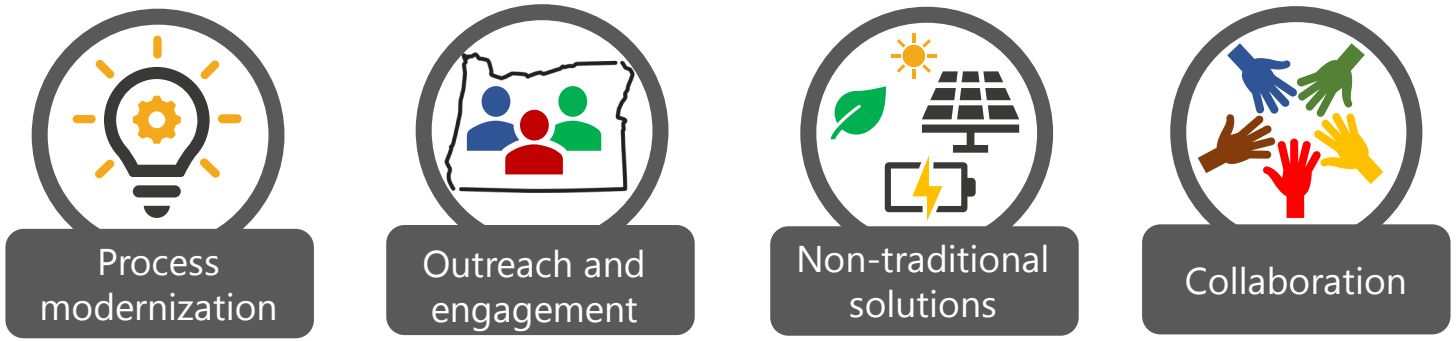
Upper Rogue
Distribution System Planning
Community Workshop #2
August 8th, 2023

Presenters:

Ian Hoogendam – Manager of DSP, Daniel Talbot – Engineer, Jonathan Connelly – Director of Asset Management



DISTRIBUTION SYSTEM PLANNING

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Workshop #2 Information

Microsoft Teams meeting info:

Join on your computer, mobile app or room device
Click here to join the meeting
Meeting ID: 282 252 790 390
Passcode: NxWdin
call in (audio only)
+1 563-275-5003,,454187910# United States, Davenport
Phone Conference ID: 454 187 910#

- Please **place your phone on "Mute"** when not speaking
- If you call in using your phone in addition to joining via the online link, please make sure to **mute your computer audio**
- Please **do not use the "Hold"** function on your phone

Participation:
This workshop is available to the public, and there is a Questions/Comment section at the end of the workshop for online participants.

Please input your name and organization into the chat when you enter, and please "raise your hand" during the Open Discussion section to ask questions or provide input.

This workshop will be recorded and published to the PacifiCorp DSP website.

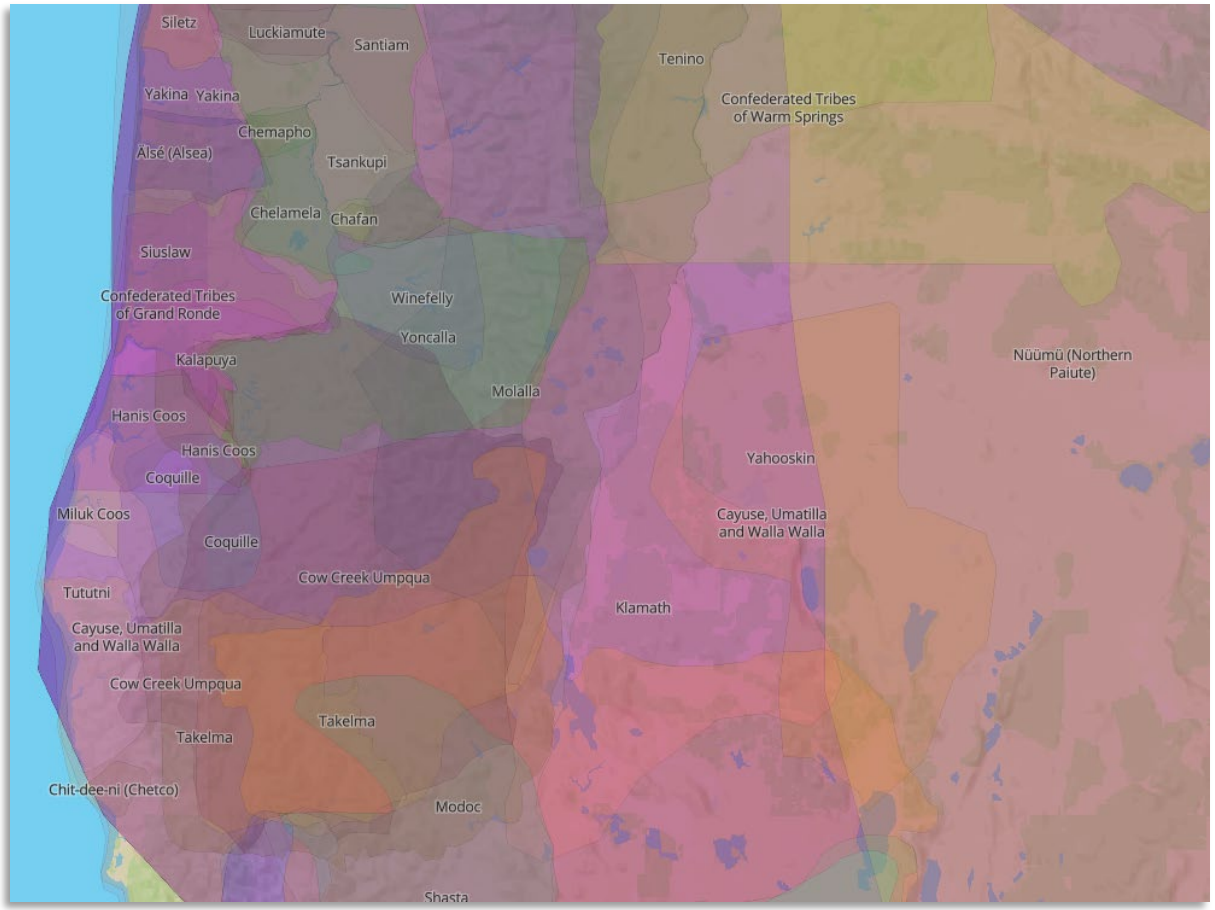
Land Acknowledgement

We are meeting online from various locations within the United States.

To learn about the original stewards of the land where you are now, this is a wonderful resource:

Native Land Digital

https://native-land.ca



By acknowledging Indigenous peoples and tribes, their traditional homeland ties are renewed and reaffirmed.

SOURCE: Native-Land.ca | Our home on native land

Today's Agenda

- 5 — Introductions
- 10 — Recap of Last Workshop
- 20 — Grid Needs and Solutions Overview
- 10 — Break
- 20 — Upper Rogue Grid Needs and Potential Solutions
- 10 — Wildfire Mitigation Update
- 10 — Open Discussion

Introductions – Pacific Power Team Members

Distribution System Planning

- Jonathan Connelly – Director of T&D Asset Management
- Ian Hoogendam – DSP Manager
- Shauna Thomas – DSP Program Specialist
- Daniel Talbot – DSP Engineer
- Daniel Morgan – DSP Engineer
- John Rush – Project Manager

Local Medford Team

- Tom Dunlap – Field Engineer
- Cooper Whitman– Regional Business Manager

Introductions – Upper Rogue Participants

- United Way of Jackson County
- Jackson County Commissioners
- Energy Trust of Oregon
- Rogue Valley Transit
- Shady Cove City
- Eagle Point City
- Jackson County Long-Term Recovery Group
- ACCESS
- Rogue Climate
- Medford Water

Workshop Objectives

Success is a transparent, robust, and holistic distribution system planning framework.

Education

- Explaining traditional solution approaches and nontraditional solution programs
- Development and comparison of solutions

Engagement

- Gathering input about the solutions being considered
- Understanding the needs, values, and concerns of the community

Transparency

- Involving the community throughout the process
- Sharing of processes, analysis results, decisions, and learnings

What do you hope to get out of today's discussion?

Recap of Last Workshop

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What is Distribution System Planning (DSP)?

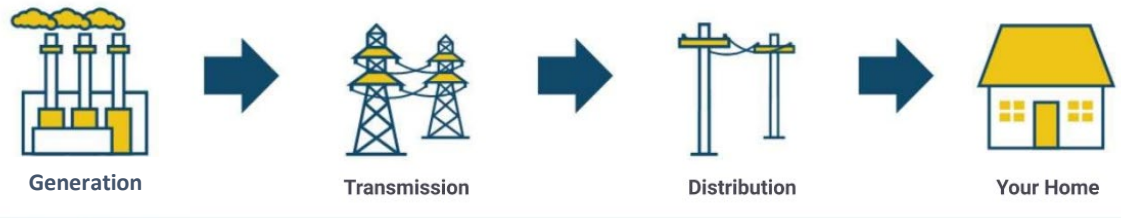
What is Oregon DSP?

- Advancements to traditional DSP based on guidelines proposed by Oregon PUC staff
- Increased transparency of DSP processes to meet the needs and leverage the capabilities of the modern grid

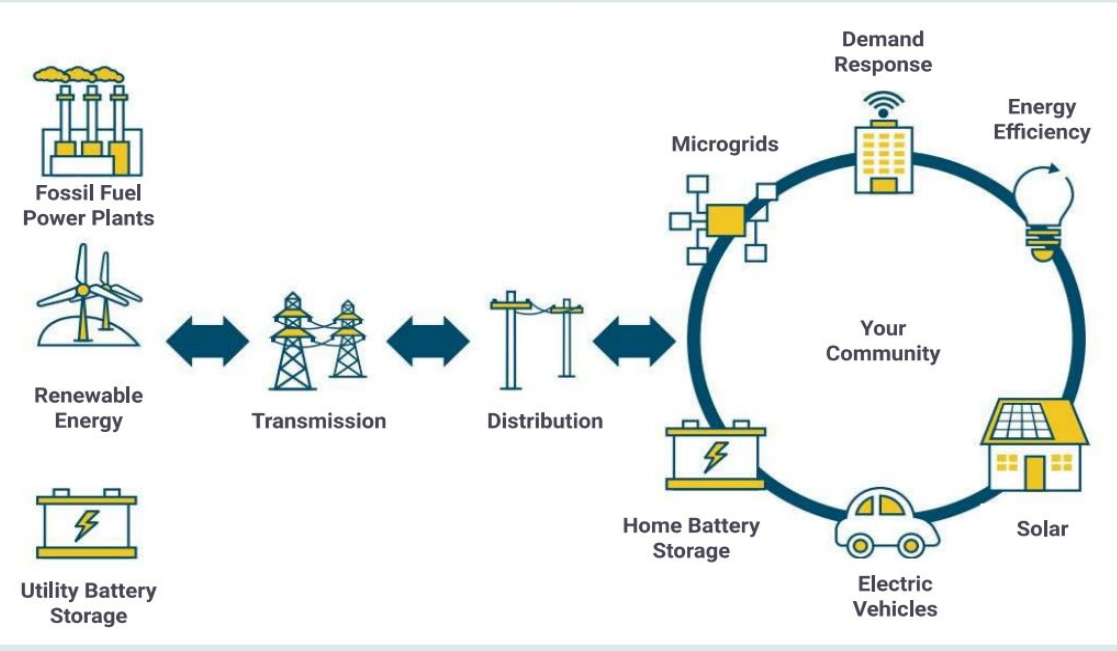
Key Changes to Traditional DSP

- Evaluation of nontraditional solutions to address grid needs
- Increased community engagement
- Enhanced forecasting:
  - 24-hour load profiles
  - Inclusion of incremental electric vehicle (EV) and solar adoption rates

Past Grid



Modern Grid



Electric Grid Overview

Generation

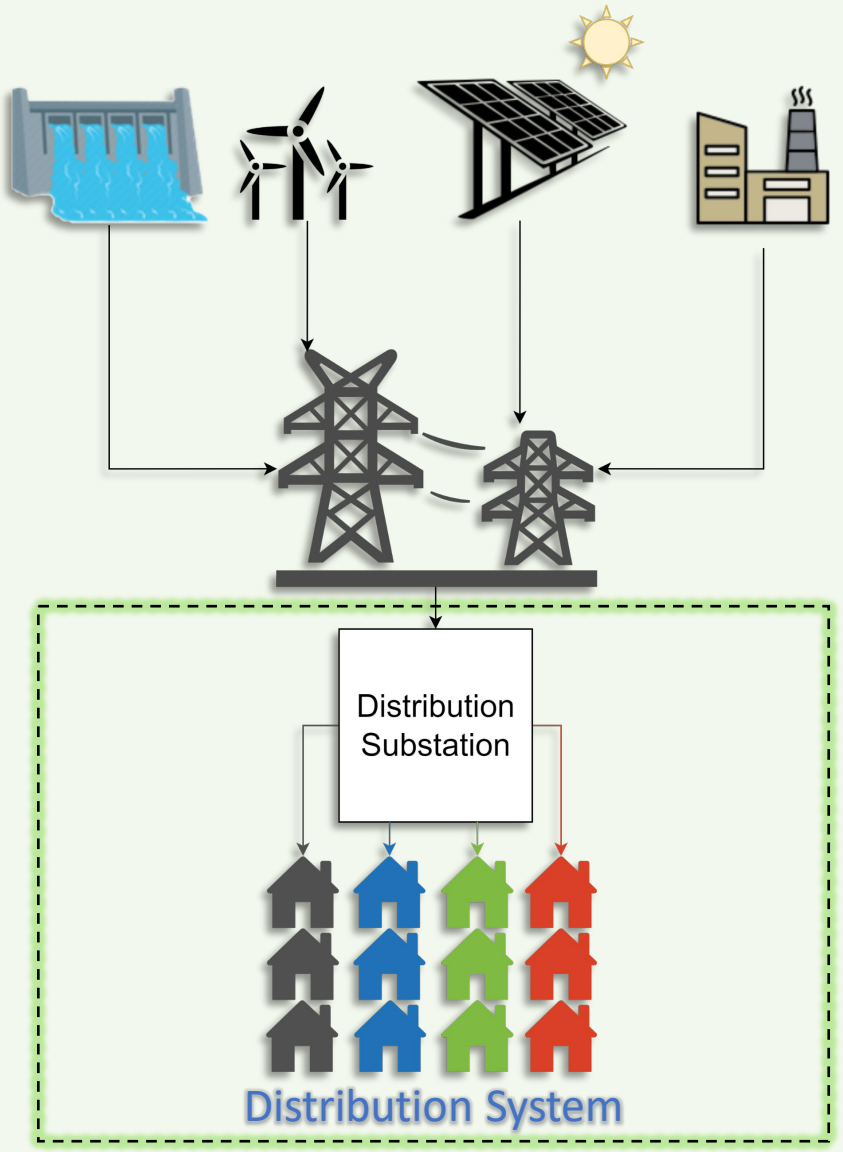
- Generates power from various resources

Transmission System

- Transmits power from generation plants to distribution substations

Distribution System

- Starts at distribution substation and ends at customer meter
- Distributes power to consumers via poles and wires (overhead and underground)



Upper Rogue Study Area Overview

Distribution System

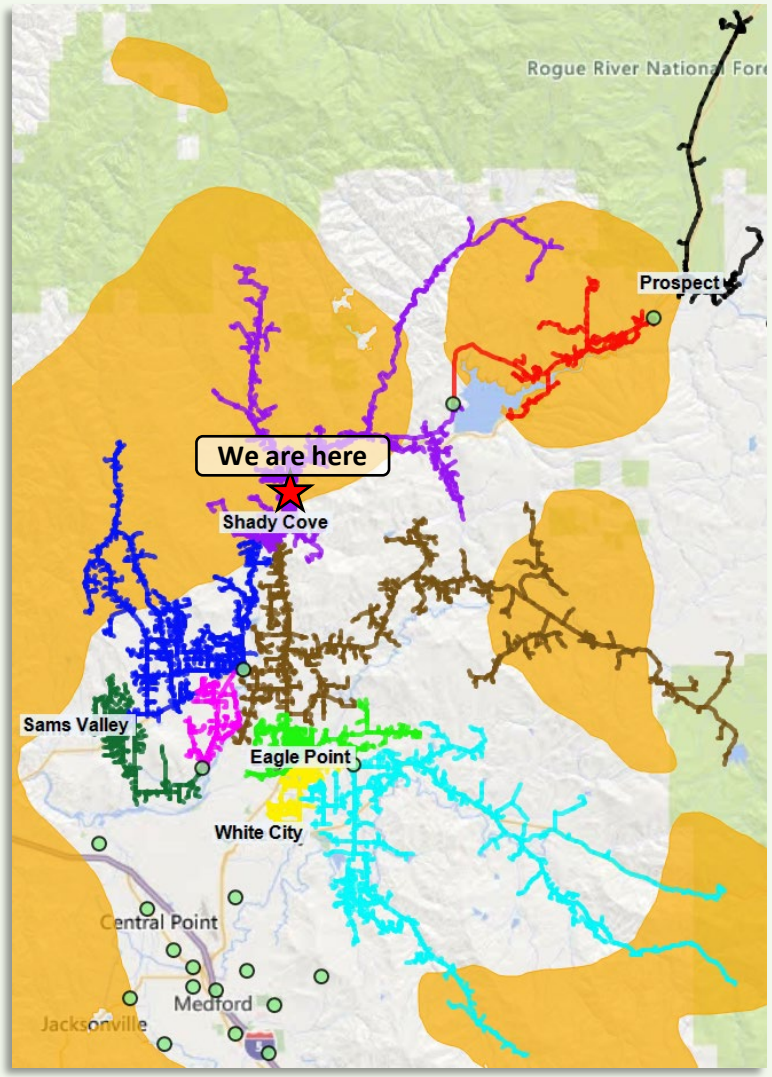
- Distribution substations: 6
- Distribution circuits: 10
- Line miles (sum of pole-to-pole distance): 868

Customers Served

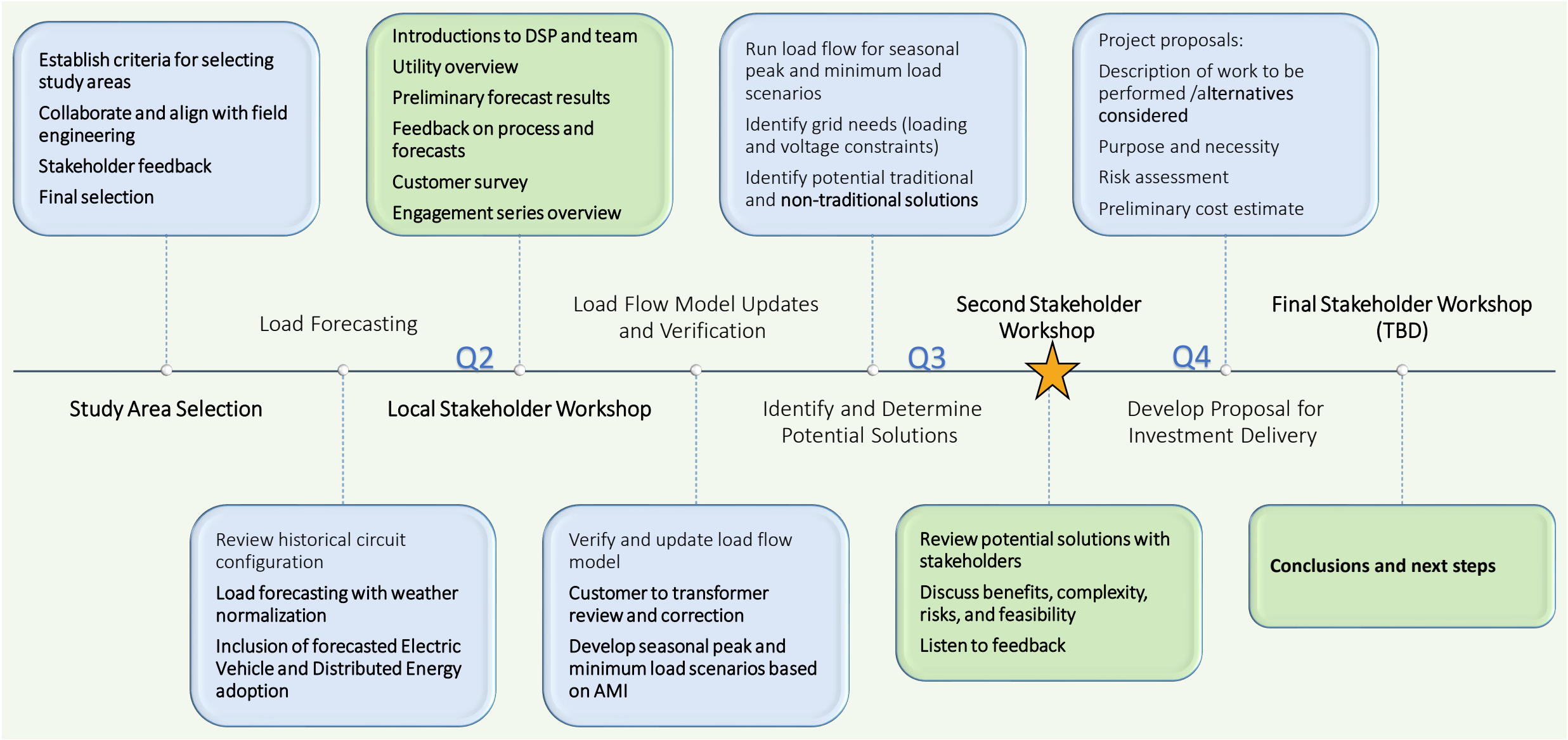
- Total: 13,285
- Residential: 11,856
- Commercial: 1,235
- Irrigation: 171
- Industrial: 11
- Other: 11

Other Characteristics

- 3 of the longest Pacific Power circuits in Oregon
- 6 circuits in Fire High Consequence Areas (FHCA)



2023 DSP Study Process and Local Engagement Plan



Grid Needs and Solutions Overview

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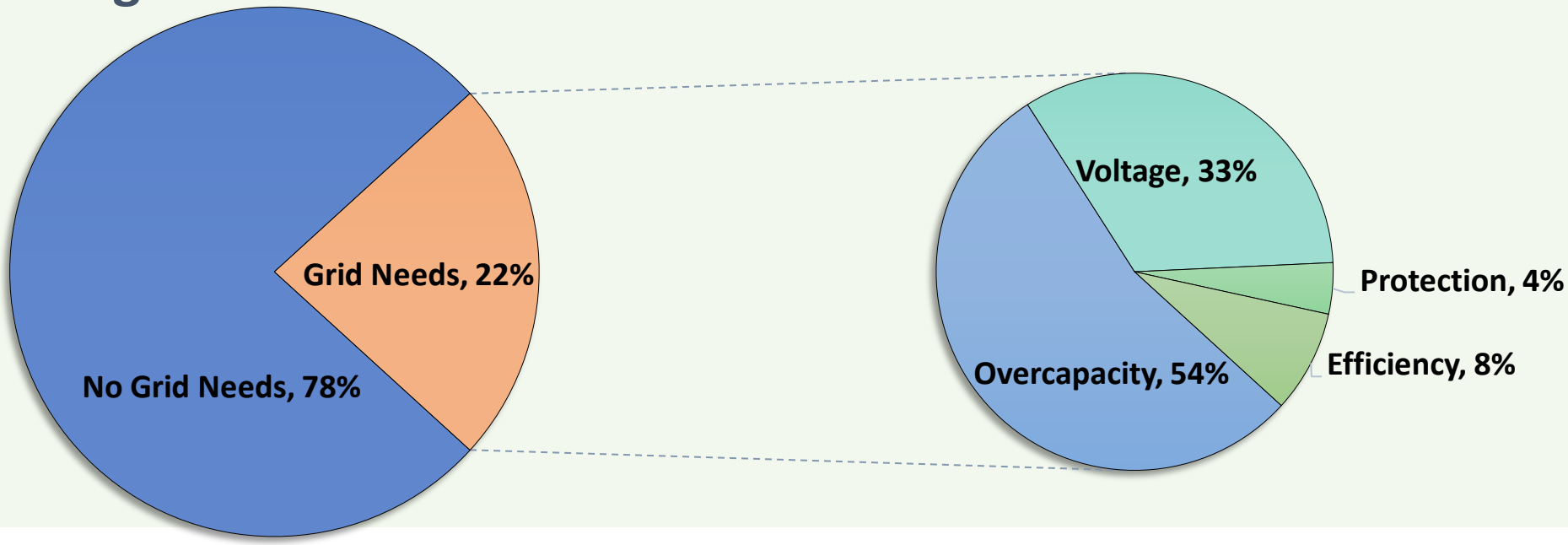
Types of Grid Needs

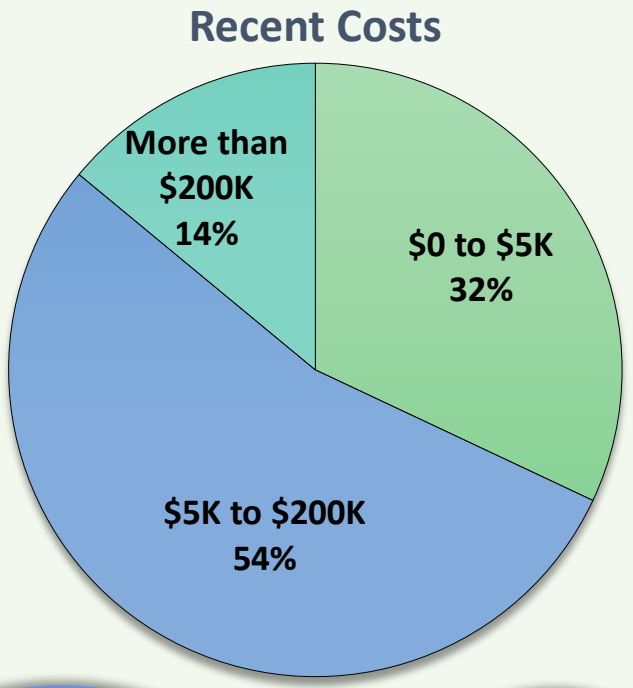
Overcapacity	Demand exceeds capacity of distribution system equipment
Voltage	Voltages levels that result in unsatisfactory performance of customer equipment
Protection	Expected loading conditions compromise the grid's ability to operate safely and reliably
Efficiency	Inefficiencies that result in avoidable power costs to the utility and can lead to other grid needs

Oregon Distribution Circuit Grid Needs from Recent Studies



Traditional Solutions: *Poles, Wires, Equipment*

Equipment Upgrades	➢Increase capacity of system equipment
New Equipment	➢New equipment to address voltage/protection needs or facilitate load transfers
New Substations and Circuits	➢Sometimes required in conjunction with other traditional solutions
Load Transfers	➢Transfer load to circuits with spare capacity
Phase Balancing	➢Balancing load among circuit wires
Settings Changes	➢Update equipment settings to ensure safe and reliable service for expected loading conditions



Nontraditional Solutions: *Energy Programs*

Solar

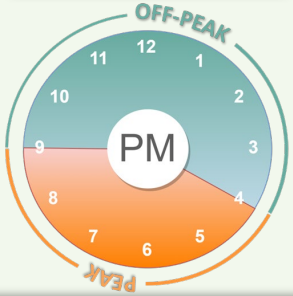
- Accelerate solar adoption in area through marketing and incentives

Energy Efficiency

- Accelerate energy efficiency in area through marketing and incentives

Demand Response

- Lower peak demand by managing behind the meter devices:
  - Batteries, Smart Thermostats, Water Heaters, EV Charging



Partnerships

- Collaboration with partners on unique/innovative solutions

Grid Need Screening and Nontraditional Solution Development

Grid Need Screening

- Traditional solution cost > $200k
- Solution needed in 5-10 years

Program Feasibility

- Basic understanding and ability to estimate effectiveness
- Implementation partners available

Program Effectiveness

- Program lessens severity of grid need

Nontraditional Solution Development

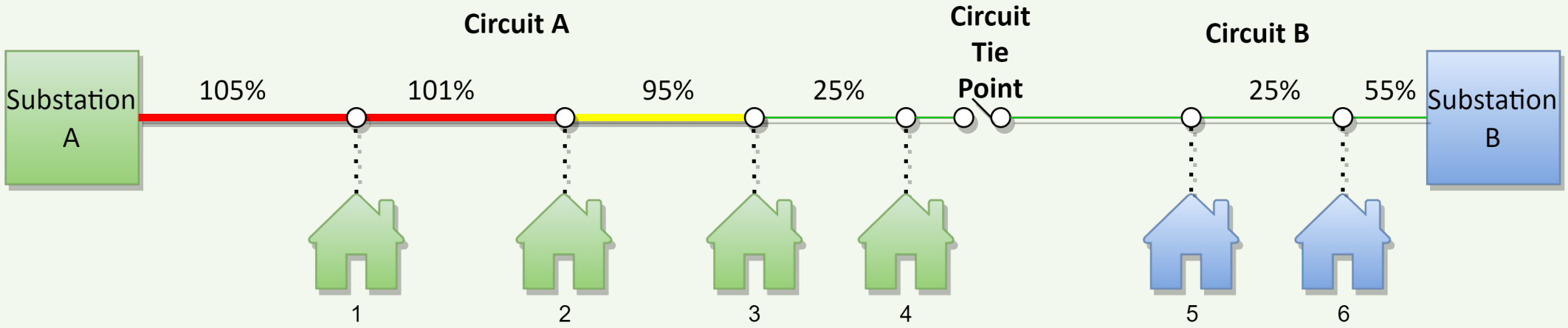
- Combinations of programs to resolve grid need

Nontraditional Solution Screening

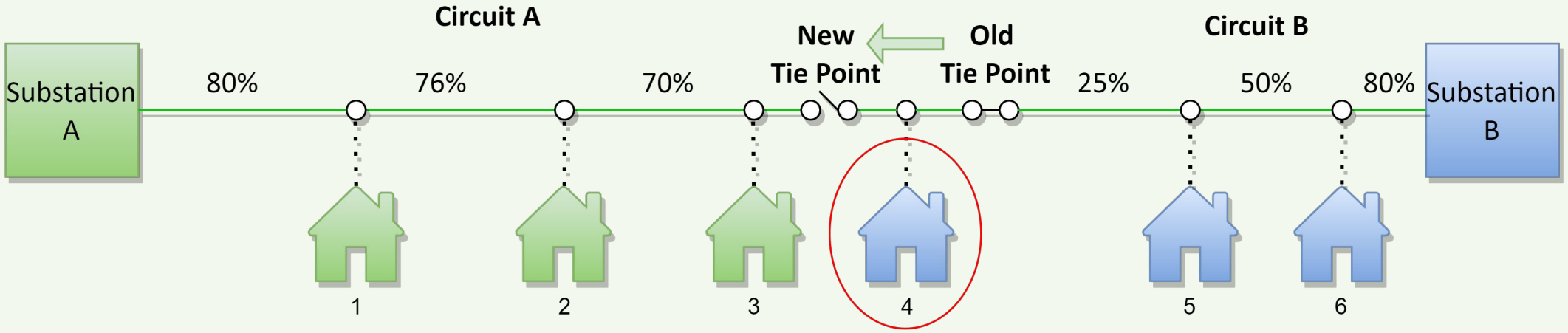
- Cost effective solution for participants and utility
- Estimated participation sufficient to resolve grid need

Traditional Solution Example: Load Transfer

Grid Need: Peak loading exceeds distribution wires rating

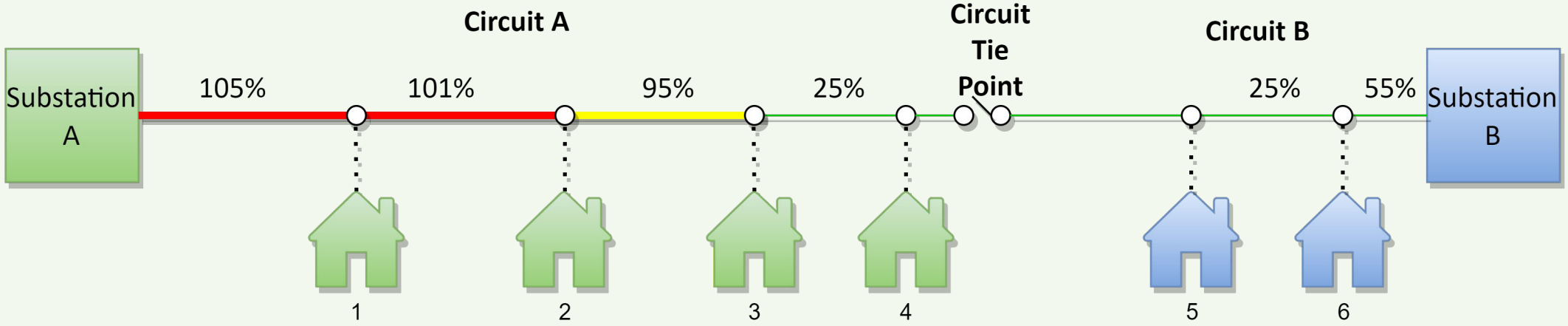


Solution: Load transfer from Circuit A to Circuit B

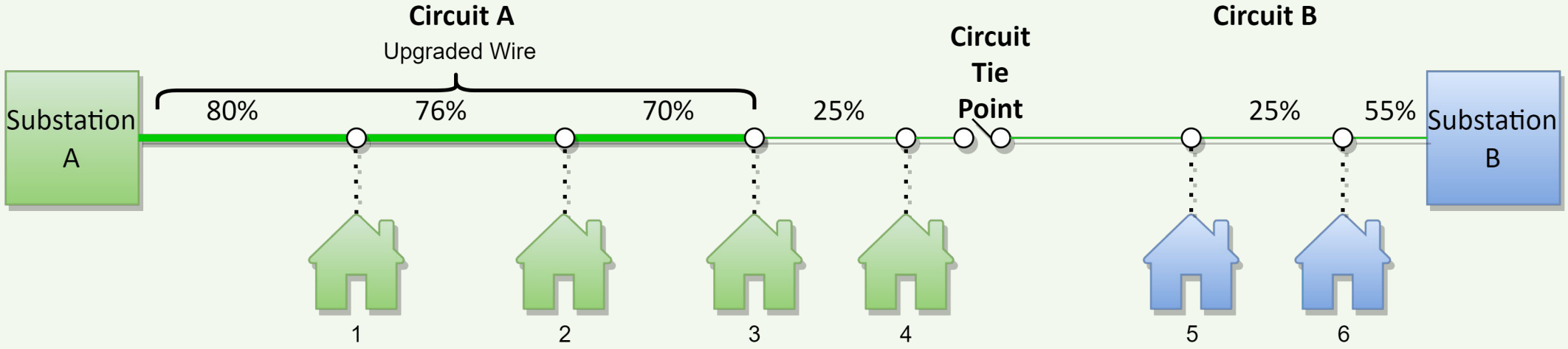


Traditional Solution Example: Upgrading Conductor

Grid Need: Peak loading exceeds distribution wires rating

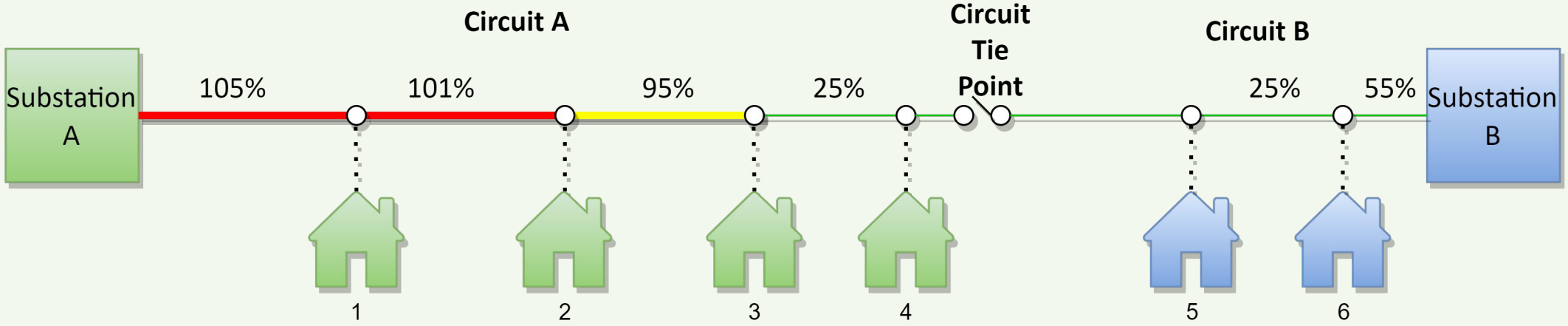


Solution: Upgrade wire to larger size to increase capacity rating

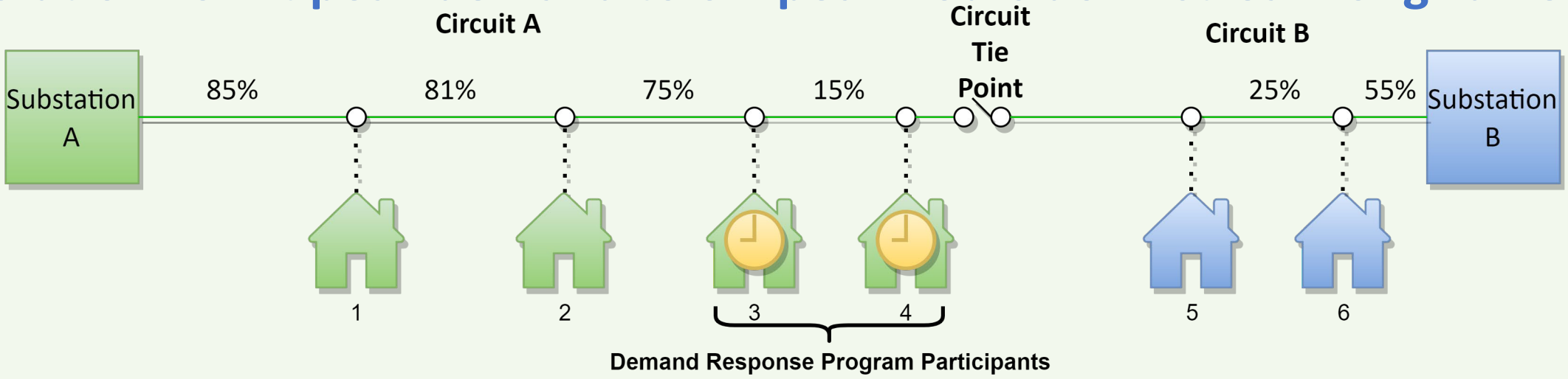


Nontraditional Solution Example: Demand Response

Grid Need: Peak loading exceeds distribution wires rating



Solution: Shift peak demand to off-peak hours downstream of grid need



Example Solution Comparison Matrix

Characteristic \ Solution	Larger Wire	Solar	Solar + Battery + Demand Response	Energy Efficiency	Smart Thermostat Demand Response
Simplicity	★★★	★★☆	★☆☆	★★☆	★☆☆
Will this be able to address the grid need in time	★★★	★★☆	★☆☆	★★☆	★☆☆
Technical Feasibility	★★★	★☆☆	★★☆	★★☆	★★☆
Cost: Participant	N/A	★★☆	★☆☆	★★★	★★★
Cost: Utility	★★☆	★★★	★★☆	★★★	★★☆
Customer and Community Benefits	N/A	★★★	★★★	★★★	★★★

Break (10 Mins)

Ti Start Timer g

TIME TO RESUME

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Forecasted Grid Needs and Potential Solutions

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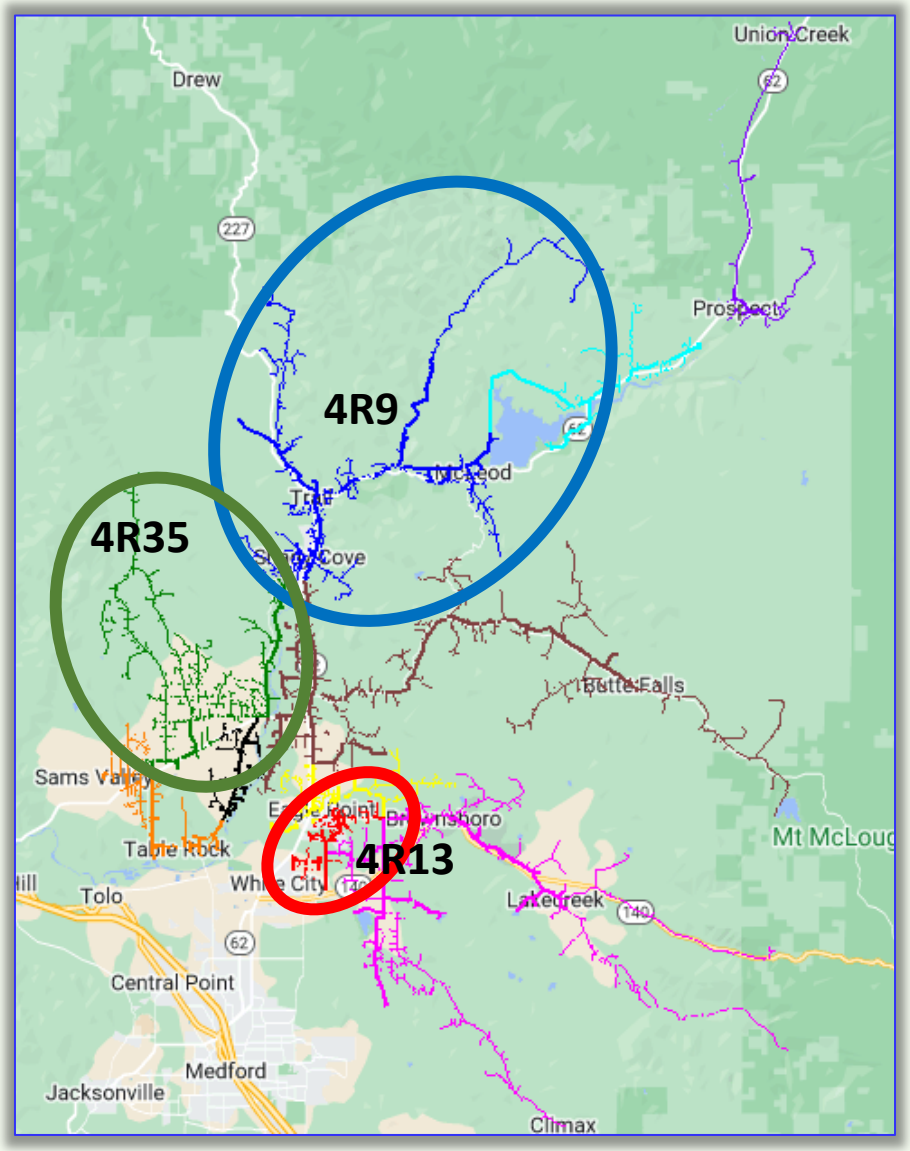
Upper Rogue Grid Needs Summary

Circuit	Grid Need	Year	Candidate for Nontraditional Solution
4R9	Wire Overcapacity	2027	Yes
4R9	Low Voltage	2023	No Not in time or cost range
4R35	Low Voltage	2023	No Not in time or cost range
4R13	Wire Overcapacity	2027	No Planned traditional solution

The forecasted wire overcapacity on 4R9 is the only grid need that is a candidate for a nontraditional solution.

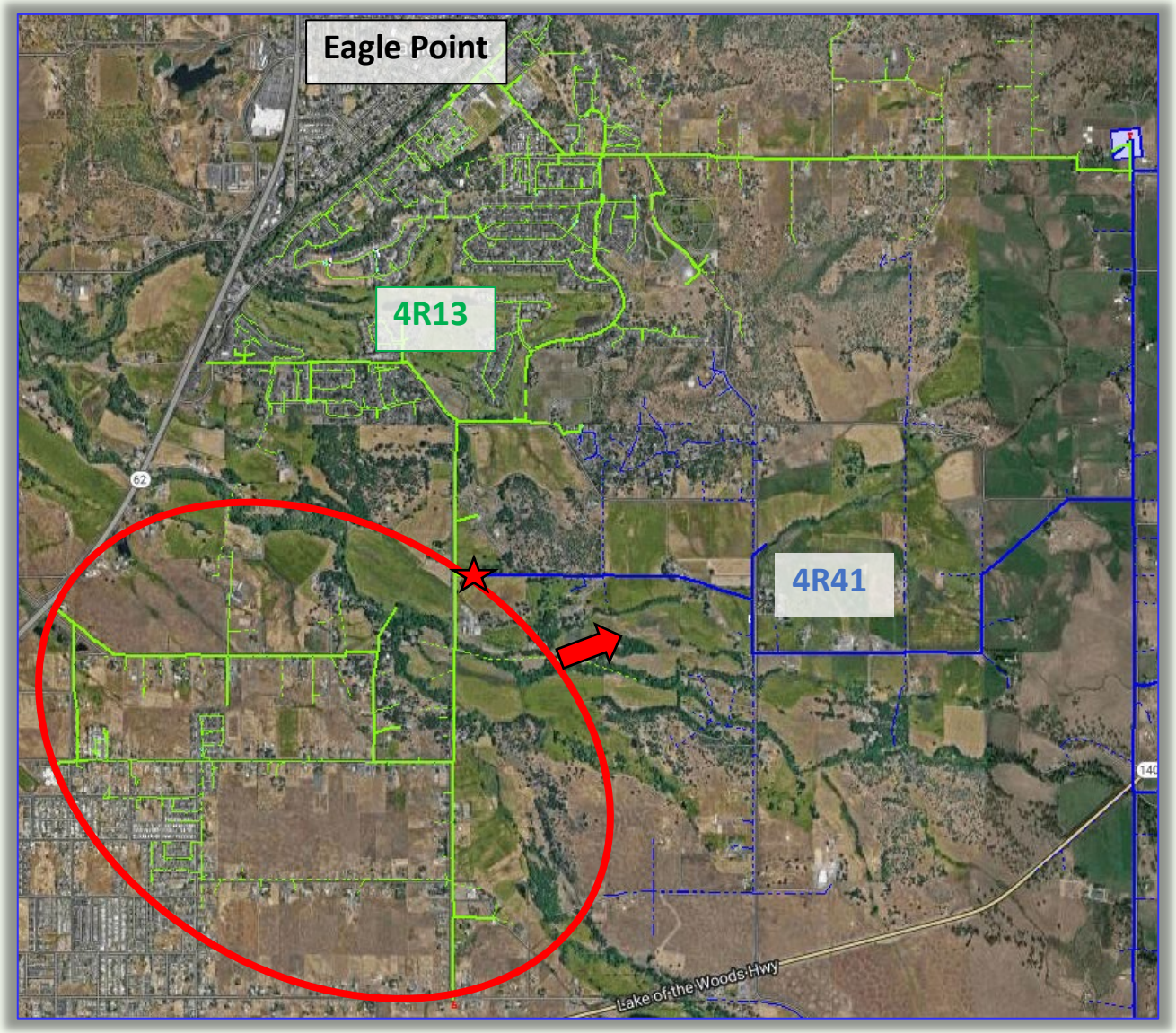


4R13 Load Transfer

Planned load transfer of over 500 customer to 4R41 for sectionalizing purposes

Also reduces projected load below wire capacity of anticipated grid need

Estimated project cost $75,000



4R9 Grid Need Summer 2032

Potential **5500 ft mainline wire overcapacity**

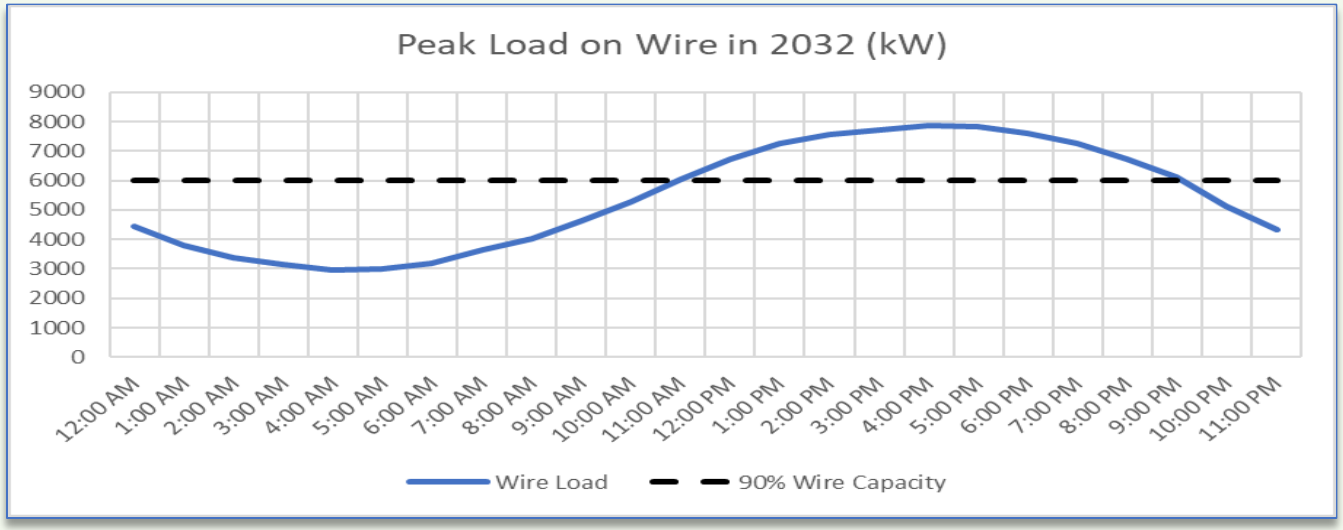
Substation feeder capacity over 100%

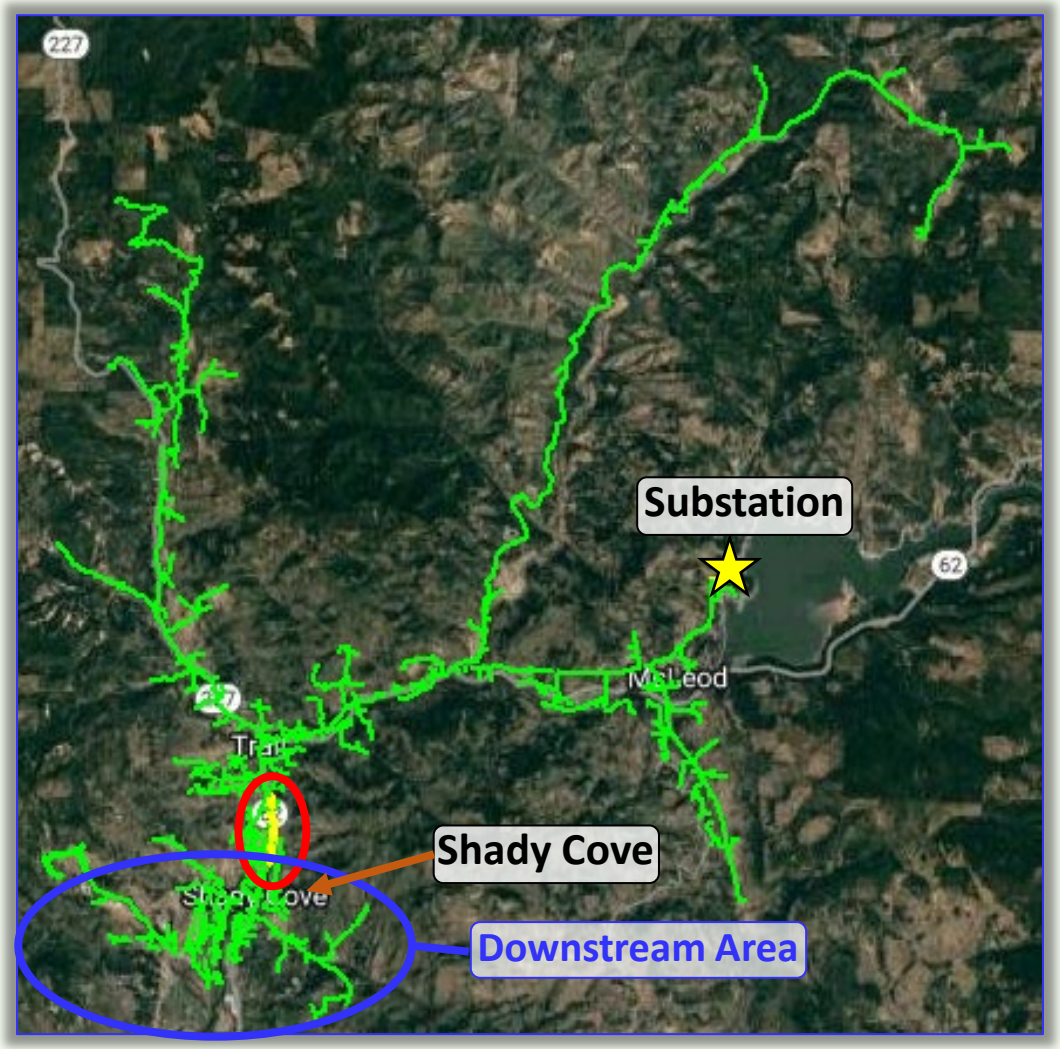
Forecasting overcapacity starts 1 hour in 2027 and over 20 hours in 2032

Overcapacity estimated from 1pm to 8pm at peak 2032

Peak load more than 1 MW & 5 MWH over capacity in 2032

Wire loading shouldn't go over 90% wire capacity

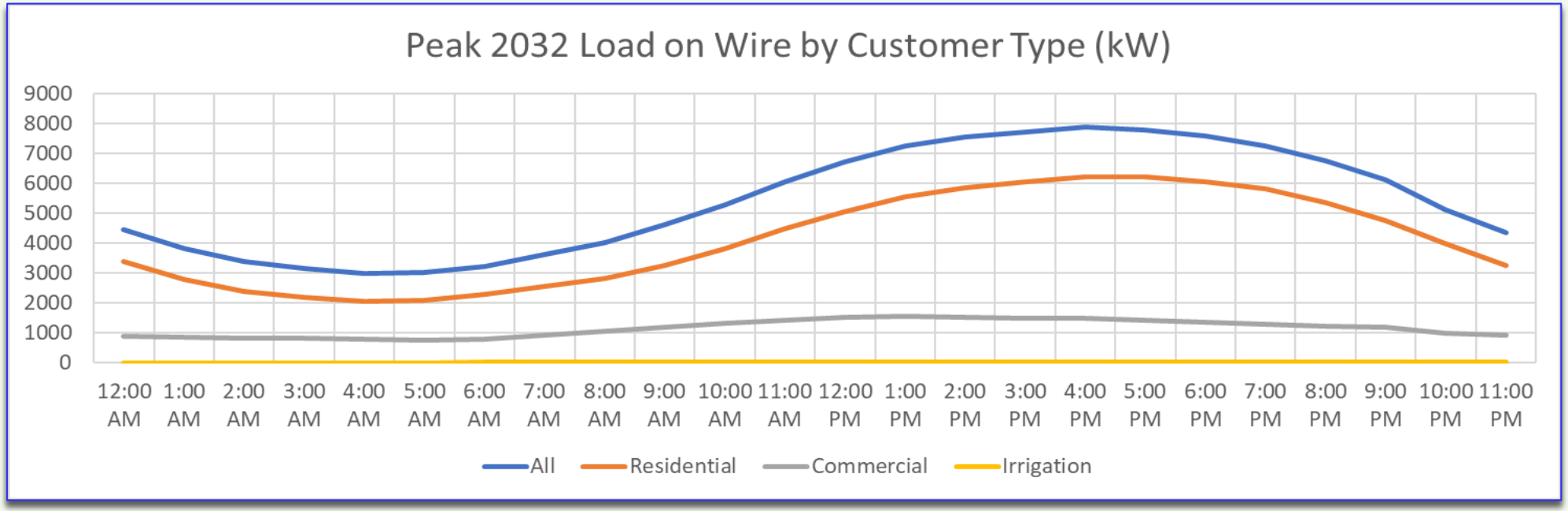




Grid Need Customer Break Down

Wire loading generally only affected by downstream load

Downstream is most of the town of Shady Cove	(65% of customers 63% of total load)
Peak load is predominantly residential	(1448 customers 54% of total load)
Commercial max load is early afternoon	(192 customer 10% of total load)
Minimal irrigation load	(3 customers <1% of total load)



Grid Solution Options

Traditional Solutions

Reconductor (~$520k)
Load transfer (costs more)
Phase balancing (doesn't solve grid need)

Nontraditional Solutions

A: Unfeasible

- Solar (PV) by itself
- Other technology
- Demand side management *(industrial and commercial)*

B: Low Feasibility

- PV and battery storage
- Energy efficiency
- Demand response *(residential)*

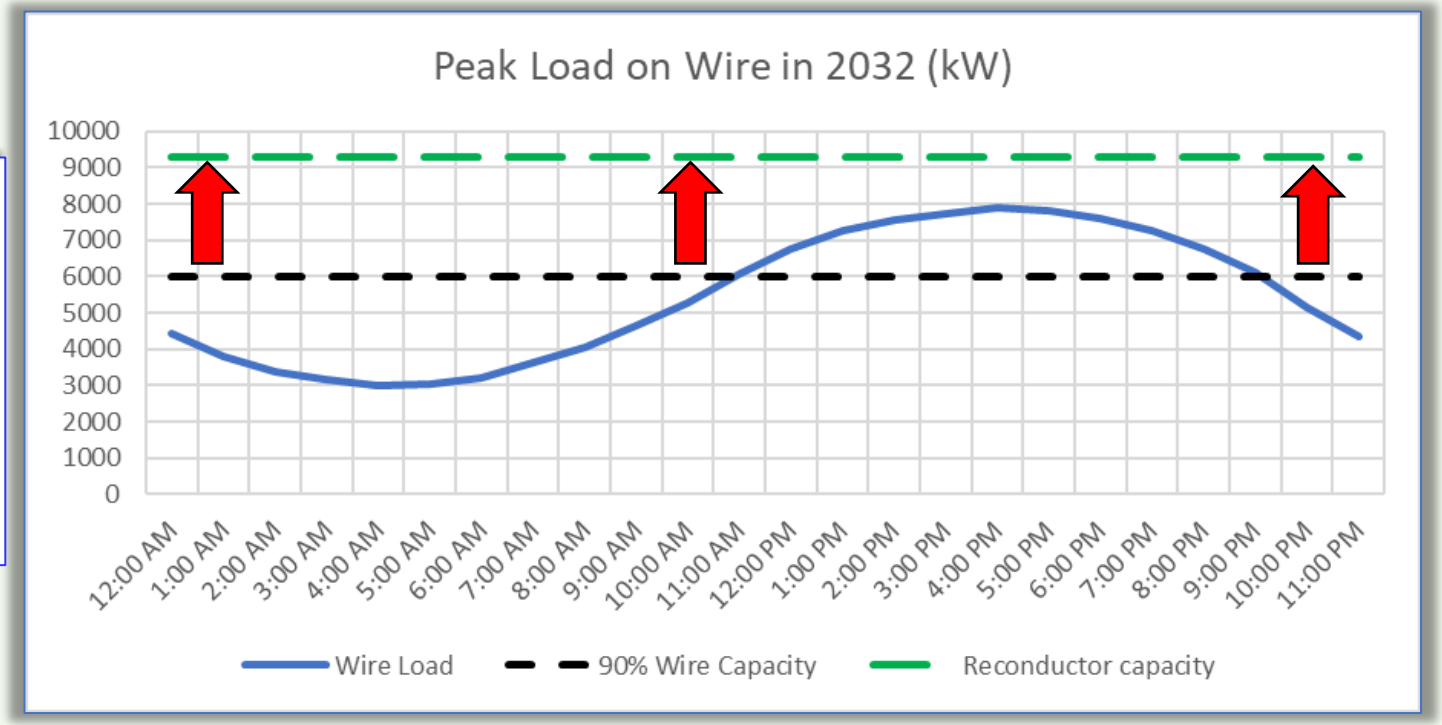
C: Medium Feasibility

Layered combinations of category B

Traditional Solution

Upgrade Conductor to Larger Size

- Putting in a larger wire increases capacity
- Buffer zones required to meet grid need
- High fire zone requires covered conductor to mitigate fire risk



Nontraditional Solutions

PV

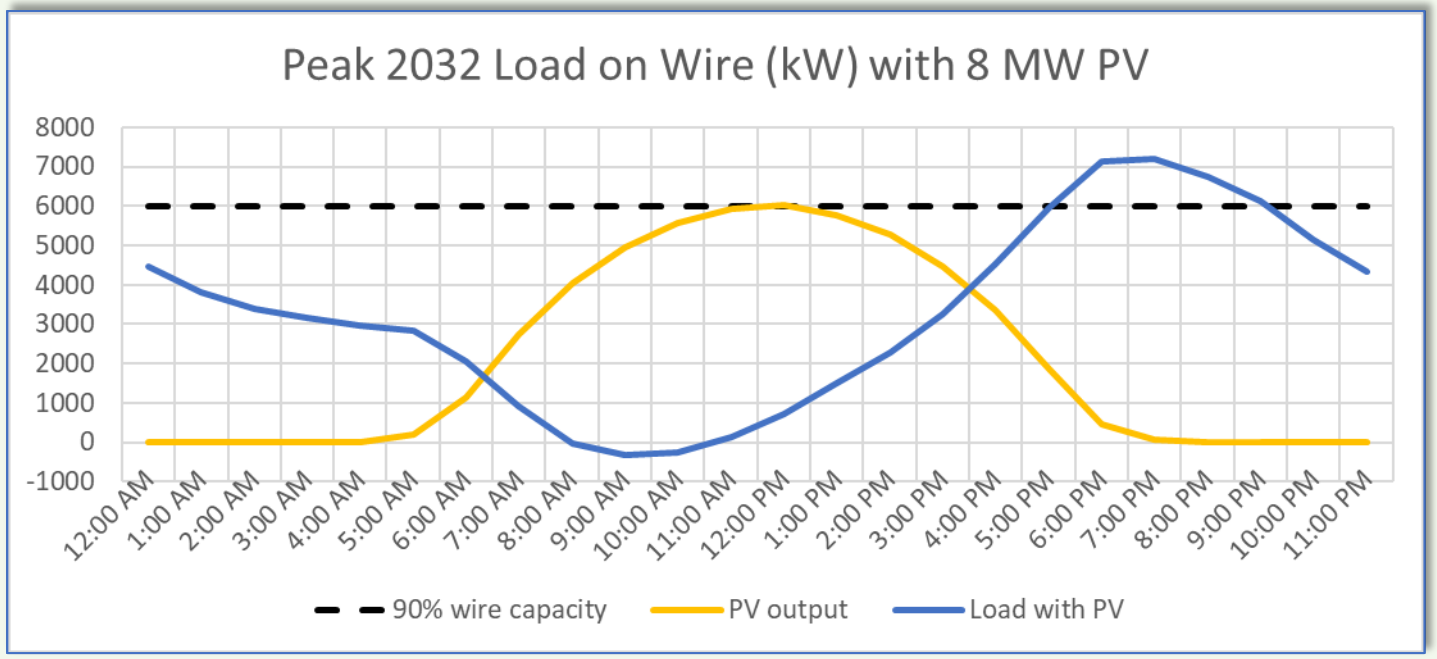
PV + Storage

Energy Efficiency

Layered Approach

Doesn't meet grid needs

- PV output is only 1% of nameplate by 7pm (for location and time of year)
- 4.1 MW is the approximate max PV on the circuit before reverse power flow occurs (would happen in the spring and fall)



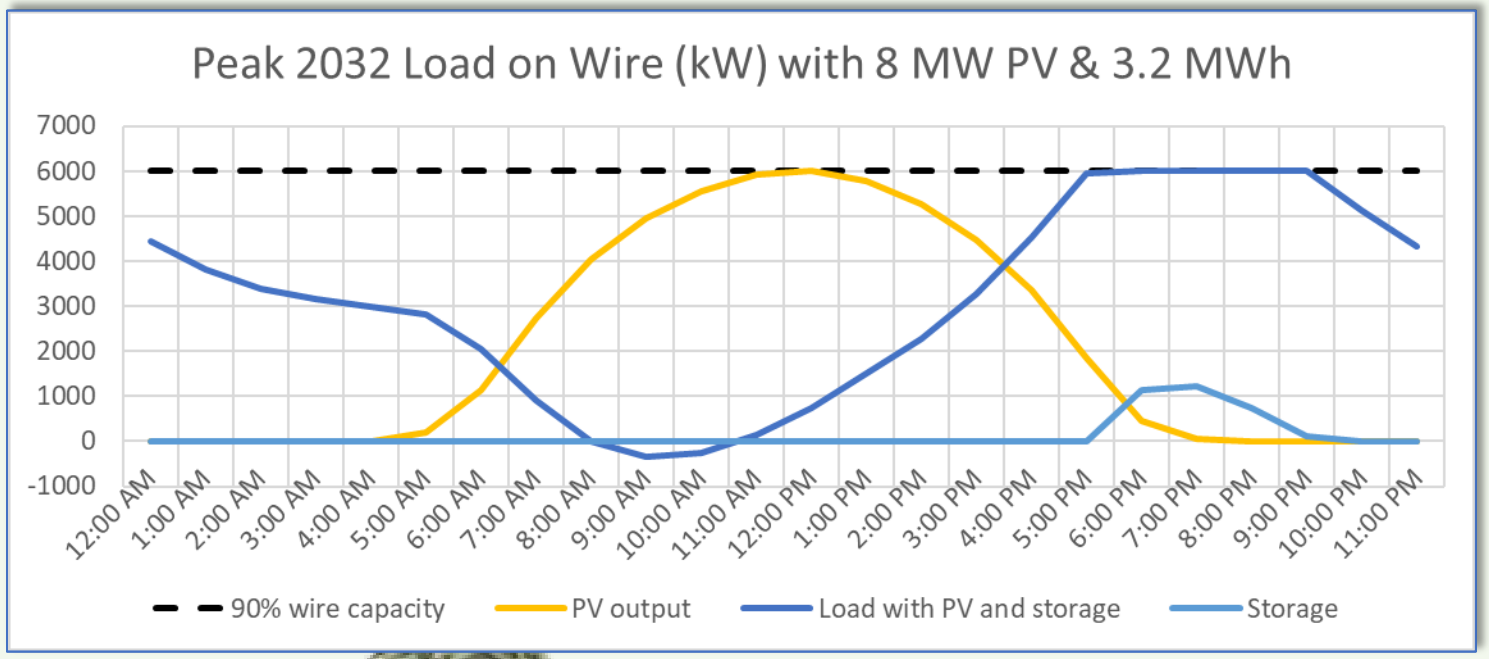
Nontraditional Solutions

PV

PV + Storage

Energy Efficiency

Layered Approach



Can meet grid needs

- Usually most expensive
- Utilizing storage is complex
- Less interest in battery storage

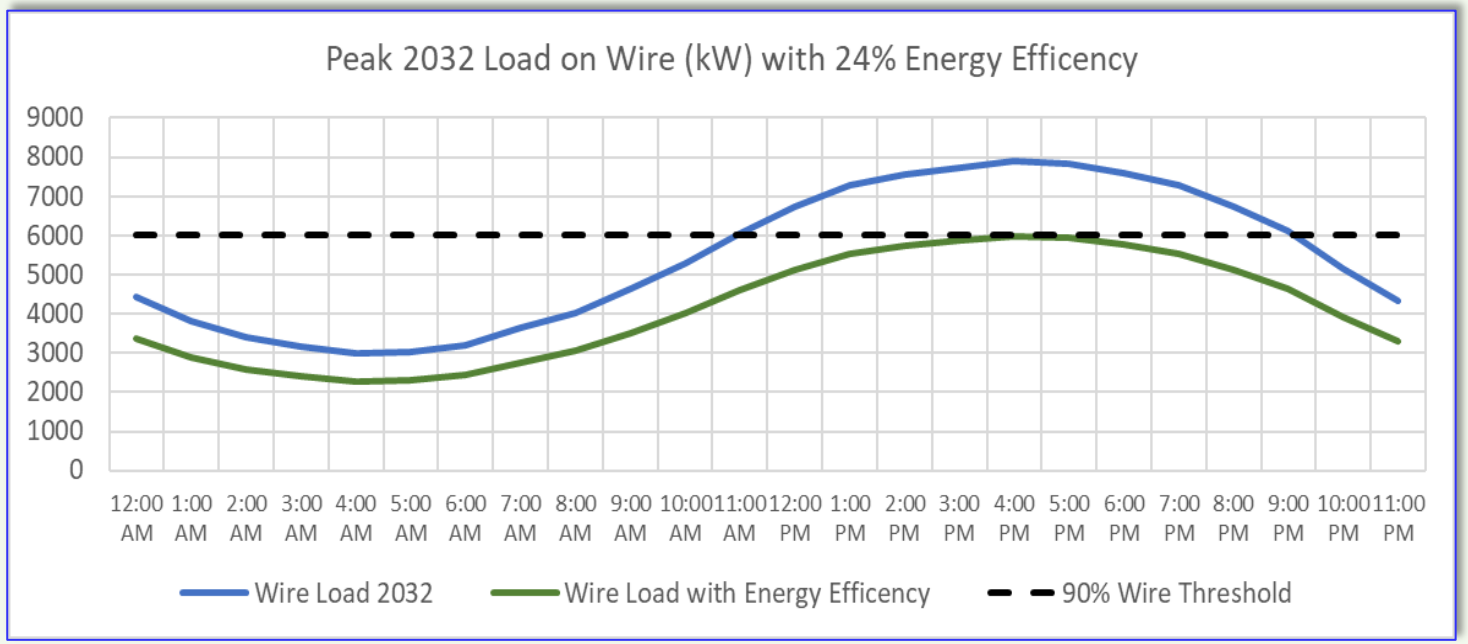
Nontraditional Solutions

PV

PV + Storage

Energy Efficiency

Layered Approach



Can meet grid needs

- 24% load reduction max, but requires very high participation
- Generally involved major appliance upgrades

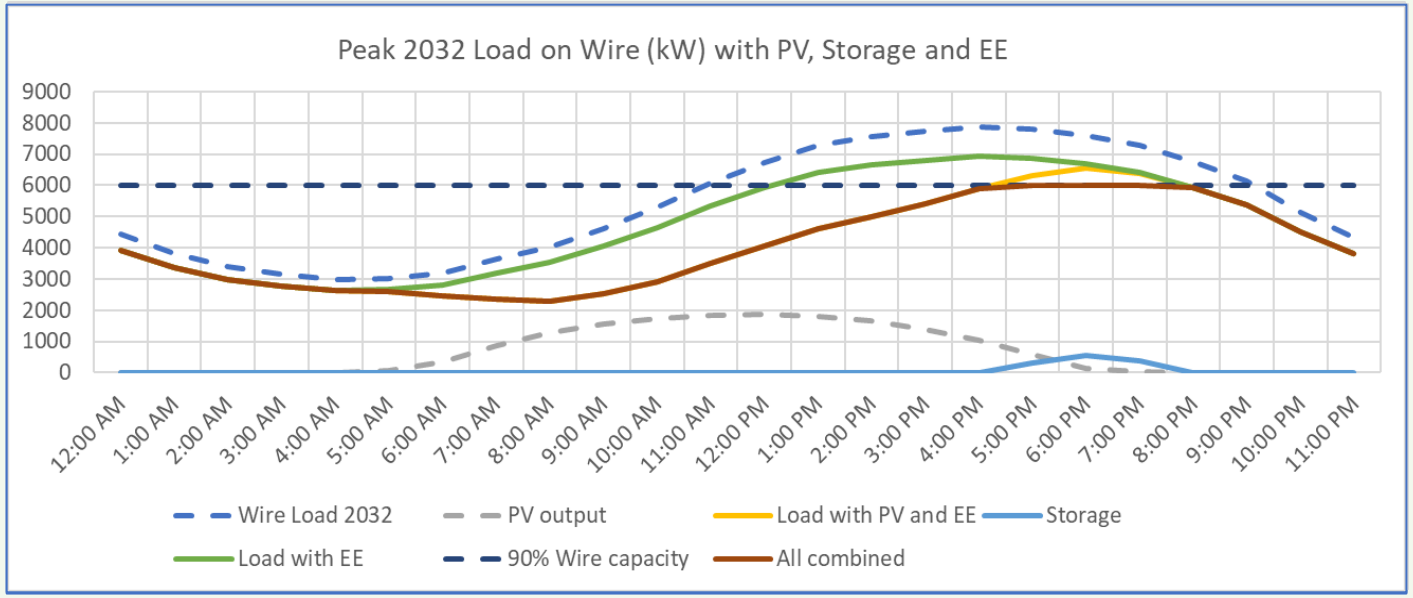
Nontraditional Solutions

PV

PV + Storage

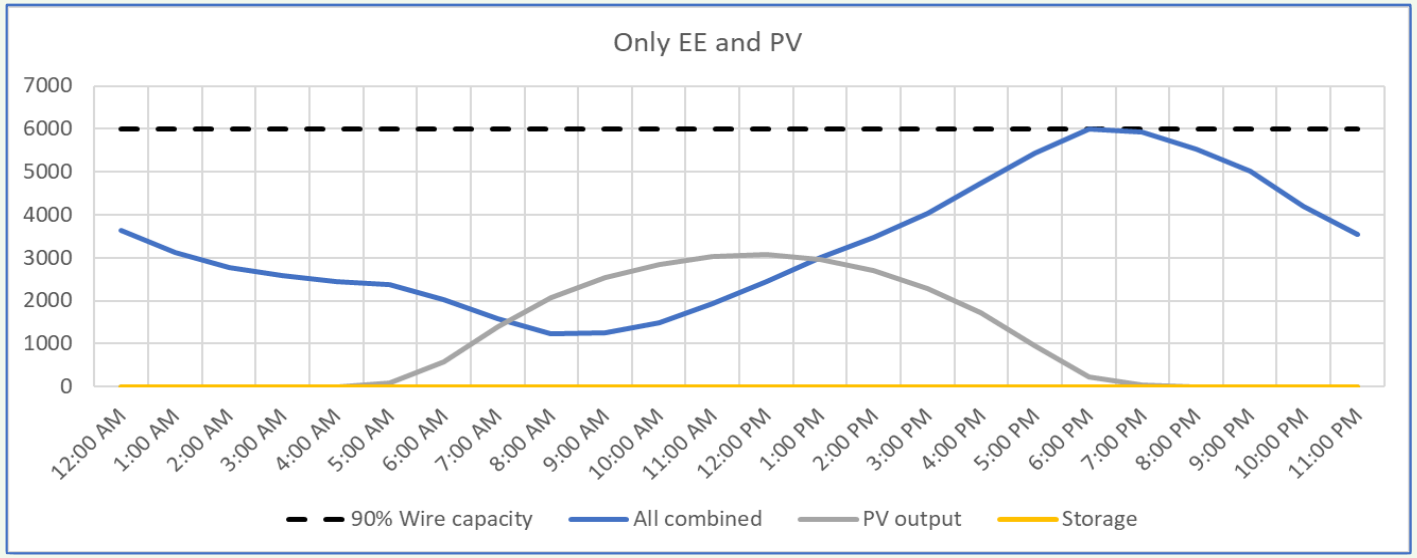
Energy Efficiency

Layered Approach



Can meet grid needs

- Combining PV, storage and energy efficiency provides many options
- Further study needed to find most cost effective and viable combination



Wildfire Mitigation Update

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Wildfire Mitigation Plan

The Pacific Power Oregon Wildfire Mitigation Plan was filled on Dec 29th, 2022, in response to Oregon PUC Docket UM 2207.

This plan specifically guides the mitigation strategies that will be deployed in Oregon, consistent with Oregon Administrative Rules.

These efforts are designed to reduce wildfire risk in the company's service area.

Situational Awareness

- Risk assessment to inform strategic program and investments
- Dynamic seasonal risk assessment to inform operational protocols
- Evaluate existing pilot projects, such as distribution IR inspections, wildfire cameras, and smoke sensors, for broader implementation

Advanced Forecasting

- 156 weather stations by the end of 2023 that provide updates every 10 minutes to support real time operations
- 5 full time meteorologists provide 24/7 support
- Advanced wildfire models, - updated daily and hourly to pinpoint potential fire risk and plan for long term system hardening

Grid Hardening

- $470 million over next five years
- Line Rebuild Program
- Advanced Protection and Control
- Expulsion Fuse Replacement
- Installation of new fault indicators

Rapid Response

- Deploy more sensitive protective coordination equipment
- Replace fuses with modern, non-expulsion, equipment
- Modified work practices during fire risk periods
- Mature and refine the Fire Potential Index (FPI) to support PSPS decision making processes.

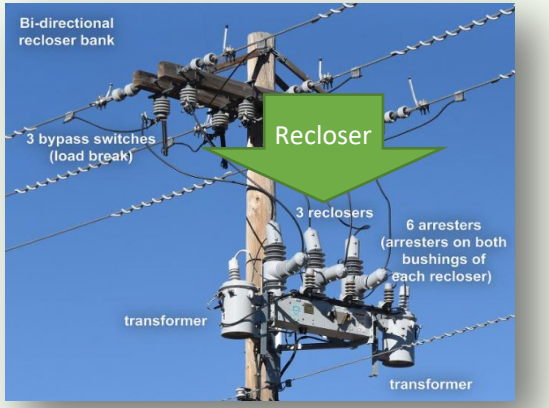
Wildfire Grid Hardening in Upper Rogue

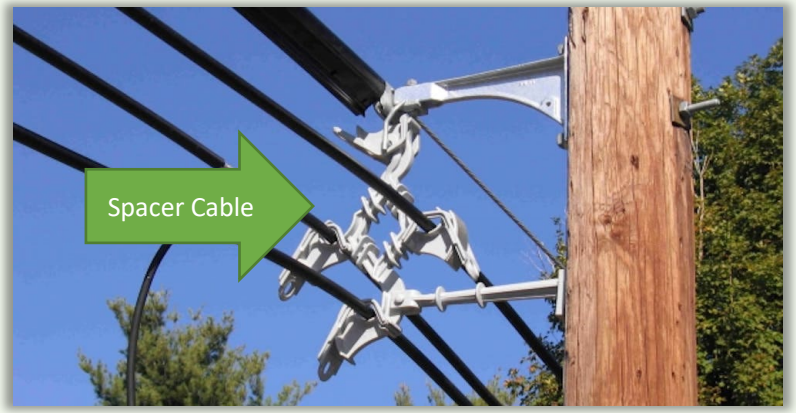
Expulsion Fuse Replacements: Replacement of expulsion type fuses in FHCA areas with non-expulsion type fuses.

Substation Relays and Recloser Upgrades:
Upgrading relays and field reclosers with new capabilities including Elevated Fire Risk (EFR). These settings are designed to clear faults in <1 second and limit arc energy, as compared to traditional schemes where clearing times can be 4-10 seconds.

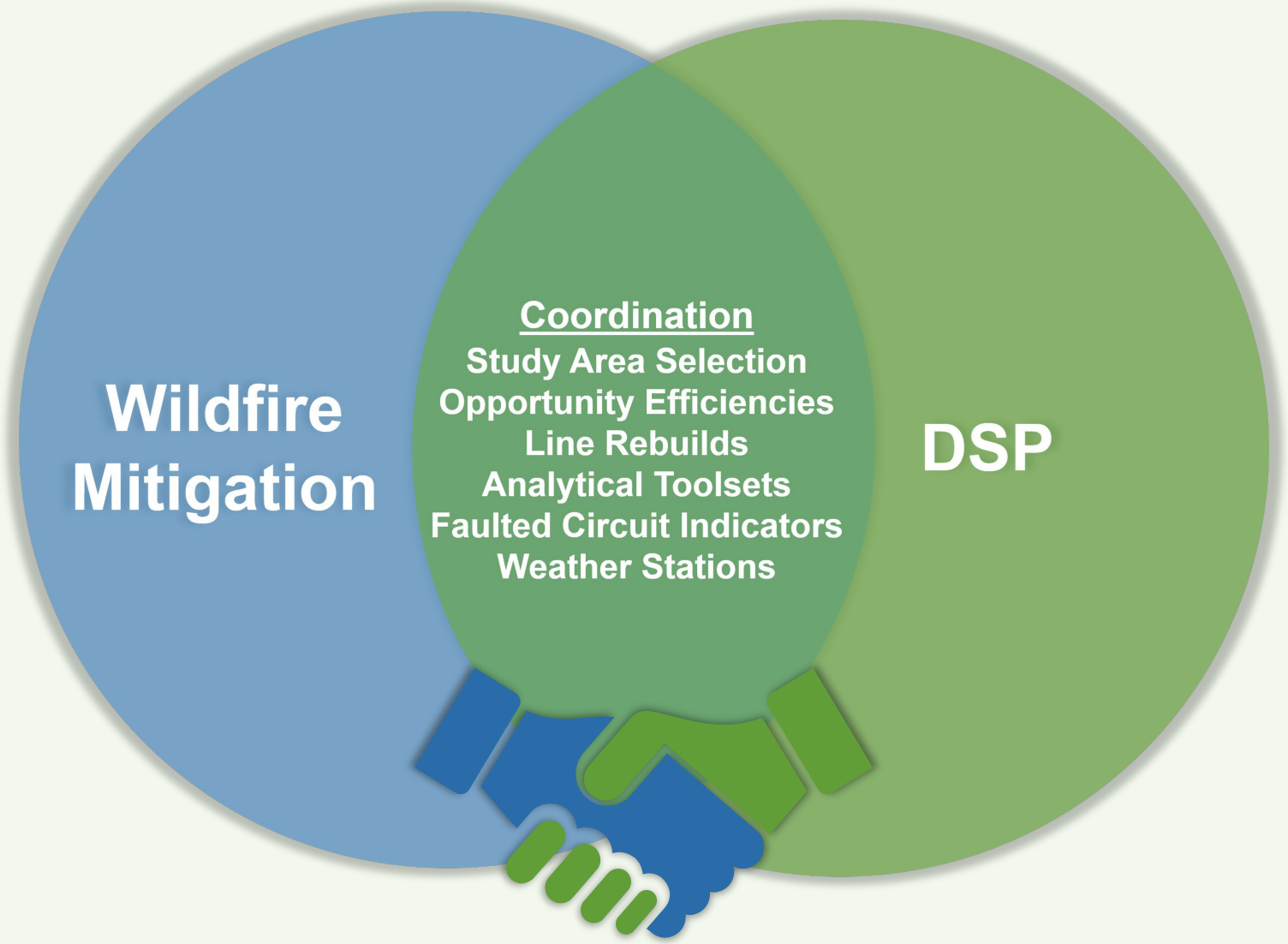
Distribution Line Rebuild:
Replacing overhead bare conductor lines with covered conductor to reduce wildfire risk.

Feeder	Recloser Upgrades	Substation Relay Replaced	Expulsion Fuse Replacements
4R1	3 in 2023	Planned 2024	Planned 2024
4R13	N/A	Planned 2025	Planned 2024
4R17	2 in 2024	Planned 2025	Planned 2024
4R35	3 in 2023	Planned 2024	Planned 2024
4R9	4 in 2022	Completed 2023	Planned 2024
5R40	N/A	Completed 2023	Completed 148 fuses
5R87	N/A	N/A	N/A
5R88	N/A	N/A	N/A
7R5	1 in 2023	Completed 2023	Completed 2 fuses

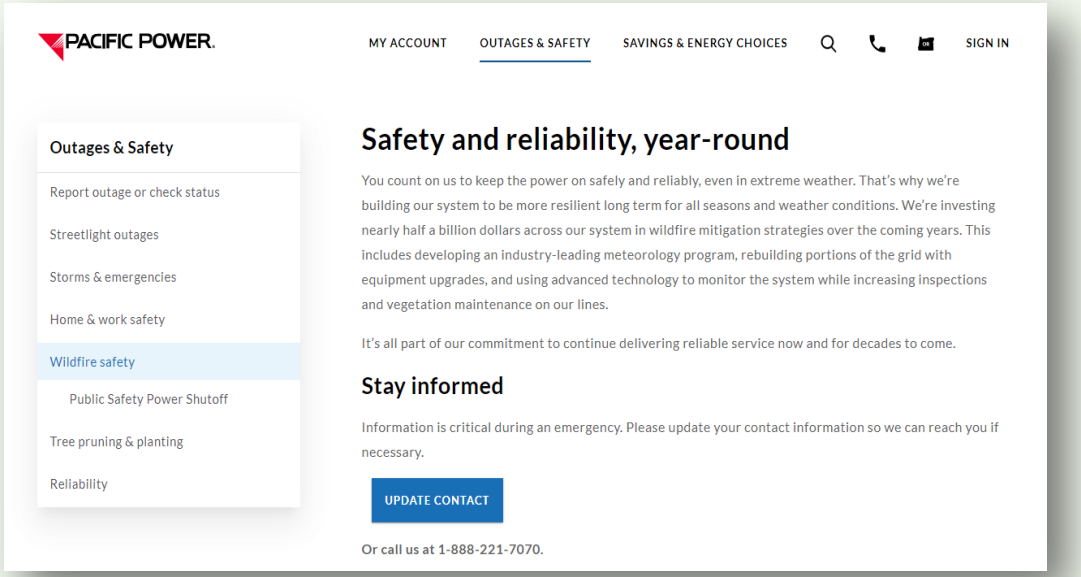


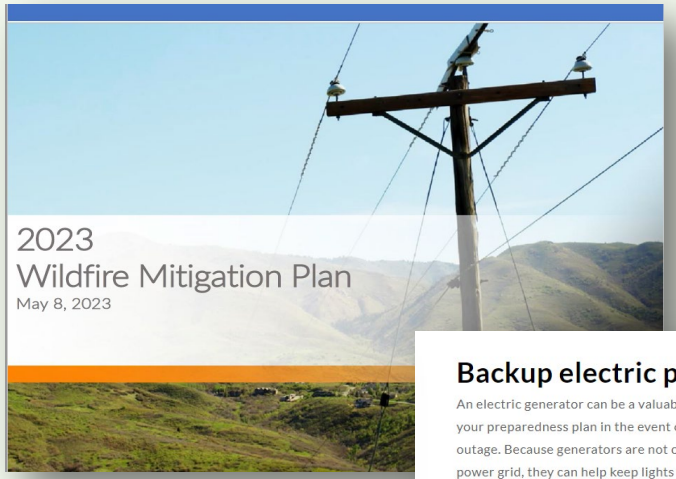


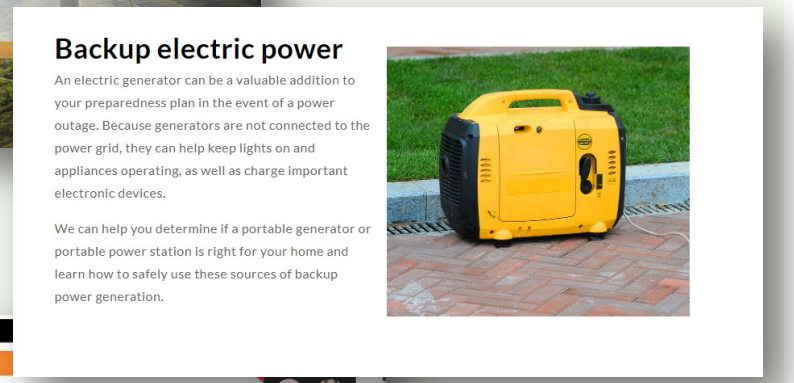
Wildfire Mitigation + DSP



Want to Know More About Wildfire Mitigation?



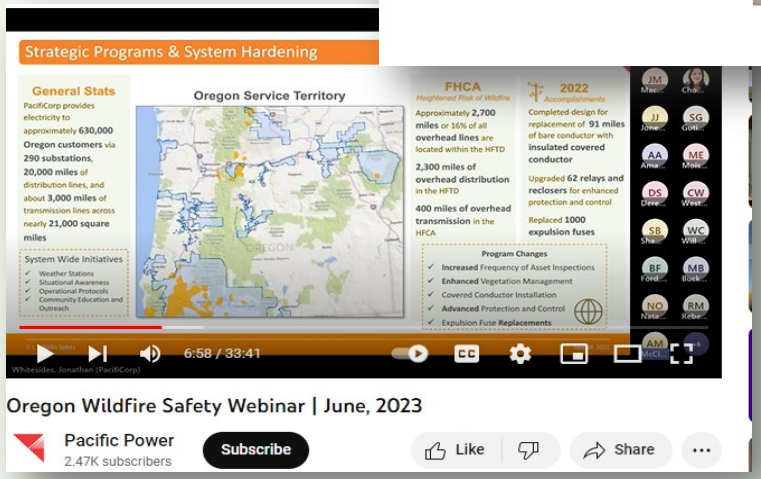




Wildfire Safety Website

Company's current Wildfire Mitigation plans:
https://pacificorp.com/community/safety/wildfire-mitigation-plans.html

For links to our YouTube Webinars, tips for our customers on how to keep homes safe, Public Safety Power Shutoff map, meteorology tools, and additional resources:
https://pacificpower.net/outages-safety/wildfire-safety.html



Next Steps/Open Discussion

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Next Steps:

We have identified grid needs in this study area and believe there are opportunities for some of the needs to be addressed with nontraditional solutions. The feedback we have received today, and further study will guide our project proposals.

Nontraditional solutions should be cost effective and benefit all parties. Thank you for engaging in the discussion today.

Questions/Comments?

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Online Participants Questions/Comments?

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Local Workshop #2 Survey

https://forms.office.com/r/ahSenKaZif

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Additional DSP Information

DSP Email / Distribution List Contact Information

- DSP@pacificorp.com

DSP Webpages

- Pacific Power Oregon DSP Website
- Planificación del Sistema de Distribución de Oregón (pacificorp.com)

Additional Resources

- PacifiCorp's DSP Part 1 Report
- PacifiCorp's DSP Part 2 Report
- DSP Pilot Project Suggestion Form
- PacifiCorp Wildfire Mitigation Plans
- Energy Trust of Oregon

Thank you!

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Back up Slides

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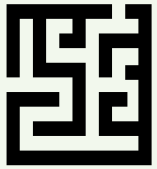
Comparison Matrix Criteria



Uncertainty

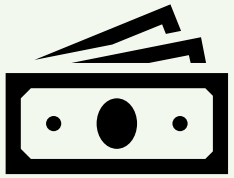
- Generally, how many factors must be developed, coordinated, managed and executed to enable the solution to meet the identified grid need?
- Generally as outlined, can the solution reliably meet the grid need identified?

Estimated Timeline to Implement

- How long, from now, would the solution realistically take to be in place to address the grid need?

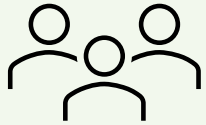
Technical Feasibility

- Assessment of the maturity of the proposed solution and a preliminary understanding of the specific requirements of the need?



Cost

- What is the total cost of solution required to meet the grid need?
- Cost effectiveness: do net benefits outweigh net costs for program participants and Pacific Power?



Customer and Community Benefits

- Do solutions offer customer benefits, such as customer choice, comfort, and/ or resilience?
- Do solutions offer the community benefits such as resilience, environmental impacts, energy equity, economic impacts?