- Flexibility
- Net-Zero emission targets
- Complex analysis
  - ✓ Automation
  - ✓ Demand Response
  - ✓ Inverter-based tech
  - ✓ Microgrids

Step 3b: Solution Analysis

Evaluated adding capacity at existing substations first

Bethany Substation:

- Substation cannot be expanded due to condition of approval when originally built
- A third transformer cannot be added without compromising the driving space within the substation, which is a safety issue

Cornell Substation:

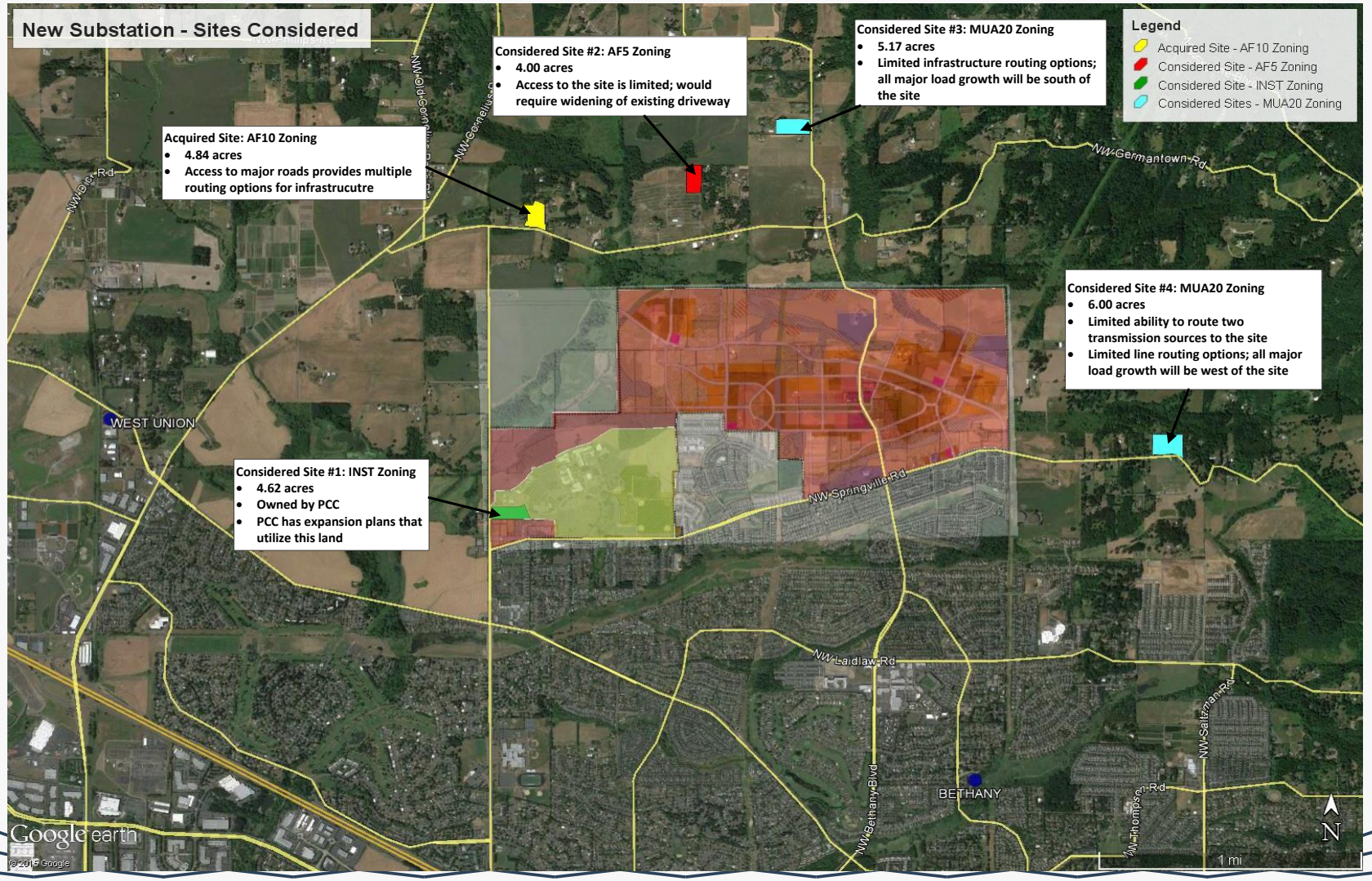
- Energized in 2013; can accommodate another substation transformer
- Much further south – reaching north to serve load is challenging

West Union Substation:

- Expansion planned for 2015 due to heavy loading at the substation
- Load growth targeted for the area that will be served by West Union substation; no capacity to serve the North Bethany community development

CONCLUSION: A new substation is required to reliably serve the load growth, as well as provide redundancy to adjacent substations

Step 3b: Solution Analysis



Step 3b: Solution Analysis

Performed power flow studies to determine the plan for new lines from the new substation

All feeders identified in location-specific characteristics are included in the study

Load Forecast at the time was for the PGE system load to remain flat for the next 5 years

Solution should target the following criteria:

- **Base case (N-0):** Feeders and transformers are in their normal configurations. No equipment exceeds planning limits (feeders no higher than 67% and transformers no higher than 80% of their ratings). This ensures system flexibility in the event of a planned or unplanned outage – load can be shifted to adjacent lines and transformers.

- **Feeder or Transformer contingency (N-1):** Feeders or Transformers are removed from service, allowing surrounding feeders to pick up the unserved load. Under all contingent conditions, loading on conductors and associated equipment cannot exceed 100% their thermal loading limits. Also under these conditions, loading on transformers cannot exceed 100% of their seasonal rating.

Step 3b: Solution Analysis

Three feeders located within 0.25 miles of the new Rock Creek substation site: Bethany-Germantown, Bethany-Springville, West Union-Cornelius Pass

Feeders from the new substation are determined by first looking at offloading these three feeders to avoid significant infrastructure buildout and provide capacity to serve the new load growth in the North Bethany community area

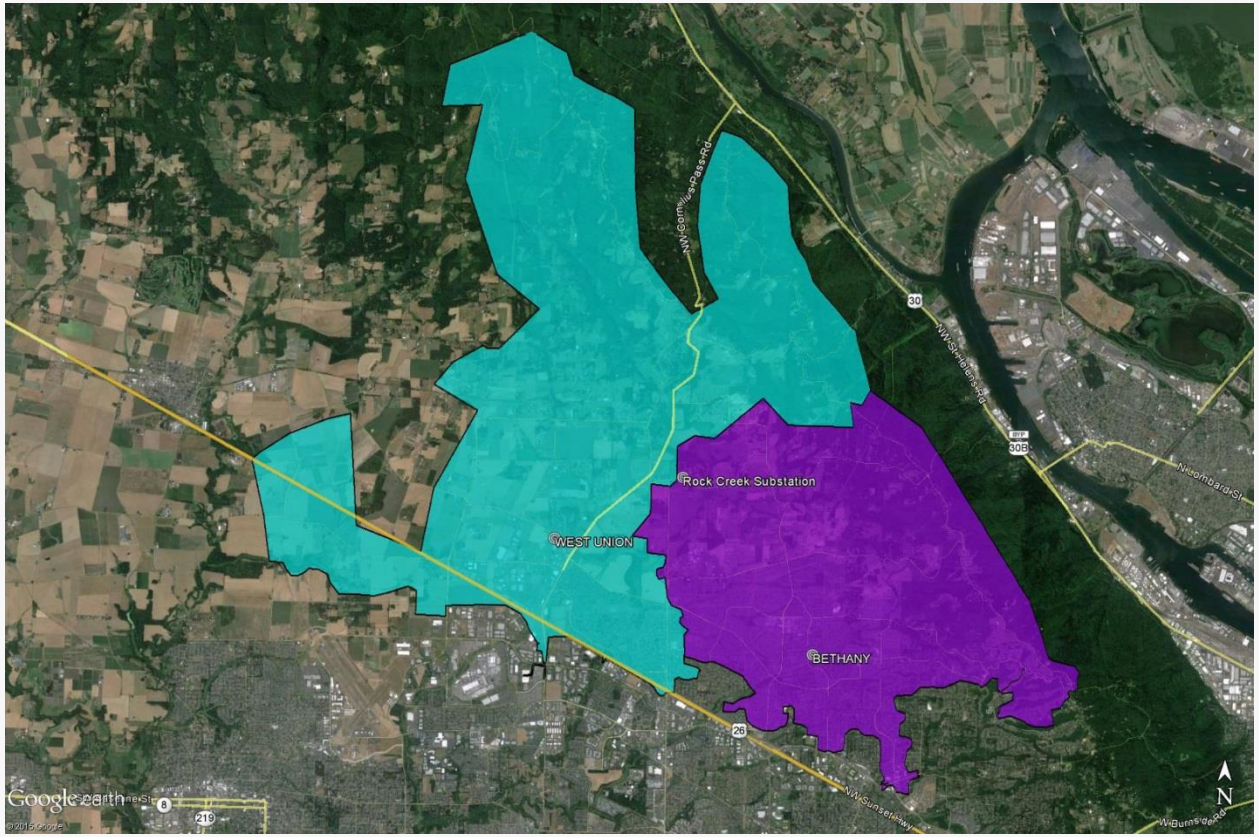
Load added to the model to simulate the capacity needs for the new development, while keeping in mind that the speed of which the load materializes is unknown

- The initial solution does not necessarily need to add ALL capacity now – just make provisions to add the capacity in the future.

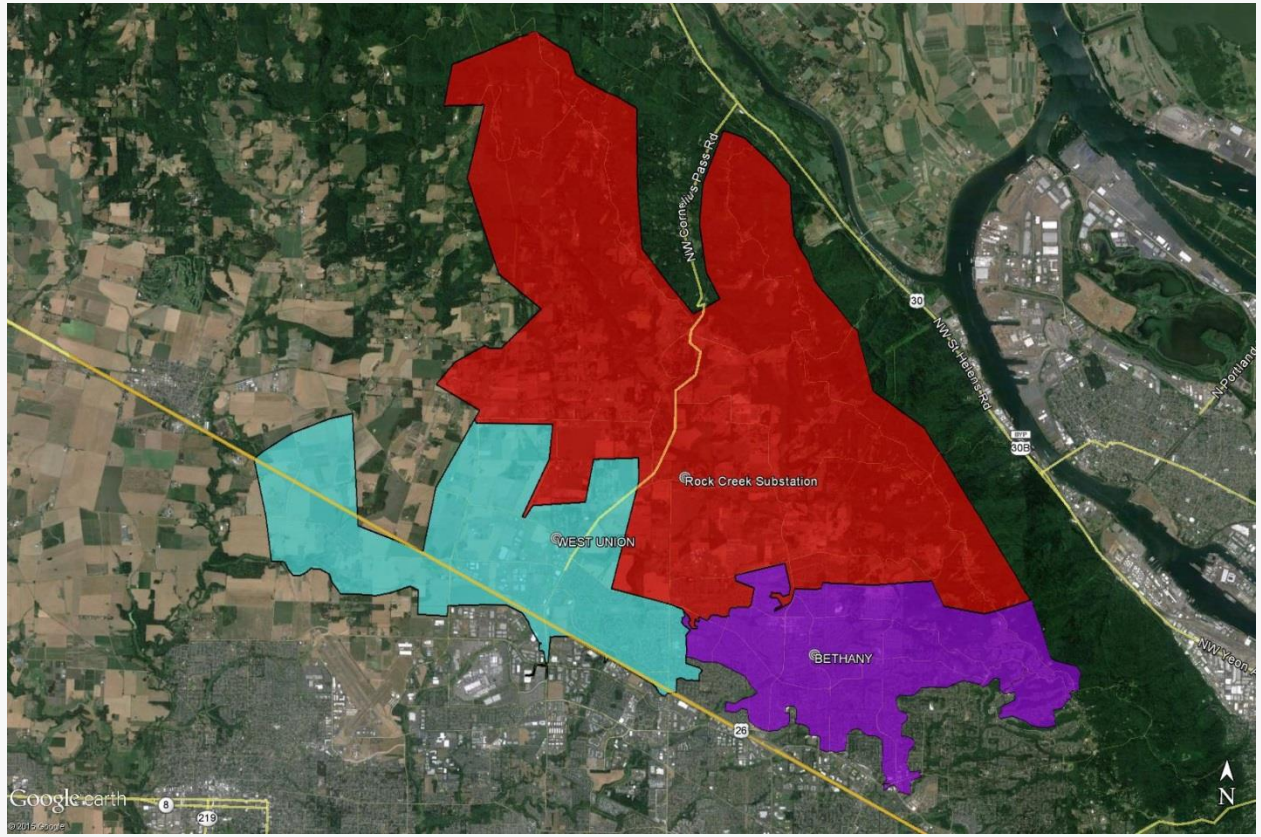
Feeders from the new substation are determined by first looking at offloading these three feeders to avoid significant infrastructure buildout and provide capacity to serve the new load growth in the North Bethany community area

- Ultimately three new feeders were identified to be constructed from the new substation, offloading 12.4 MVA from Bethany and West Union

Step 3b: Solution Analysis



Substation Service Areas – Pre-Project



Substation Service Areas – Post-Project

Step 4: What are the limitations to the solutions?

Solutions

Do They Satisfy:

- **Problem Statement**
- Additional discoveries during **finding solutions** ***current state analysis***

Do They Meet:

- **Customer/community** needs
- **Regulatory**/compliance guidelines
- **System** needs under:
  - ✓ normal conditions
  - ✓ contingent conditions

Are They:

- Optimal
- Constructible

Is duration of short-term/intermediate option valid

Step 4: Solution Limitations

While the addition of the Rock Creek substation provides full N-1 feeder redundancy for Bethany substation, it does not provide N-1 transformer redundancy for Bethany WR2 during peak summer conditions

A capacity addition at Sylvan was identified as a potential future solution to provide full N-1 transformer redundancy at Bethany

The solution did not build out infrastructure to serve the entire North Bethany community plan due to the unknown timing of the load growth. Therefore, a future project will be required to add capacity as load in the area grows.

Provisions were made to accommodate the new load growth (room for a second transformer at the Rock Creek substation)

Step 5: What are the benefits and risks of the solutions?

- Benefit vs Cost
- Risk reduction on assets and non-assets
- Stacked benefits
- Savings
- Improve resilience
- Reduce outage duration/ frequency

Step 5: Benefits and Risks of Solutions

Asset Management analysis is performed for most distribution projects

The construction of Rock Creek substation reduces the consequences of an extended, unplanned outage at Bethany substation. Rock Creek substation offloads approximately 6.5 MVA from Bethany WR1 and approximately 4.8 MVA from Bethany WR2. This load shift not only reduces the consequence of failure but also defers replacement of 115kV equipment at Bethany substation.

	Existing		With Rock Creek Substation		Difference	
Device	**Consequence of Failure**	**Years to Replacement**	**Consequence of Failure**	**Years to Replacement**	**Consequence of Failure**	**Years to Replacement**
Bethany W110 (WR1 high-side CS)	$1,449,695	10	$1,052,866	14	-$396,829	+ 4
Bethany W228 (WR2 high-side CS)	$1,449,695	18	$1,156,652	21	-$293,043	+ 3
Bethany W102 (E 115kV line position CS)	$2,878,280	5	$2,188,408	7	-$689,872	+ 2
Bethany W110 (St Marys 115kV line position CS)	$2,878,280	5	$2,188,408	7	-$689,872	+ 2

Step 5: Benefits and Risks of Solutions

More substation capacity and ties to adjacent substations provides for more flexibility and resiliency in a planned or unplanned outage scenario to restore load

Non-wires solution not considered (were not actively pursuing these back then); however, it would be difficult to serve a new community of this size (this much load) with a non-wires solution, as we have to provide a base level of service, not just peaking load

Load at risk of not materializing in expected timeline

- Projects are evaluated each year in the Portfolio stage to determine if it is still prudent to execute on the project in the designated timeframe
- This project was originally expected to be completed by June 2018; this was delayed to June 2020 for a variety of reasons, including that the load did not materialize as quickly as anticipated

Step 6: Are there Additional Impacts to the Solutions?

Impacts

Community, Customer & Environmental

Safety

Personnel & Public

Complexities

Construction sequencing

Introduction of newer technologies

Portable equipment scheduling

Newer concepts/procedures

Leads to Step 7

Final Recommendation(s)

Step 6: Additional Impacts to Solutions

Community Impact Requests:

- Develop a mitigation plan in the event of a fire
- Perform environmental analysis to ensure that the water supply is not contaminated
- Undergrounding distribution lines in front of the adjacent historic church and the new substation property

Step 6: Additional Impacts to Solutions

Community Impact Requests:

- Transmission poles – gave the community the choice on color, silver or brown
- Landscaping to provide screening (required per permitting process, but solicited input from community)

Step 7: Final Recommendation

The Seven Steps of the Current Planning Process

1

WHAT IS THE PROBLEM

2

WHERE IS THE PROBLEM LOCATED

3

FINDING SOLUTIONS

4

WHAT ARE THE LIMITATIONS TO THE SOLUTIONS

5

WHAT ARE THE BENEFITS AND RISKS OF THE SOLUTIONS

6

ARE THERE ADDITIONAL IMPACTS TO THE SOLUTIONS

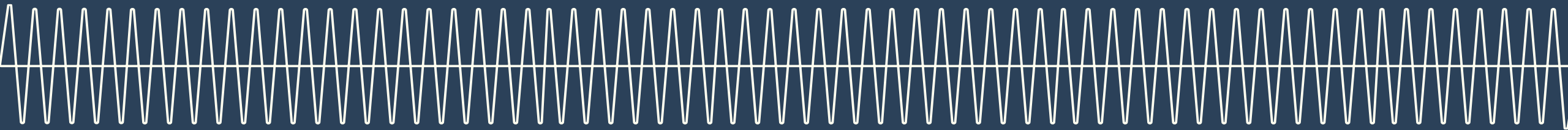
7

RECOMMENDATIONS

5 Minute Break

Moving Toward a Future Distribution Planning Process

Part Two



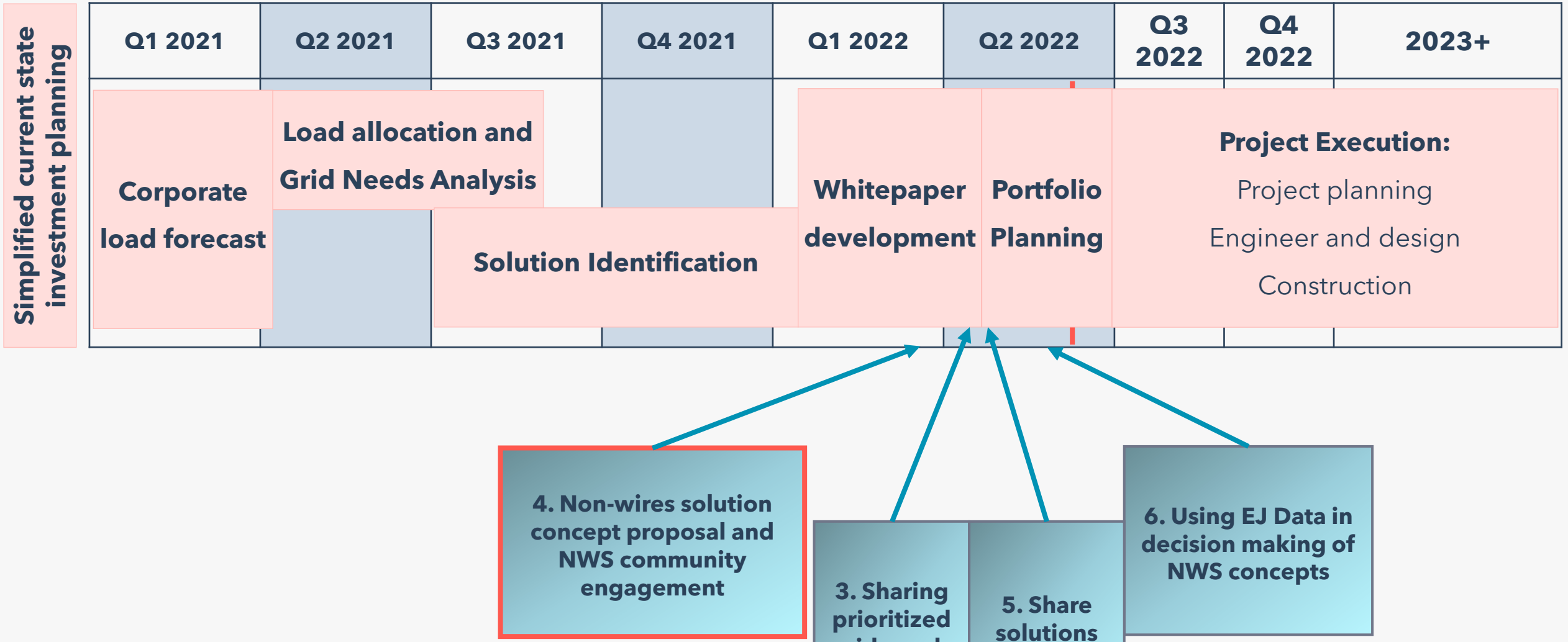
Non-wires Solutions Project Candidates

Nihit Shah, Distributed Resource Planning,
Senior Analyst



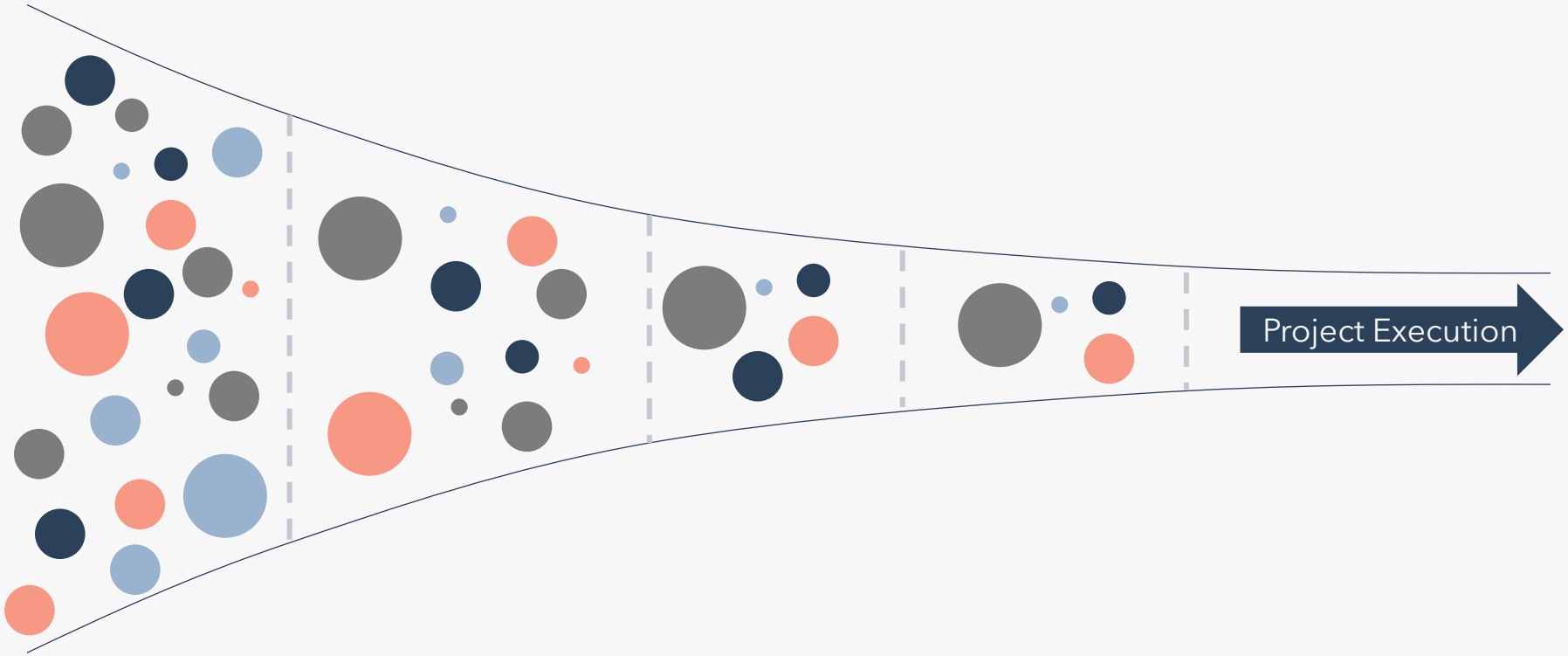


A year in transition – PGE's 2023 capital cycle*



* Funds allocated to start the project

Project Development Funnel



Recapitulation of the Last Meeting

Section Objectives

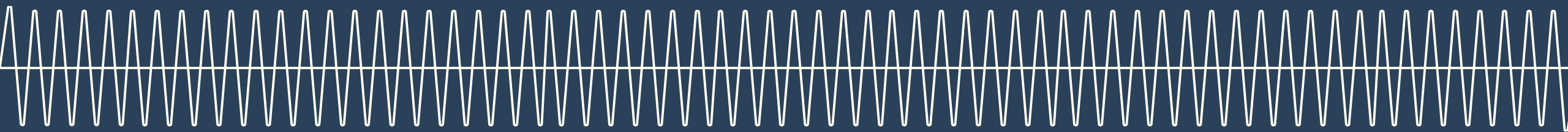
Share and receive feedback on the NWS candidates' information

- Location of grid need
- Customer and equity information
- Magnitude of need
- Time and duration of need
- Contingency
- Potential solution technology options

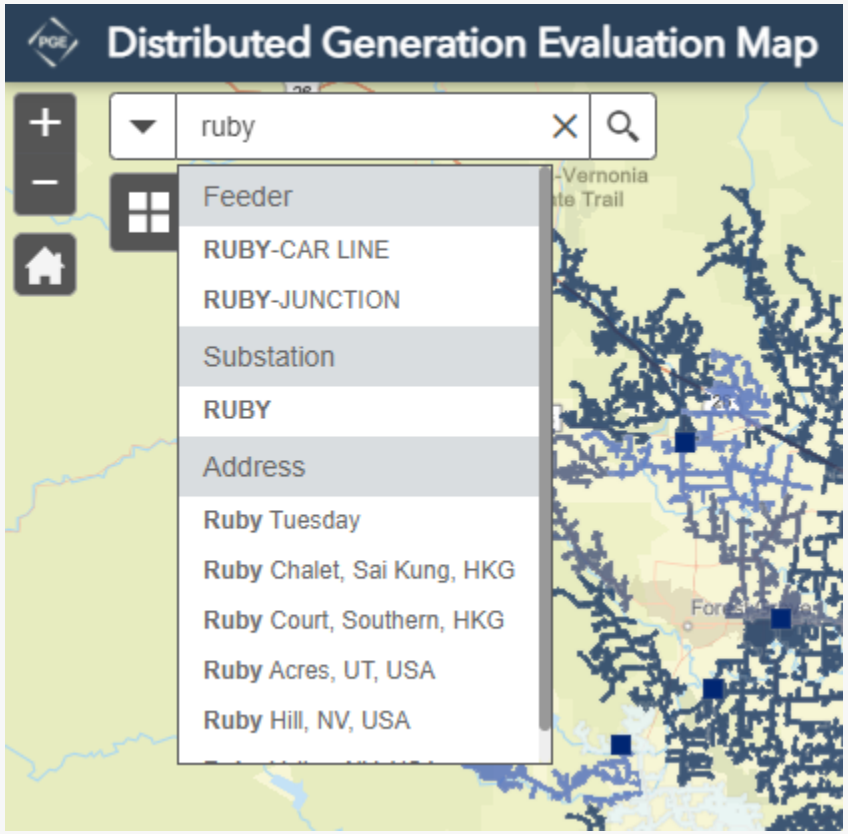
Potential NWS Candidates

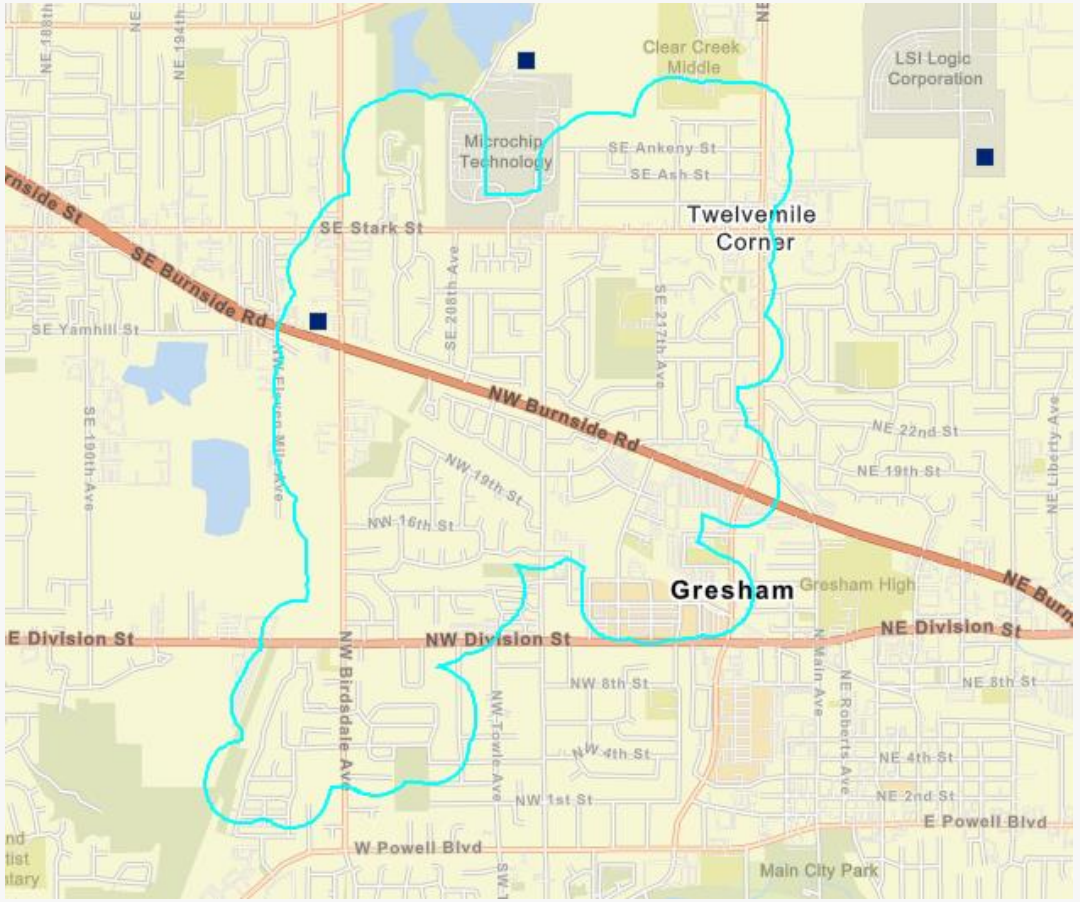
Substation	Substation location	Target area	Expected issue
Ruby Substation	**831 SE 202nd Ave, Portland, 97233**	**Ruby-Junction and Ruby-Carline feeders**	**Heavily loaded feeder**
Dayton Substation	12970 SE Amity Dayton Hwy, Dayton, 97114	Dayton-East feeder and Dayton substation transformer	Heavily loaded feeder and transformer
West Union Substation	21430 NW West Union Rd., Hillsboro, 97124	West Union-West Union 13, Oak Hills-Somerset, and West Union-Cornelius Pass feeders	Heavily loaded feeder and under voltage issues
Eastport Substation	4405 SE 80th Ave, Portland, 97206	Eastport-Plaza and Eastport substation transformer	Heavily loaded feeder and transformer
Clackamas	17104 SE Evelyn St, Clackamas, 97015	Clackamas-Tolbert feeder	Heavily loaded feeder

Ruby Substation Walkthrough – Data Transparency

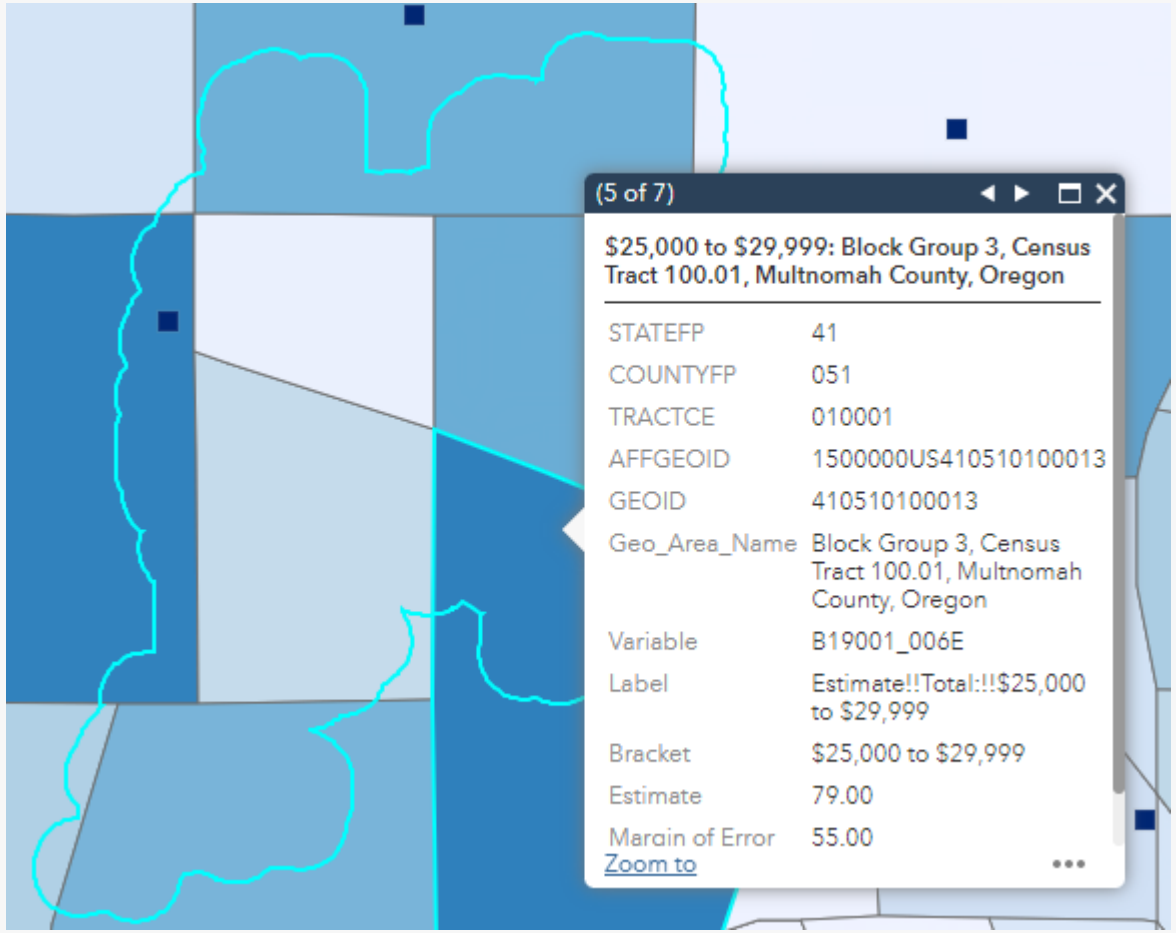


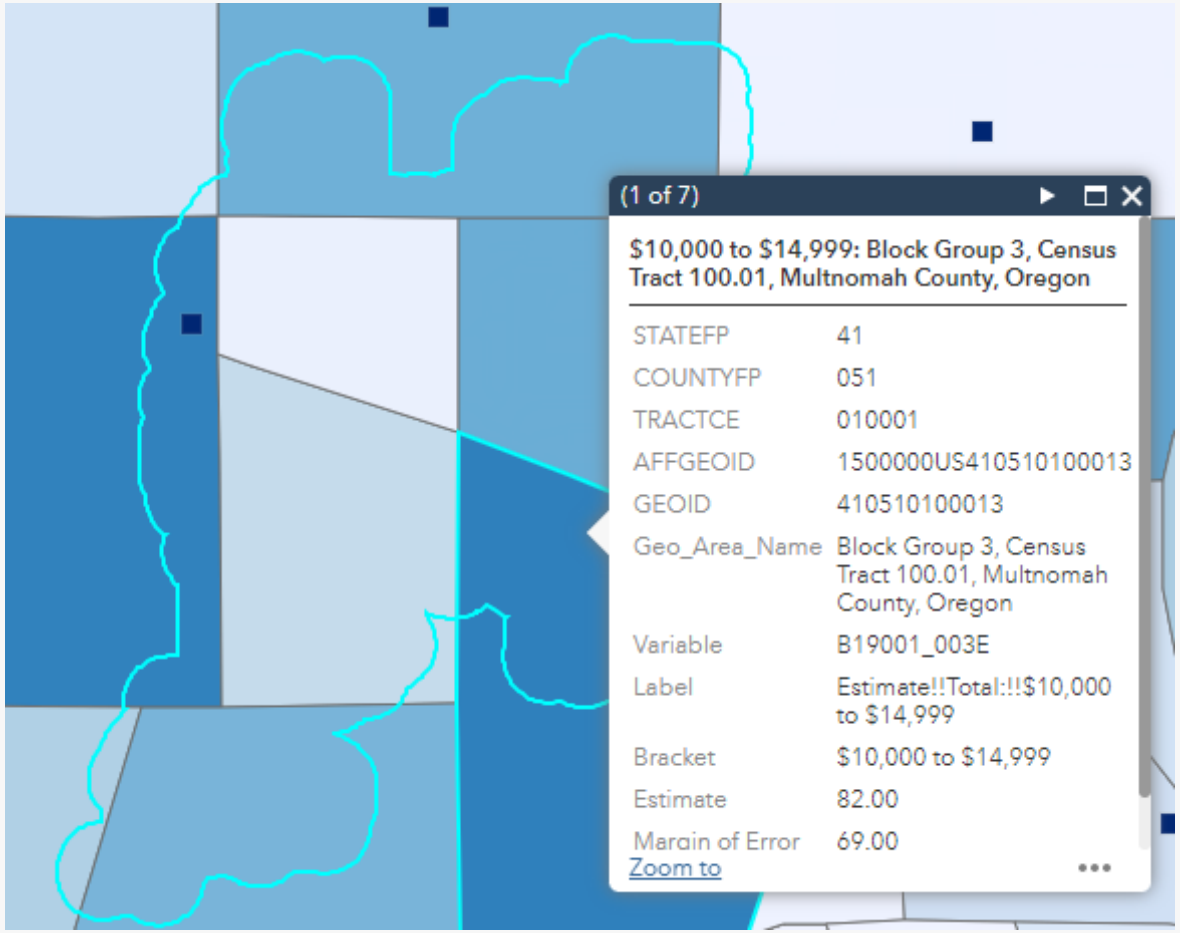
Finding Ruby Substation in the DG map



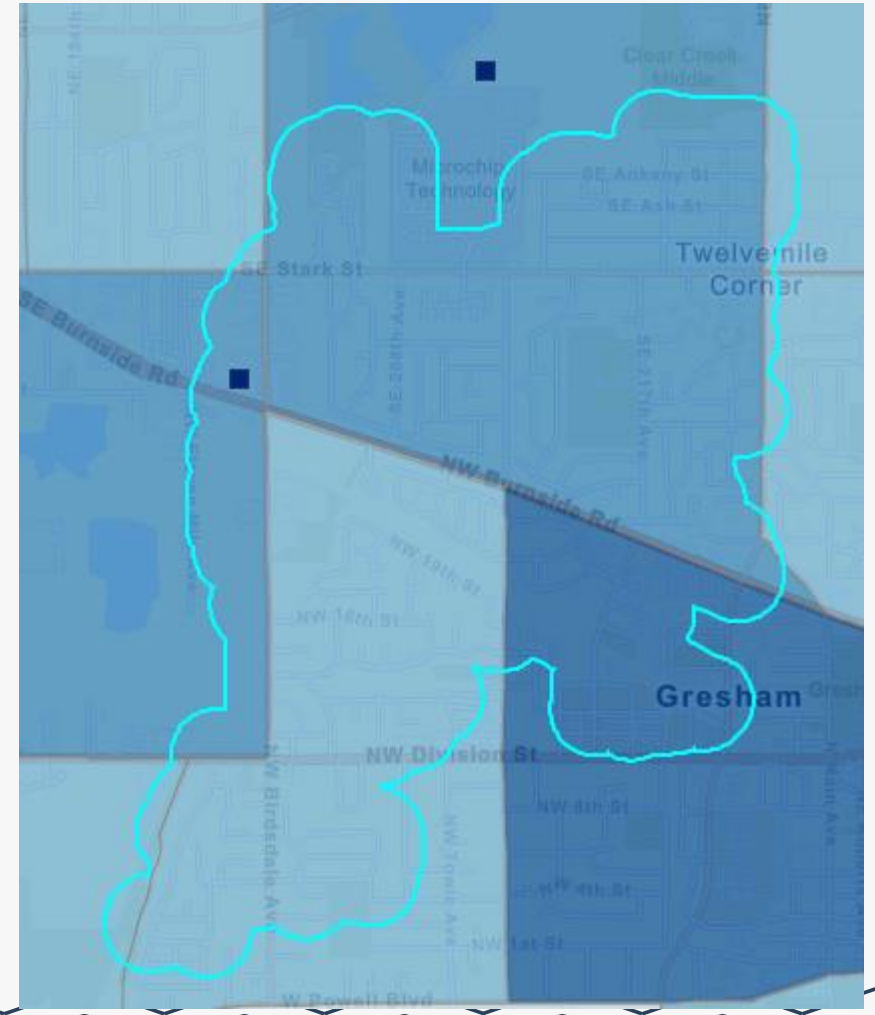


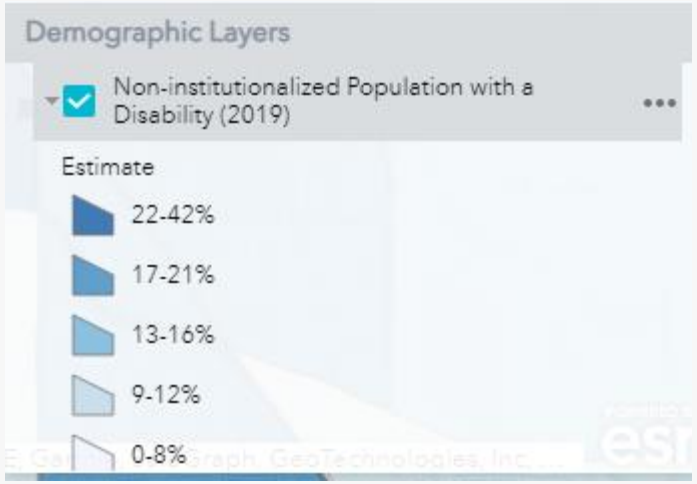
Reviewing Equity Indicators – Income



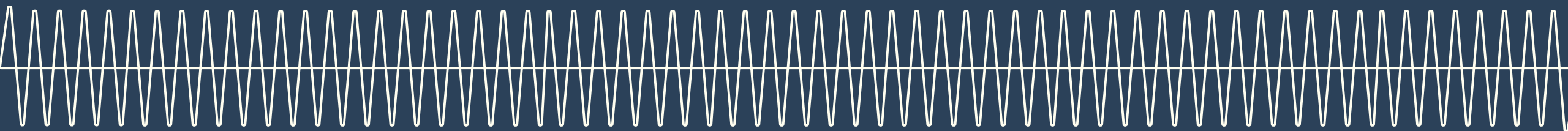


Reviewing Equity Indicators –Disabilities

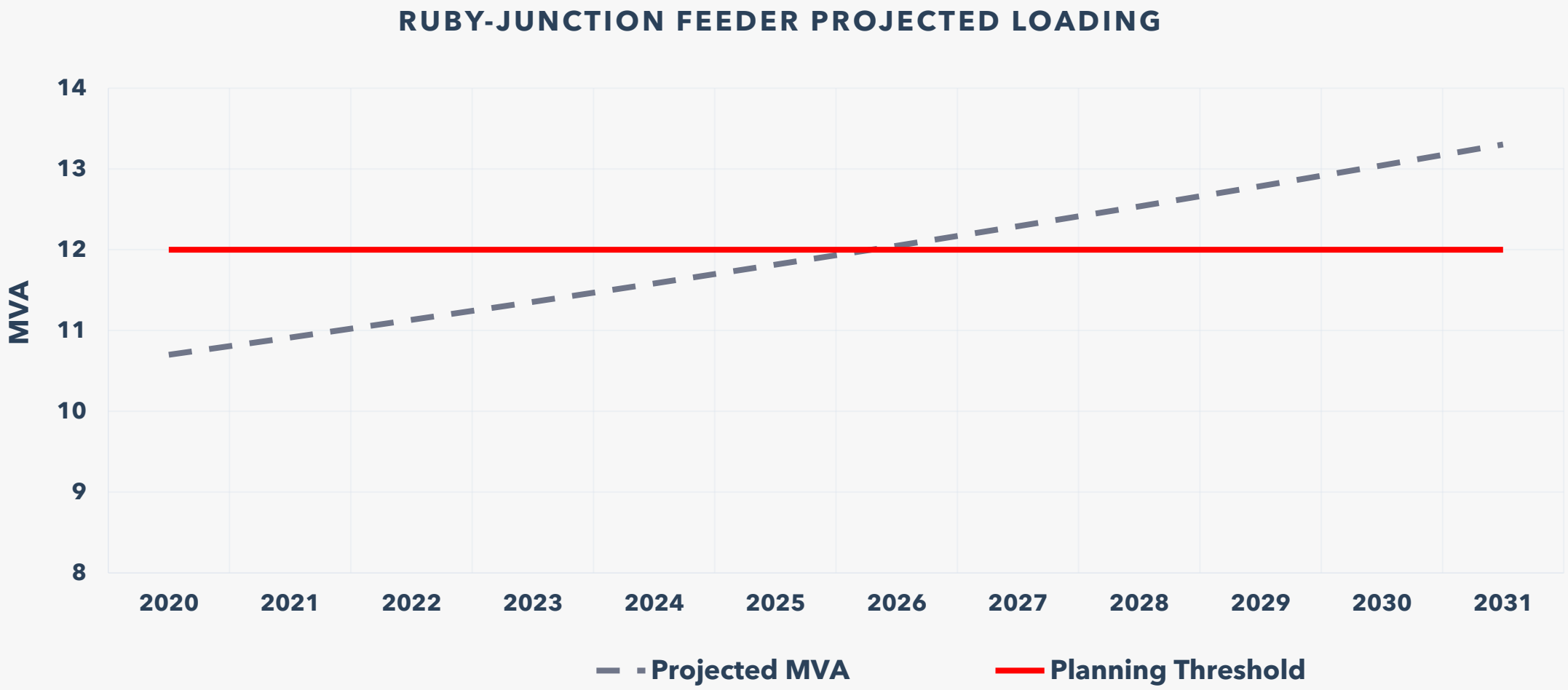




Ruby Substation Walkthrough – Understanding the Problem



Load Growth vs Planning Threshold

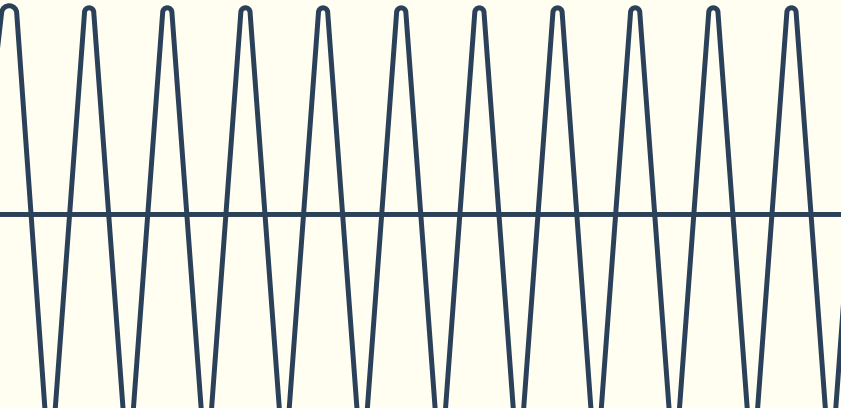


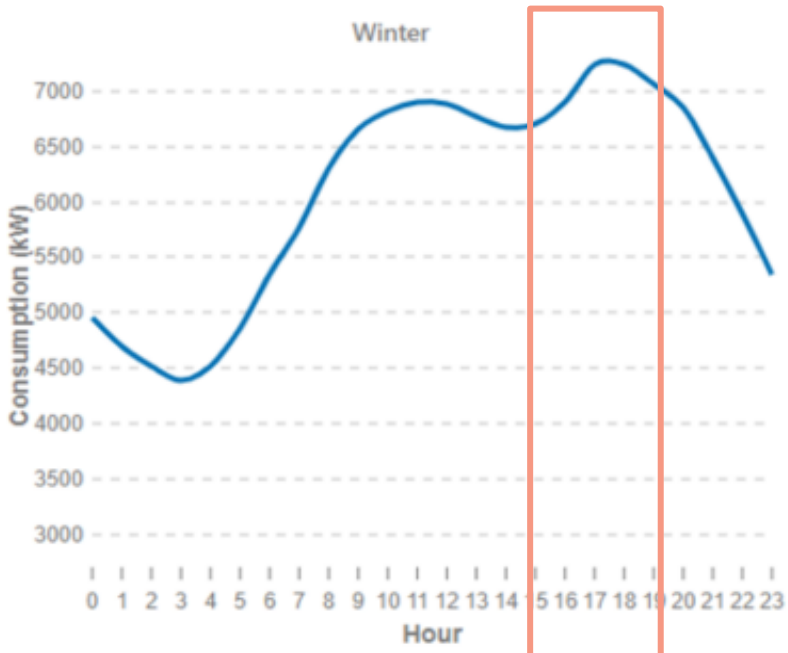
Grid Needs

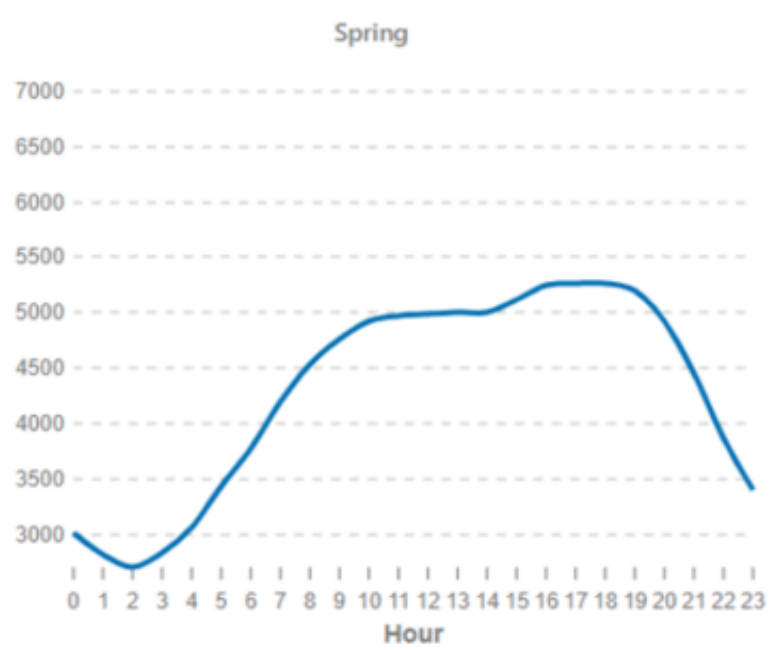
Parameter	Value under normal condition (N-0 condition)	Value under contingency condition (N-1 condition)*
Violation type	No violation but above planning threshold	Overload (thermal issues)
Violation magnitude	No violation but ~250 kW above planning threshold	~3.5 MW
Applicable areas for load relief	Across the entire Ruby-Junction feeder	Across the Ruby-Junction and Ruby-Carline feeders
Violation time and duration	3-7PM, June, Weekday	Summer weekdays

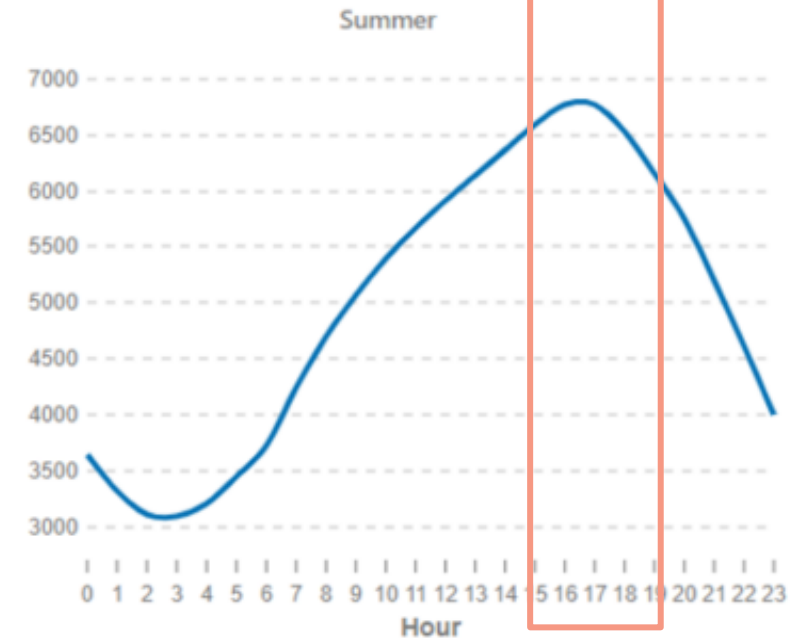
* Contingency condition is when the load of one feeder is transferred to another feeder on the same or different substation usually for emergency or planned maintenance purposes.

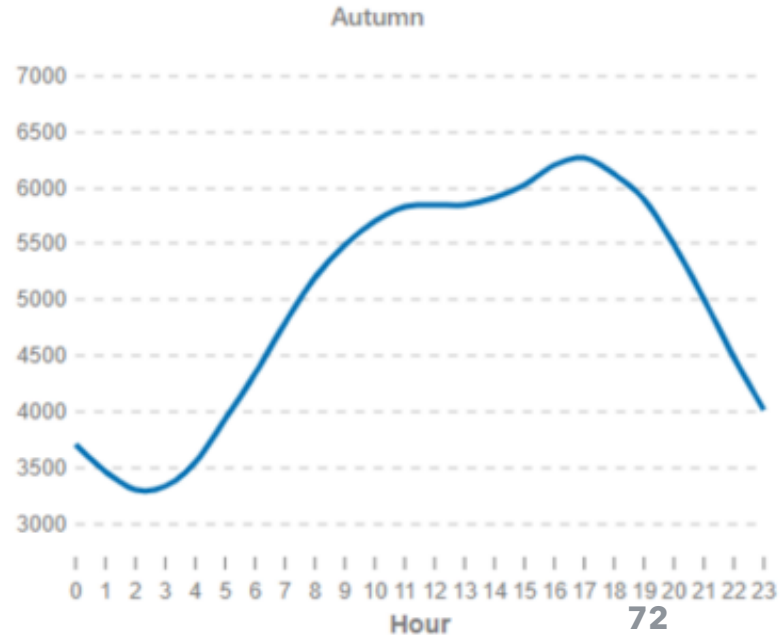
Ruby Substation – average seasonal load profiles



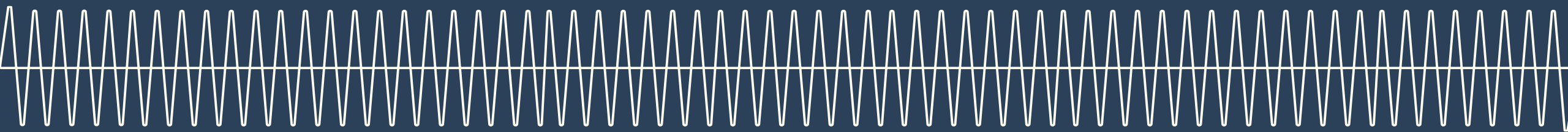






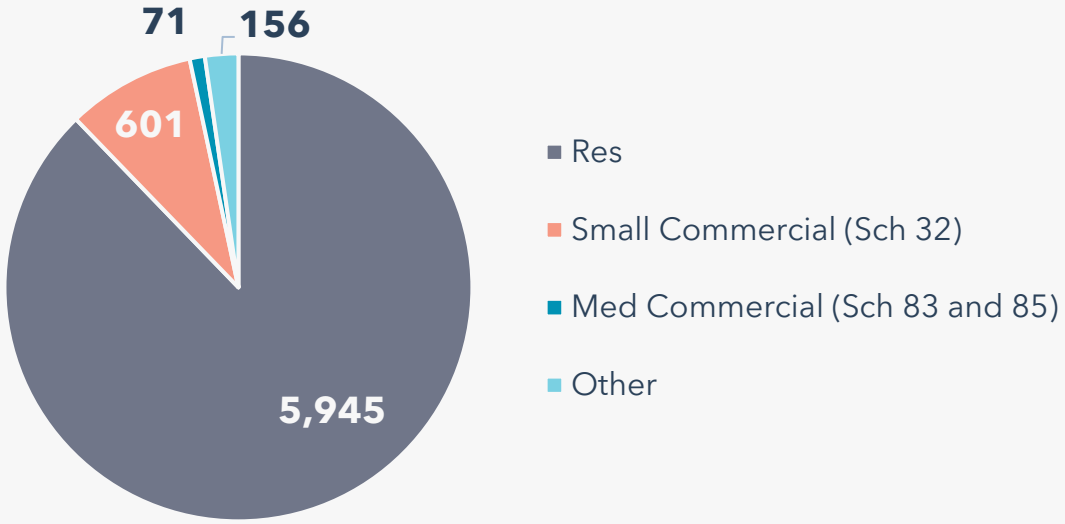


Ruby Substation Walkthrough – Customer Statistics

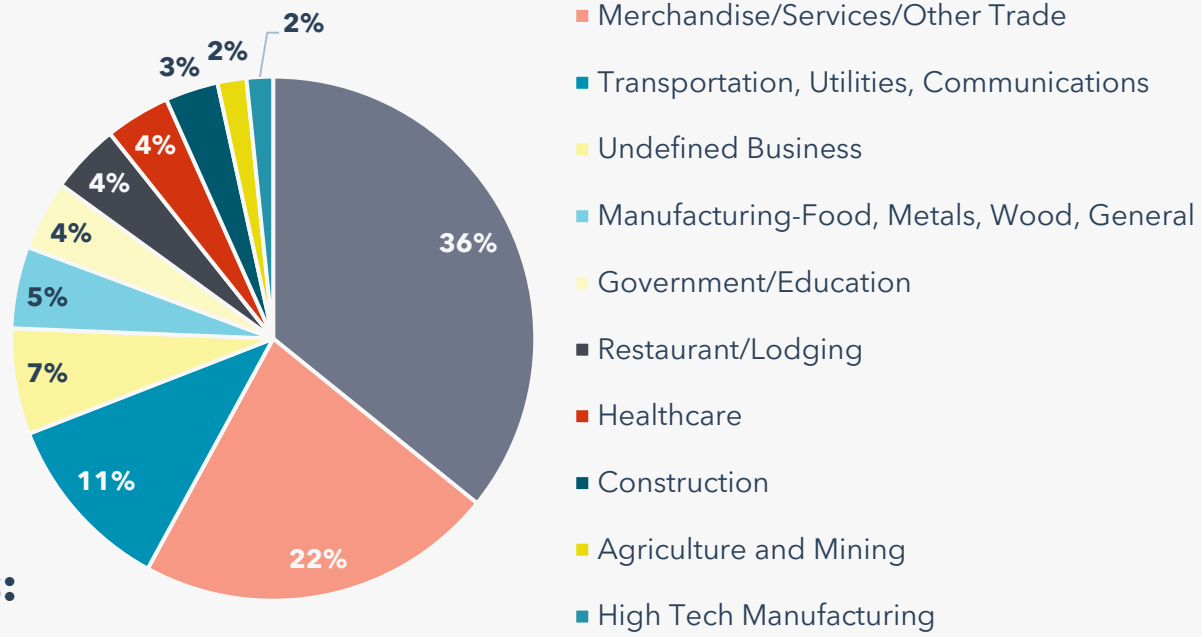


Customer Segment Breakdown

Summary of Customer Types on Ruby Substation
(Count of Distinct Premises)



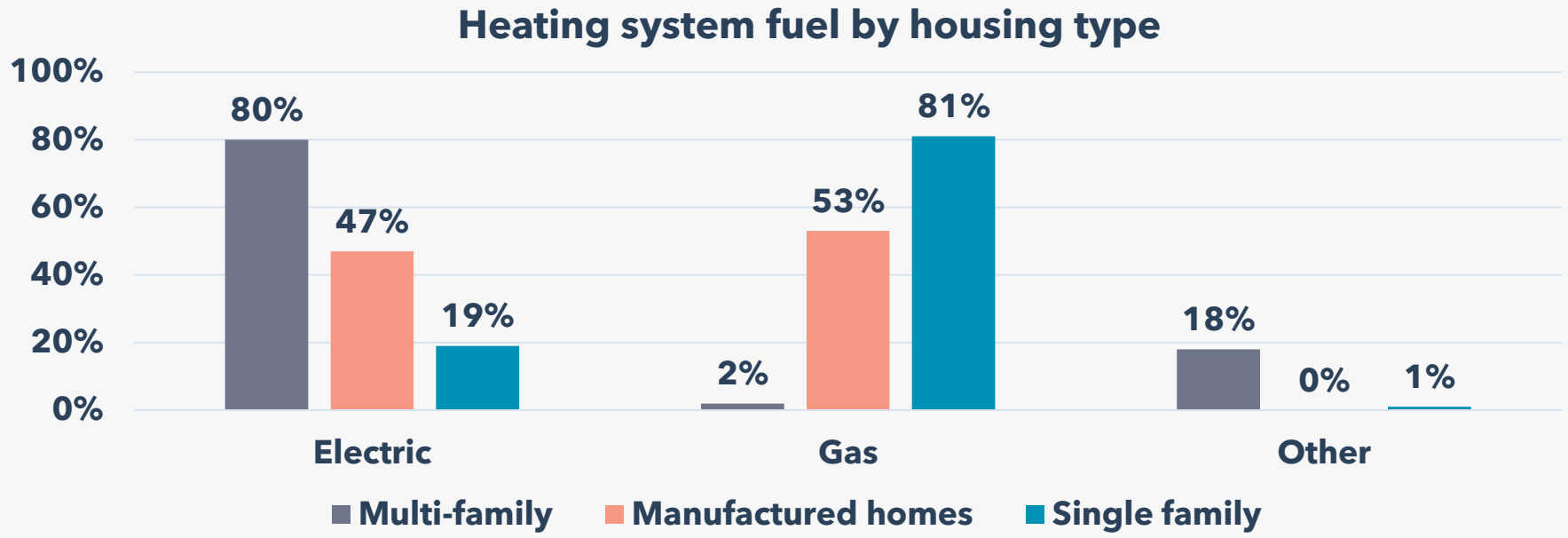
Commercial Customer Types - SIC Description



Summarized rate schedule by generic customer class:

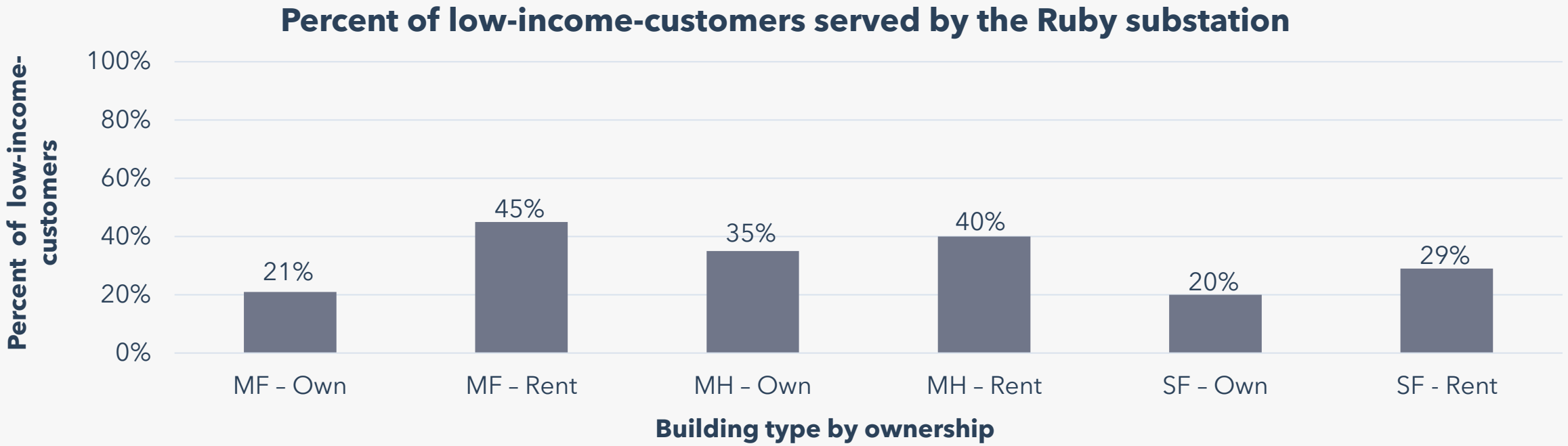
Customer class	Number of customers
Residential	5,945
Small Commercial (Sch 32)	601
Med Commercial (Sch 83 and 85)	71
Other	156

Customer Heating System Fuel Breakdown



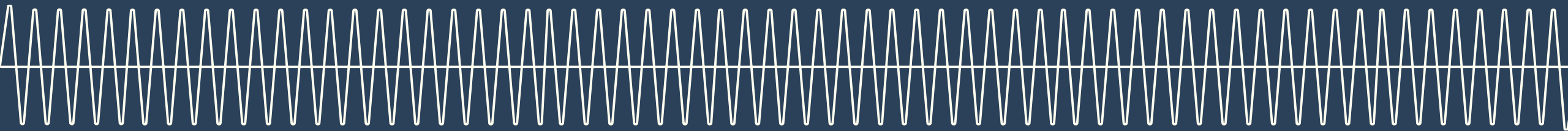
Building Type	Electric	Gas	Other	Grand Total
Multi-family	80%	2%	18%	100%
Manufactured homes	47%	53%	0%	100%
Single family	19%	81%	1%	100%
Grand Total	**55%**	**35%**	**11%**	**100%**

Equity Metrics of Customers Served by Ruby

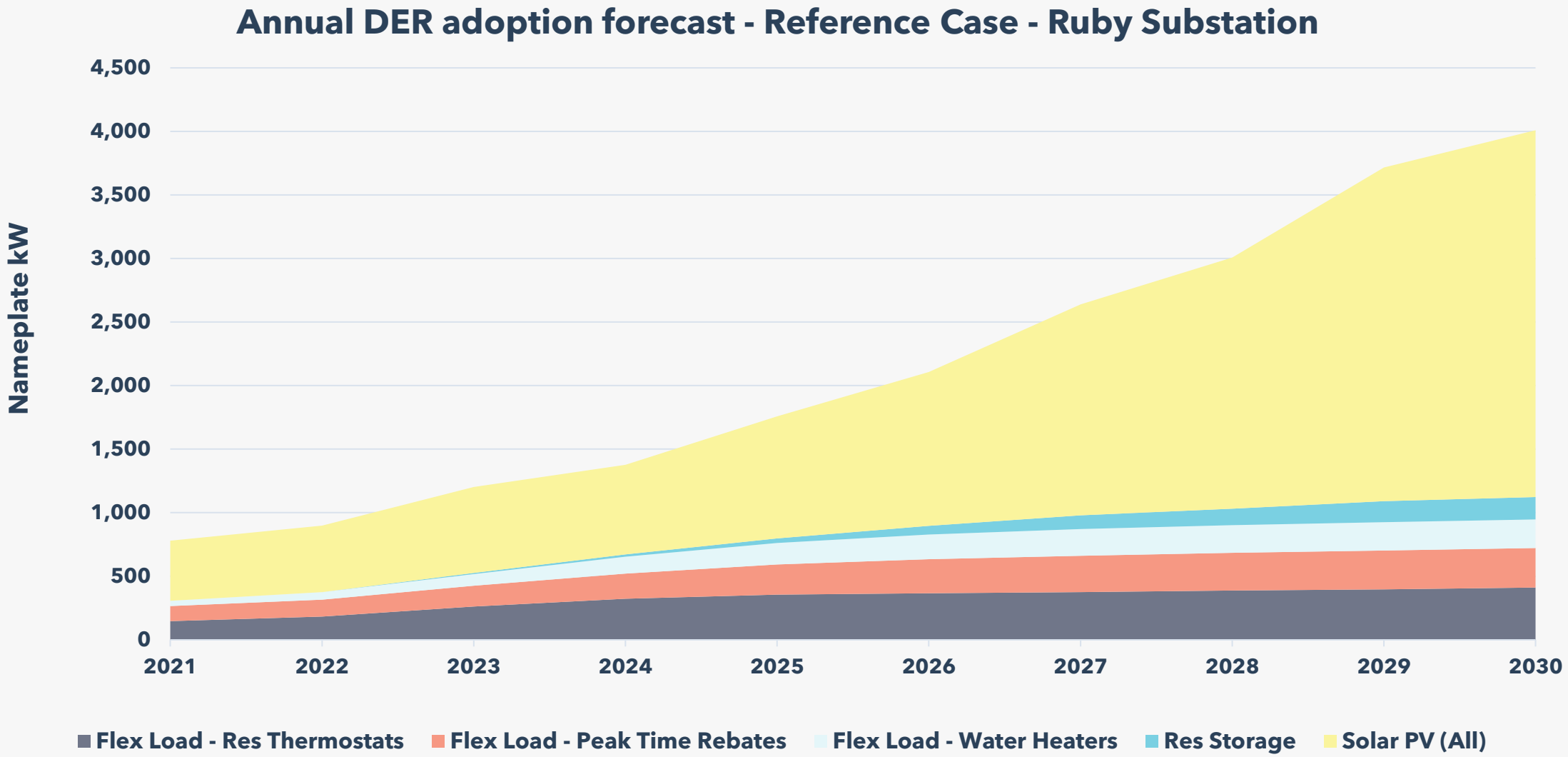


Building Type	Count of PremId	Count of Low-income	Energy Assistance Payments - Last 12 Mo.	% low-income customers
Multi-family (MF)	3,391	1,436	$413,360	42%
Manufactured homes (MH)	222	83	$7,233	37%
Single family (SF)	2,330	548	$65,450	24%
Grand Total	**5,945**	**2,069**	**$486,044**	**35%**

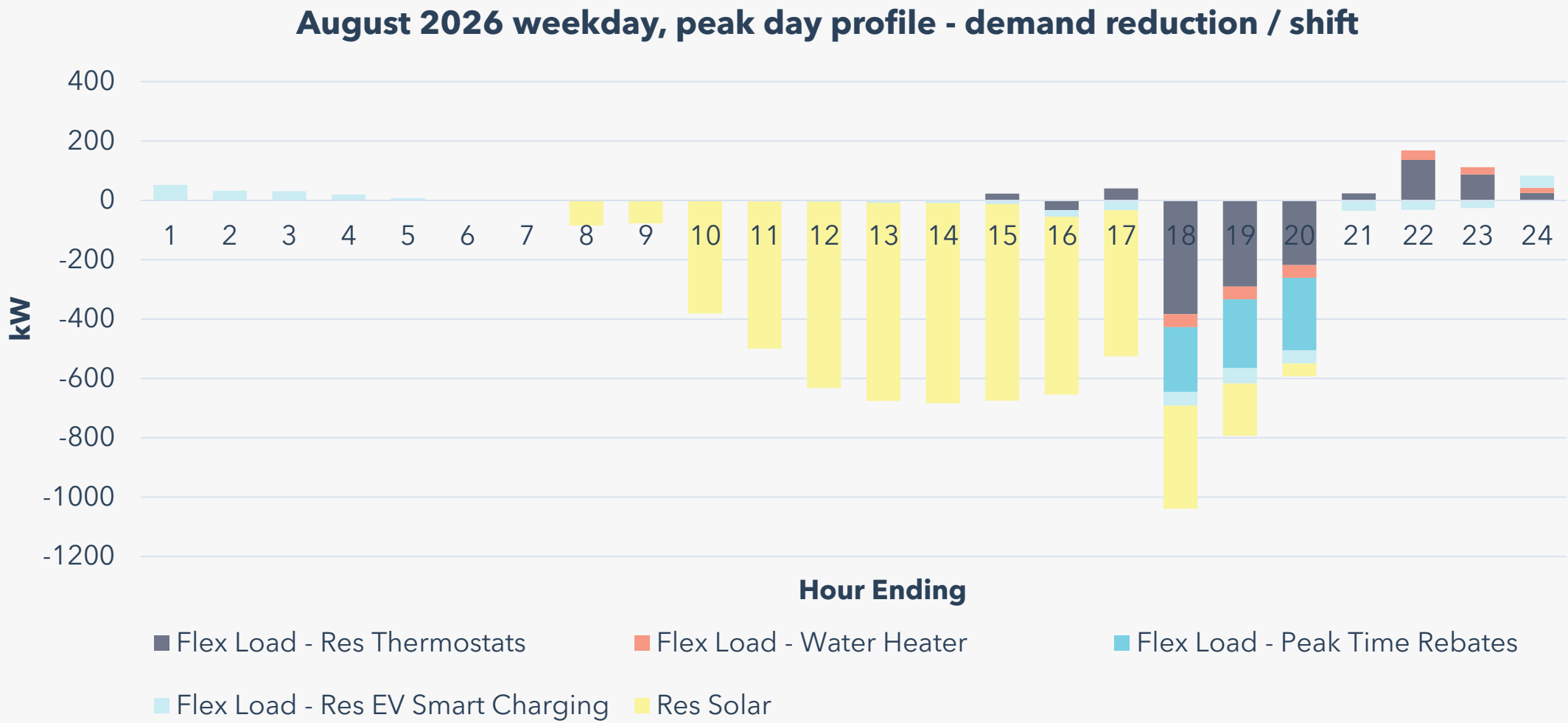
Ruby Substation Walkthrough – DER Forecast



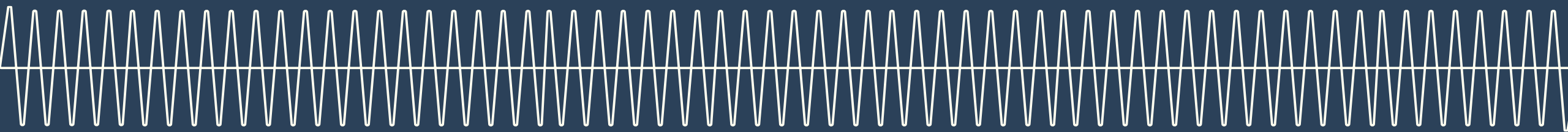
DER Forecast without an NWS



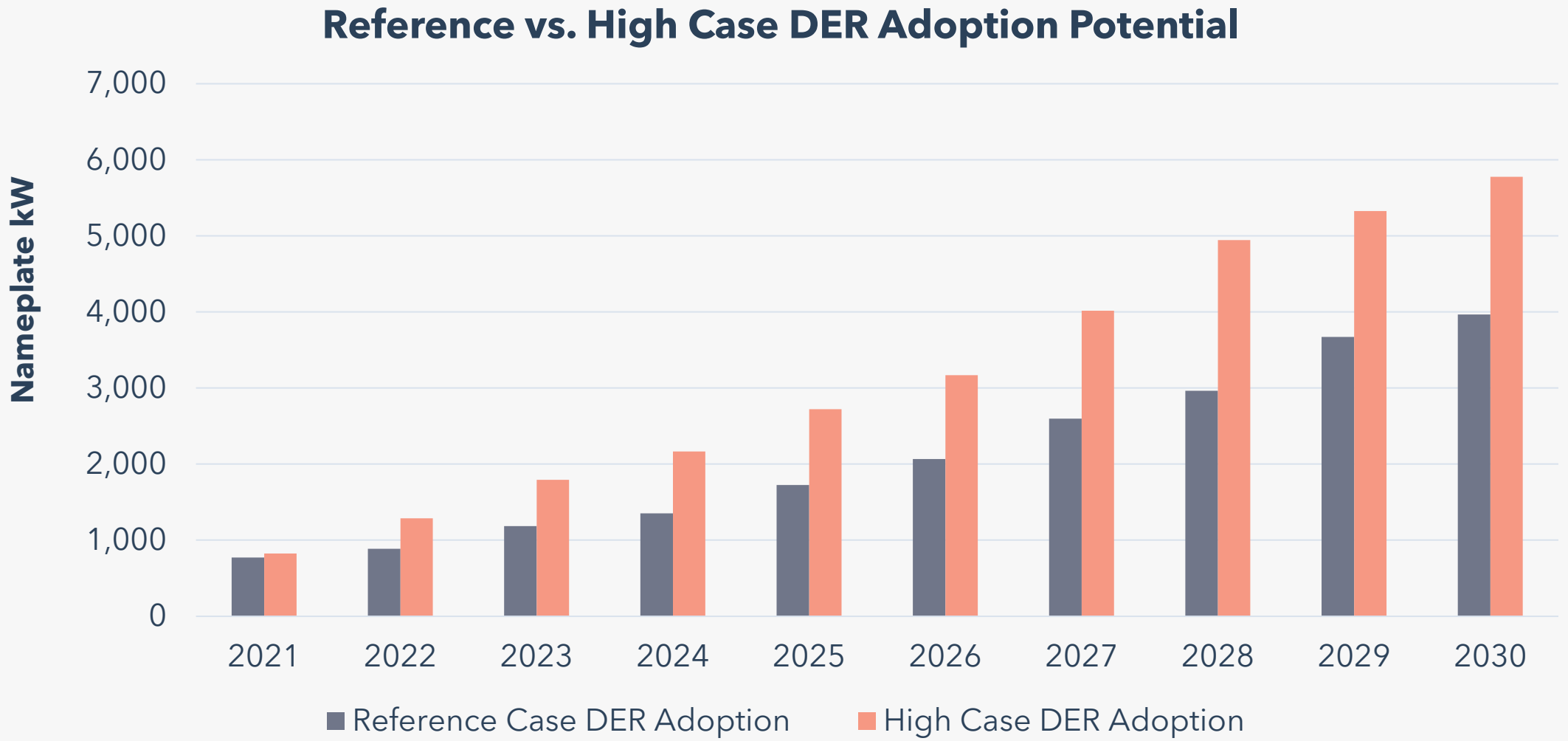
Hourly DER Forecast Without an NWS



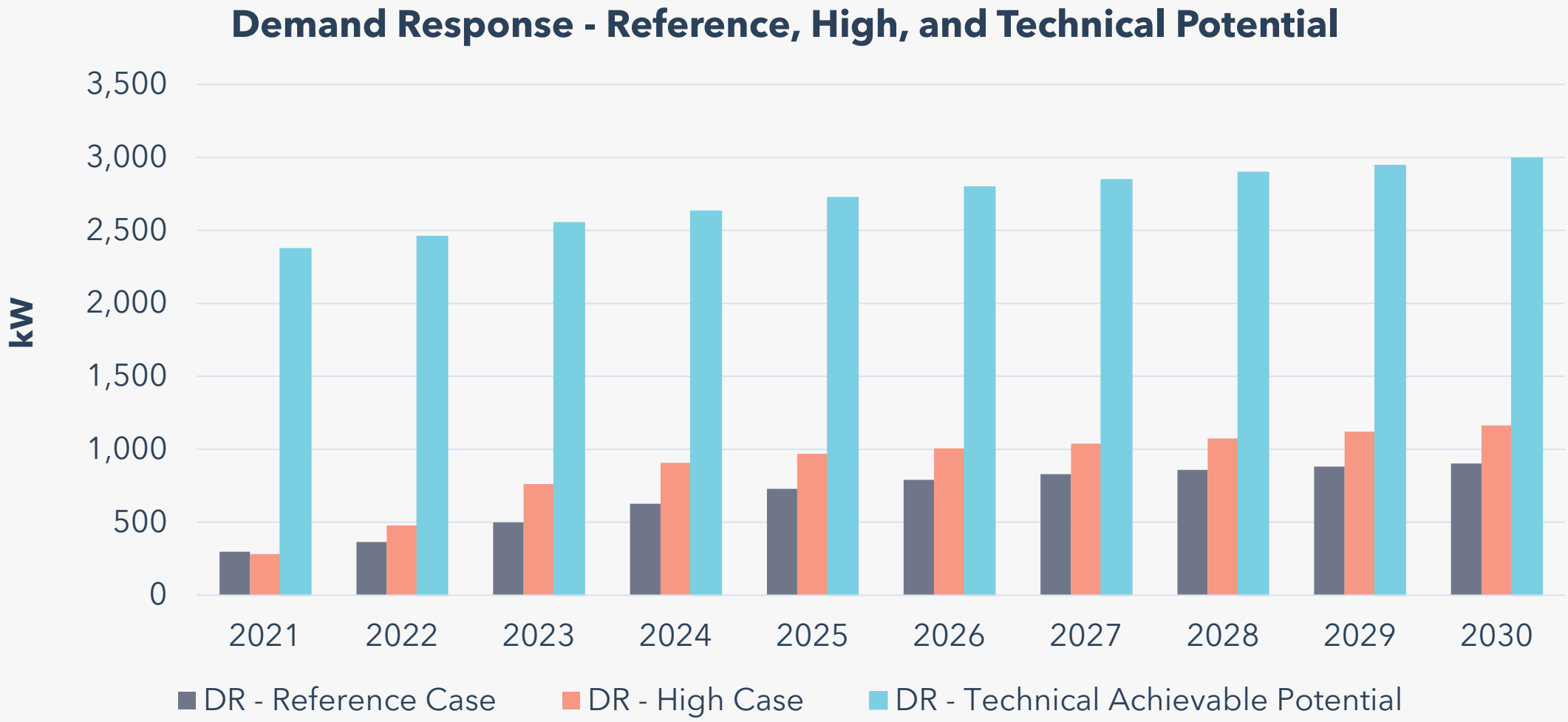
Ruby Substation Walkthrough – DER Potential Available



DER Forecast – Reference and High Case



DER Forecast – Flex Load Technical Potential



Feedback Requested

Please review and provide feedback to **DSP@pgn.com**, attention to **Nihit Shah**

What additional information do you need to better understand the problem?

- Please reach out if you have potential solution opportunities such as partnerships with HOAs, Federal Govt. work, existing initiatives etc. in each of the NWS candidate areas
- PGE will share similar slides on all other Candidates in the next few days. Please provide feedback if another medium is preferred.
- Please provide feedback on potential solution opportunities **by May 1st** to ensure they are considered during solutioning

Please review and provide feedback to **DSP@pgn.com**, attention to **Nihit Shah**

Takeaways and Next Steps

Next Steps

DRAFT Agenda for 2022

April 27

- DSP Updates
  - Water Heater
  - Community Solar
  - Community Engagement
  - CEP & MYP
- DER Forecasting & Adoption
- NWS

June 1

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

July 13

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

Let's meet the future together.

You can reach us at:

DSP@PGN.com

Appendix

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

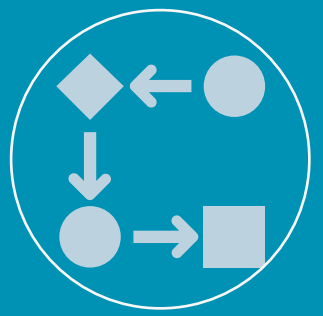
- Resilience/Outage

- 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

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

Identifying Grid Needs for NWS Pilots

Step 1: What is the problem?

Prioritized grid needs for capital cycle

Potential future grid needs/ lower priority grid needs

NWS pilot candidates for the DSP