Rocky Mountain Power

Grid Modernization Collaborative

Docket No. 21-035-16

January 25, 2023






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Agenda

- **Oregon Distribution System Planning Overview**
  Ian Hoogendam, Distribution System Planning Manager
- **PacifiCorp Electrification Forecast Overview**
  Peter Schaffer, Customer Solutions Planning Manager
- **Infrastructure Investment and Jobs Act (IIJA) Funding**
  Rohit Nair, Director of Engineering Standards and Grid Modernization
- **Cellular Field Area Network (CFAN) and Interactive Volt-Var Optimization (IVVO)**

  Rohit Nair, Director of Engineering Standards and Grid Modernization

Oregon Distribution System Planning Overview

Ian Hoogendam, Distribution System Planning Manager

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Introduction & Background

What is Oregon DSP?

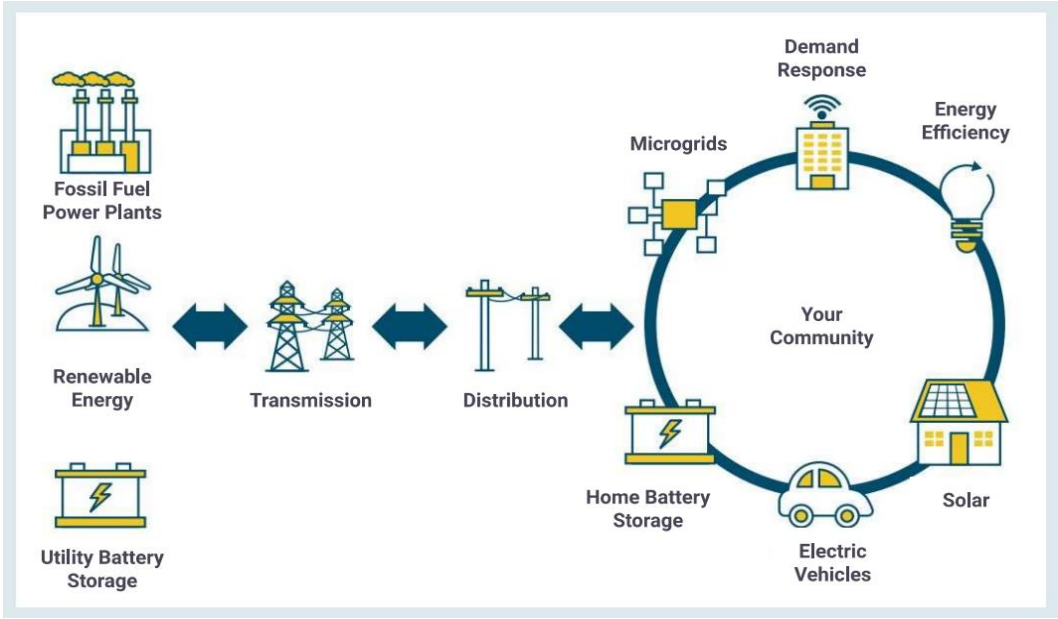
- Based on guidelines proposed by Oregon PUC staff
- Increased transparency and modernization of traditional DSP to meet the needs and leverage the capabilities of the modern grid

Key changes to traditional DSP:

- Increased community engagement
- Consideration of non-traditional solutions to meet grid needs
- Enhanced forecasting
  - 24-hour load profiles
  - Inclusion of incremental electric vehicle and solar adoption rates

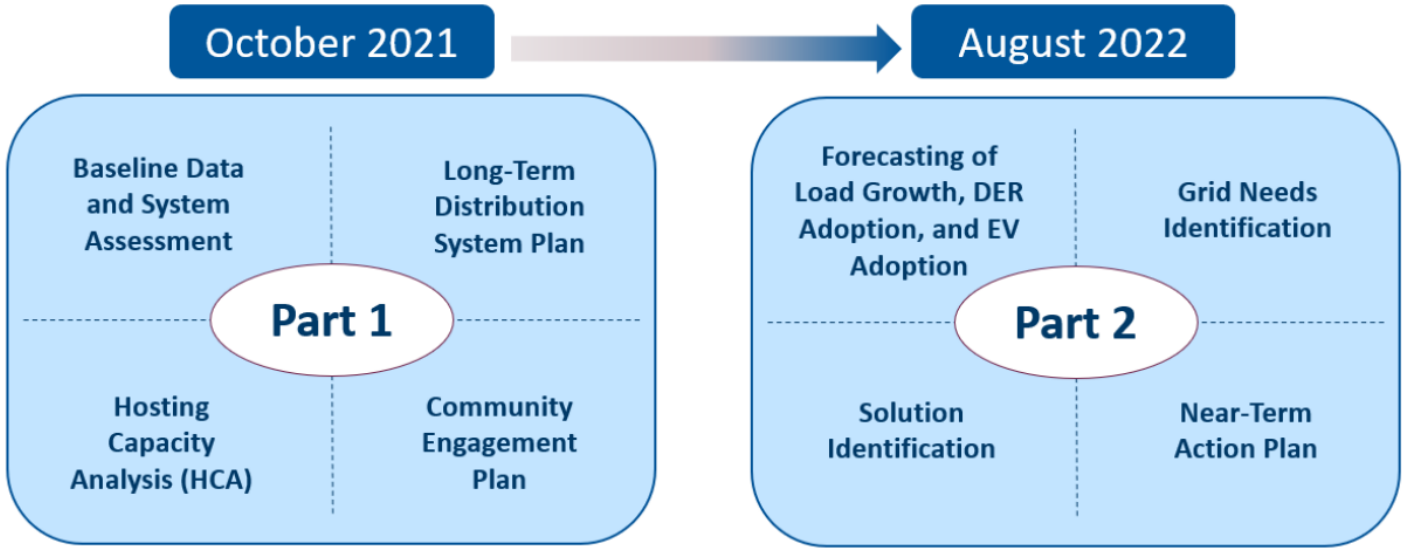
Past Grid

Modern Grid



How Distribution System Planning modernization started in Oregon

- Mar 22, 2019 - The Oregon Commission issued Order No. 19-104 opening UM 2005 to investigate distribution system planning
- Dec 16, 2020 - Order No. 20-485 Consideration of adoption of OPUC staff proposed guidelines to Distribution System Planning (DSP) became effective.
- Oregon utilities required to file distribution system plans in two separate filings



ORDER NO. 20-485

ENTERED Dec 23 2020

BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UM 2005

In the Matter of

PUBLIC UTILITY COMMISSION OF OREGON,

Consideration for Adoption Staff Proposed Guidelines for Distribution System Planning.

ORDER

DISPOSITION: STAFF'S RECOMMENDATION ADOPTED WITH MODIFICATION

This order memorializes our decision, made and effective at our December 15, 2020 Regular Public Meeting, to adopt Staff's recommendation in this matter, with a modification, as proposed by Staff during the public meeting. The modification proposed by Staff deletes the parenthetical phrase included with the definition of distributed resources in the approved guidelines. The Staff Report with the recommendation is attached as Appendix A.

Made, entered, and effective Dec 23 2020.

Megan W. Decker
Chair

Letha Tawney
Commissioner

Mark R. Thompson
Commissioner

A party may request rehearing or reconsideration of this order under ORS 756.561. A request for rehearing or reconsideration must be filed with the Commission within 60 days of the date of service of this order. The request must comply with the requirements in OAR 860-001-0720. A copy of the request must also be served on each party to the proceedings as provided in OAR 860-001-0180(2). A party may appeal this order by filing a petition for review with the Circuit Court for Marion County in compliance with ORS 183.484.

Oregon Distribution System Plan Part 2 filing

- Filed Oregon DSP Part 2 on August 15th, 2022
- Presented summary of DSP Part 2 filing to the OPUC on September 15th, 2022
- Defined Near-Term Action Plan (‘23-’26):
  1. Analytical projects and pilot evaluations
  2. Data evaluation and improvement
  3. Toolset evaluation and implementation
  4. Process improvements
  5. Outreach and engagement (local and statewide)
  6. Utility staffing and development

- Estimated O&M costs of Near-Term Action Plan for Oregon
  1. Internal admin costs (annual): $2.0M-$4.5M
  2. External vendor/contract costs (annual): $250k - $350k
  3. Pilot activity costs (2): $1.5M- $2.0M

Progress on Near-Term Action Plan since filing DSP Part 2

Analytical projects and pilot evaluations

- Klamath Falls Non-Traditional Solution Pilot Analysis
- Statewide Irrigation Solar Sizing Analysis

DSP Process Improvements

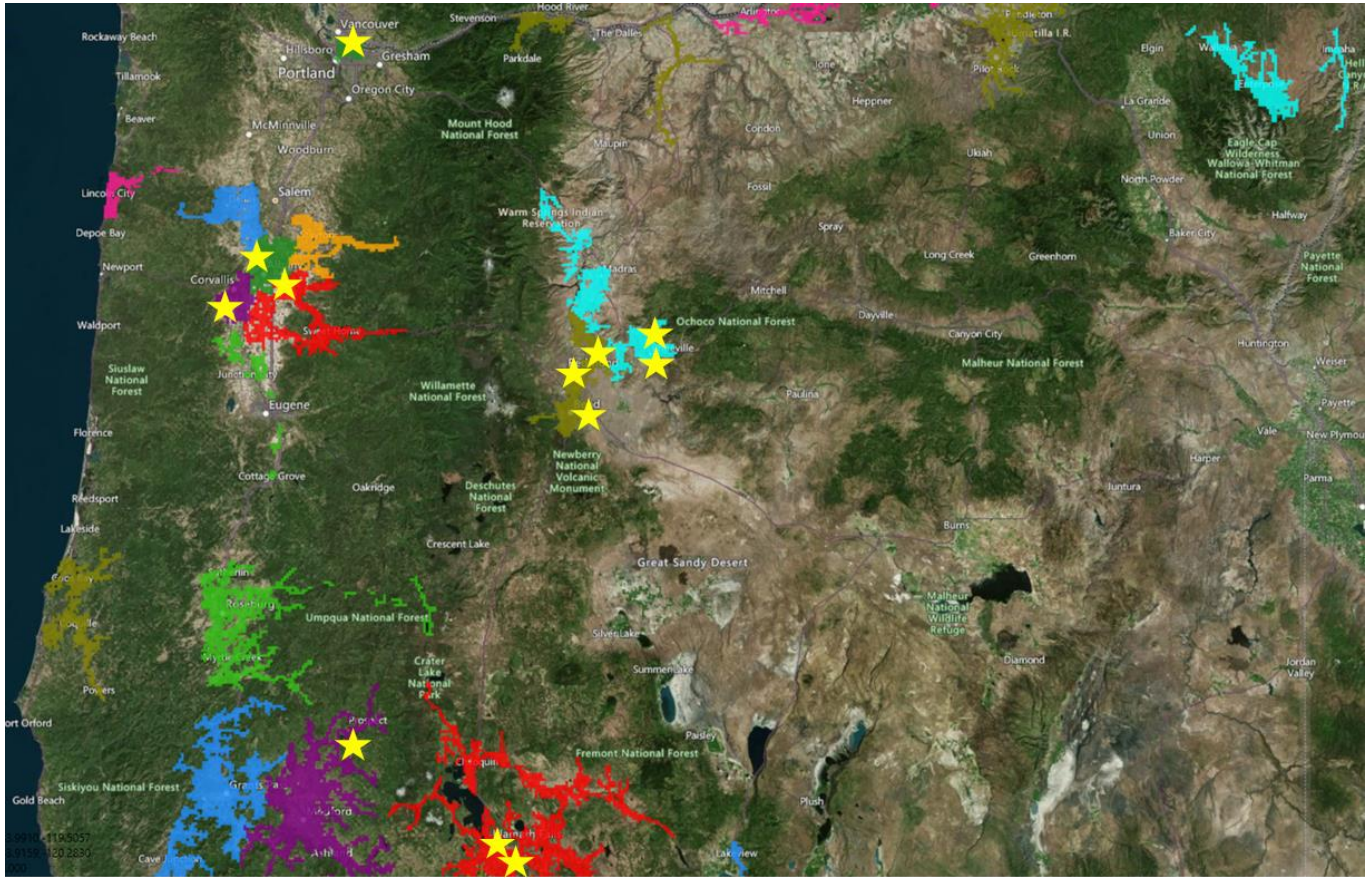
- Analyze Potential 2023 DSP Study Areas (In Progress)
  - High level analysis on 12 circuits with a diverse set of characteristics across Oregon service territory
  - Goal: Based on analysis findings identify 2-4 study areas to go through modernized DSP study process

Data Evaluation and Improvement

- Evaluate AMI data and use cases
  - Substitute for missing SCADA
  - Observed voltage violations during peak and minimum loading
  - Load profiles by customer class

Utility Staffing and Development

- DSP Manager (started September 2022)
- DSP Data Governance Specialist (position posted)
- DSP Program Specialist (position posted)

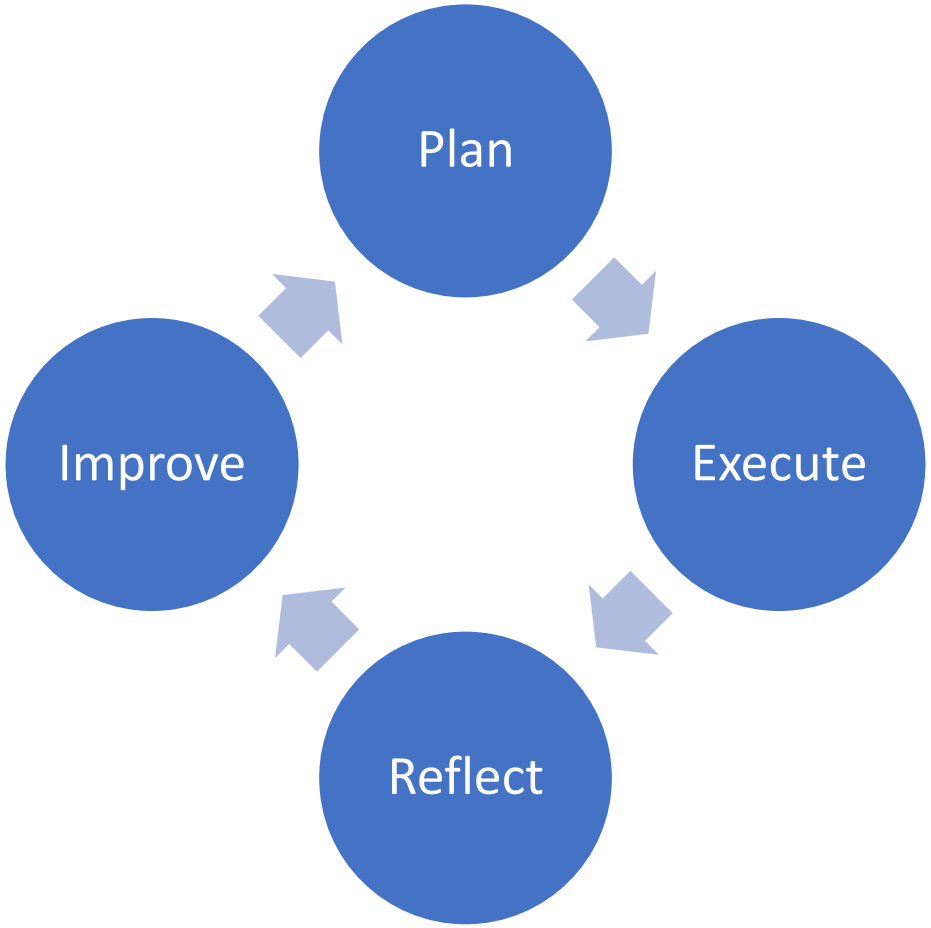


Preliminary 2023 Near-Term Action Plan roadmap highlights

Q1	Q2	Q3	Q4
DSP Process Improvements *DSP Study Areas:* • Finalize study area selection • Local meetings to review study areas and forecasts *Collaboration:* • Provide DSP Input to Clean Energy Plan and IRP • Participate in Community Benefits and Impacts Advisory Group • Educate Internal Stakeholders on DSP **Outreach and Engagement** • Statewide workshop #1 (Feb 17th) **Utility Staffing & Development** • Hire Data Governance Specialist • Hire Program Specialist • Set 2023 Development Goals **Data Evaluation and Improvement** • Document current data structures and flows	**DSP Process Improvements** *DSP Study Areas:* • Grid need and solution Identification • Develop new methods/approaches within studies including analysis of non-traditional solutions *Collaboration:* • Continued collaboration with Clean Energy Plan and IRP • Continued participation in Community Benefits and Impacts Advisory Group **Toolset Evaluation and Implementation** • Document data requirements and use cases based on input from DSP study area analysis (As Needed)	**DSP Process Improvements** *DSP Study Areas:* • Continued work from Q2 *Collaboration:* • Continued collaboration with Clean Energy Plan and IRP • Continued participation in Community Benefits and Impacts Advisory Group **Outreach and Engagement** • Local meetings to review DSP study area findings • Statewide workshop #2 **Toolset Evaluation and Implementation** • Define toolset requirements (As Needed) • Begin preliminary toolset evaluation (As Needed)	**DSP Process Improvements** *DSP Study Areas:* • Finalize Studies • Define Next Steps *Collaboration:* • Continued collaboration with Clean Energy Plan and IRP • Continued participation in Community Benefits and Impacts Advisory Group **Outreach and Engagement** • Local meetings to communicate final findings and next steps • Statewide workshop #3 **Toolset Evaluation and Implementation** • Implement data improvements and new toolsets (As Needed)

In closing…

- Modernized Distribution System Planning processes are being developed based on Oregon specific requirements.
- Developing new processes will require years of iterations and is a significant investment being paid for by Oregon ratepayers.
- Oregon Distribution System Planning requires close collaboration with other Company and Oregon initiatives such as the Integrated Resource Plan and Oregon Clean Energy Plan.



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

PacifiCorp Electrification Forecast

Peter Schaffer, Senior Customer Solutions Planning Manager

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Electrification Projections

The electrification projection is used to identify load-growth potential generated by vehicle and building electrification. Forecasts consider several potential growth scenarios simulating various levels of electrification uptake specific to PacifiCorp's service territory and customers but does not attribute specific interventions to each. Possible future interventions may include:

- Future state-specific policy considerations
- Company-sponsored program implementation and design
- Increases in technology, market maturity and decreases in technology costs
- Increased scarcity in fossil-fuel resources

Directives and Policies Supporting Electrification

Electric Vehicles

- IRA extends tax credits for EVs and expands them to the used market for EVs.
- Utah investment of $50 million in EV infrastructure (EVIP).
- Utah DEQ offers rebates for up to 50% the installation cost of Level 2 and DCFC stations
- OR, WA, CA all require 100% of light duty sales to be EVs by 2035.
- WY bill (not passed) seeking to phase out EVs by 2035.
- OR rebate ($1500-$2500) available for purchase or lease of new EVs.

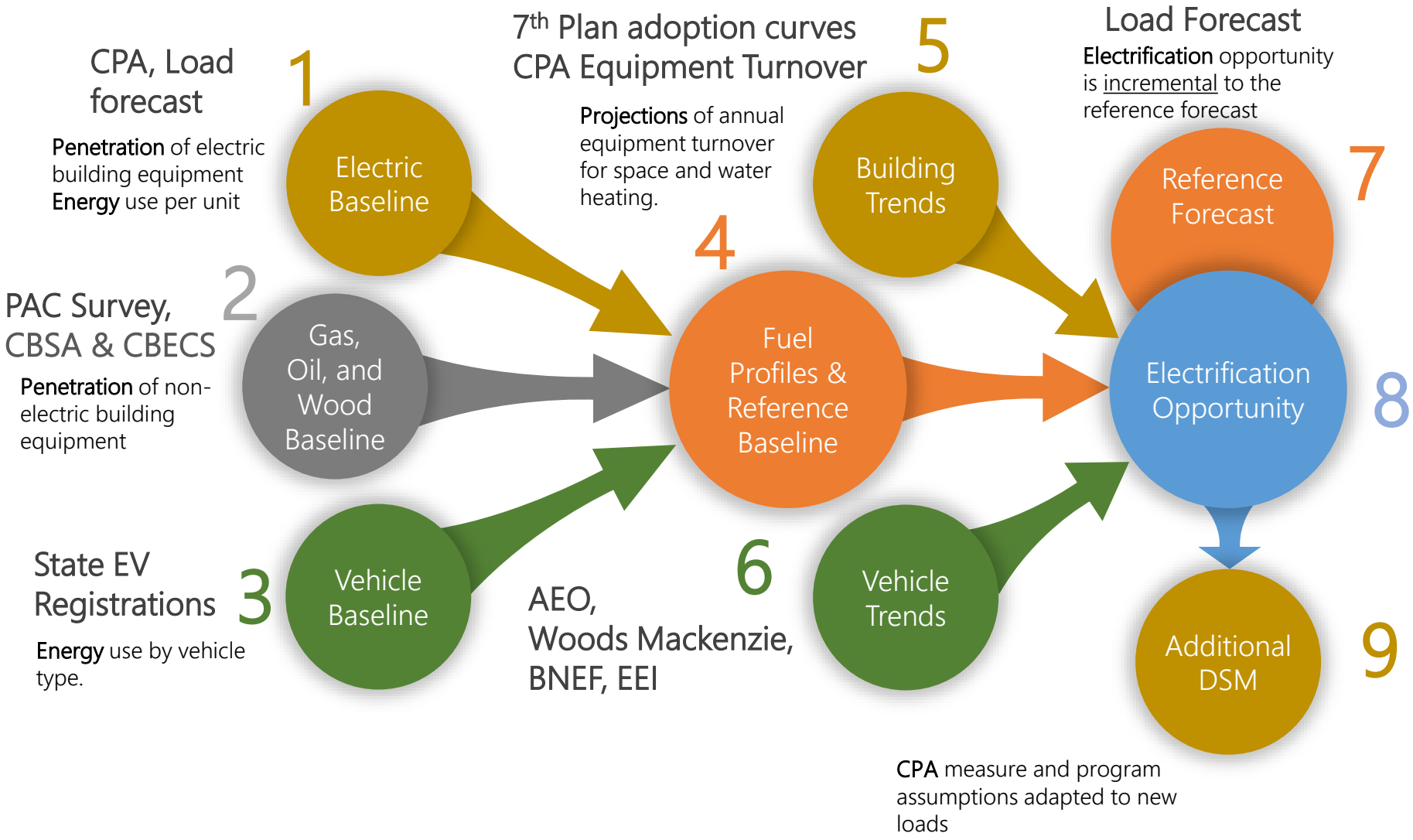
Building Electrification

- IRA encourages heat pump adoption though not explicitly displacing fossil fuels.
- Allowance for DSM spending on heat pumps displacing non-electric heat in Utah and Idaho.
- Can replace non-natural gas systems in Oregon with DSM spending.
- Can replace non-electric heating systems in low-income home with DHPs in WA.
- Fuel switching pilots underway in CA which may be expanded statewide.
- Ban on natural gas in new construction for large buildings in WA.

Electrification Projection Principles

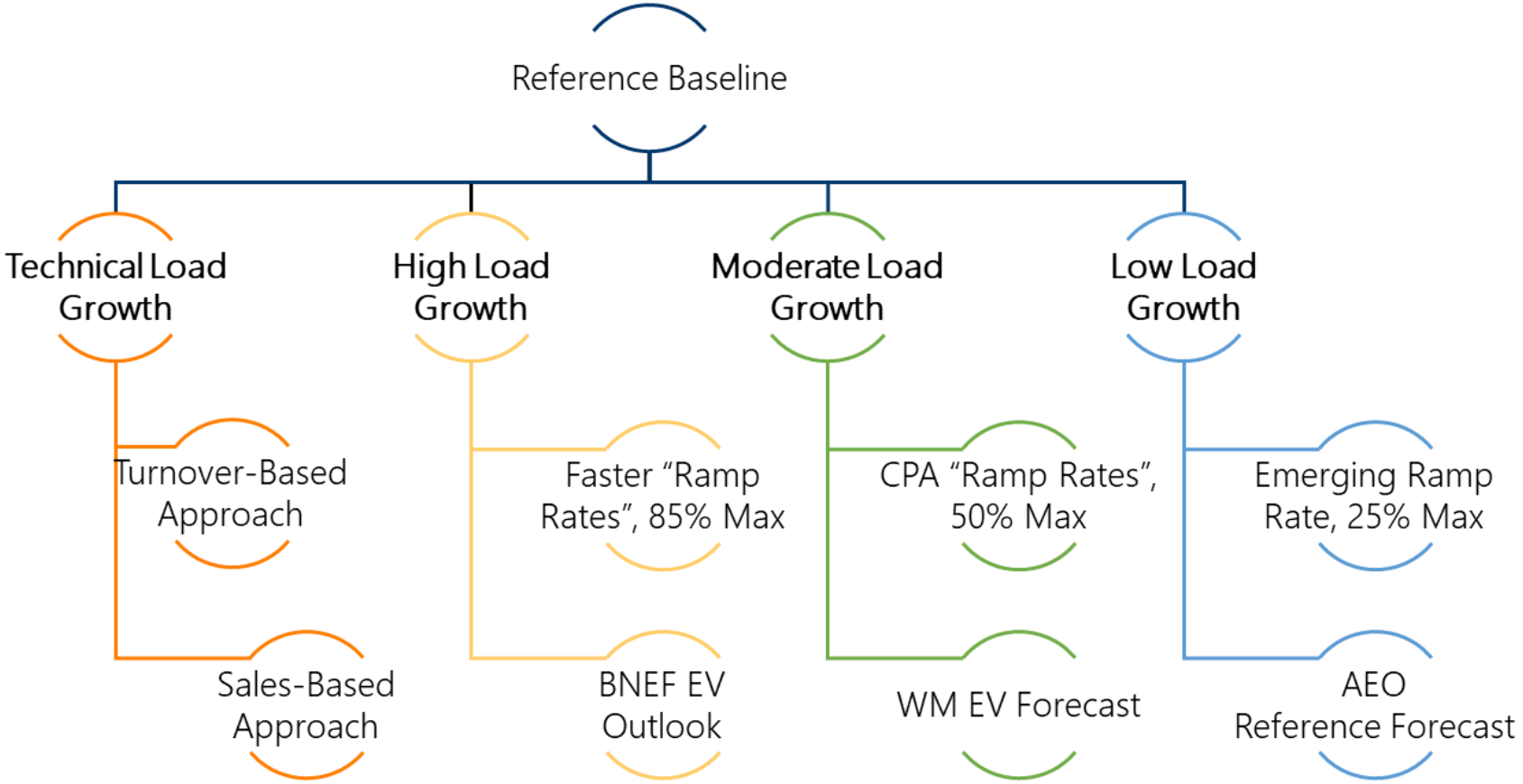
- Continually refine assumptions and methods to evolve with emerging trends and industry standards.
- Calibrate to actuals or current market data where possible.
  - EV DMV registrations
  - DSM measures displacing non-electric equipment
- Prioritize large impact items – this can change over time as new trends emerge.
  - Emphasis on light duty vehicles and not niche use cases such golf carts or airplanes.
  - Emphasis on space and water heating end-uses and not small loads like electric grills.
- When in doubt leave it out. Focus on what seems likely to occur with noticeable impact.
- Select scenario based on state market trends and policy directives
  - EV sales requirements, decarbonization goals, fuel switching policies etc.

Forecast Approach and Key Data Sources



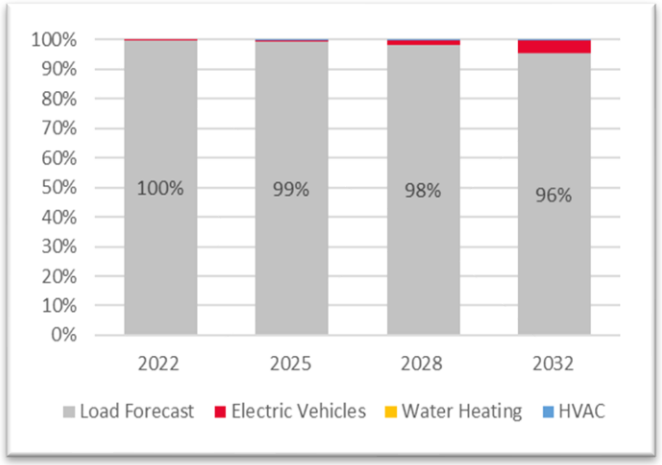
Electrification Scenario Definitions

The four scenarios presented below represent possible electrification outcomes based on a variety of factors. Rather than prescribing one "certain" future, a range of meaningfully different possibilities is provided for consideration. Growth opportunities below are incremental to that within the PacifiCorp Load Forecast.

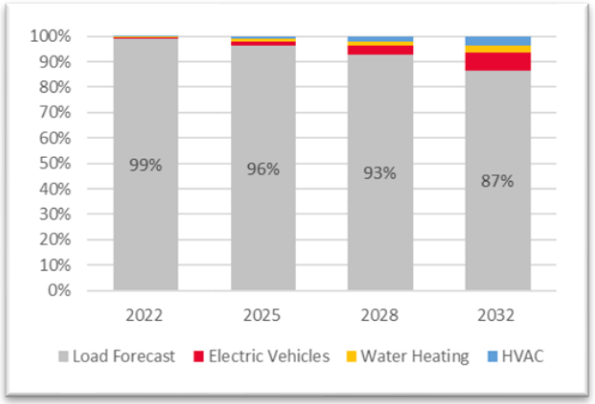


Growth Scenarios, All States

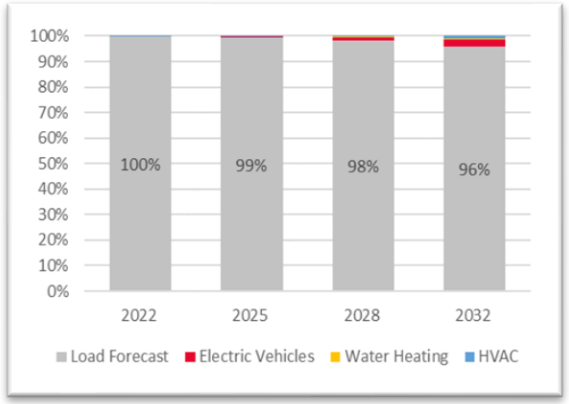
Reference Case Growth



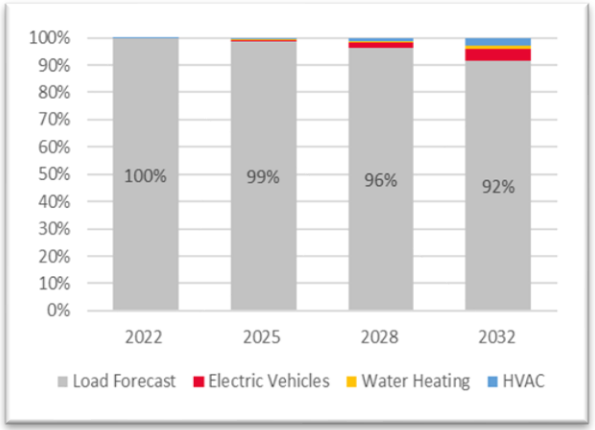
Technical Growth



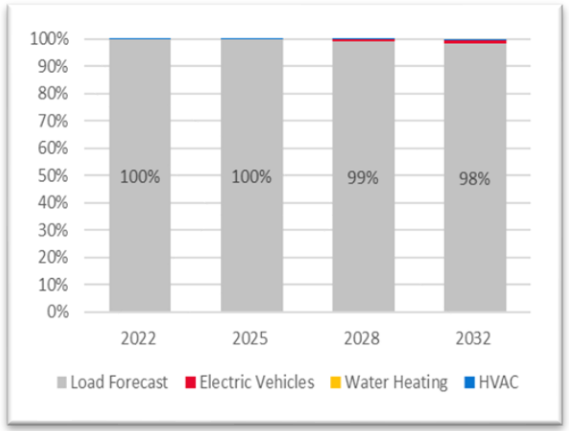
Moderate Growth



High Growth

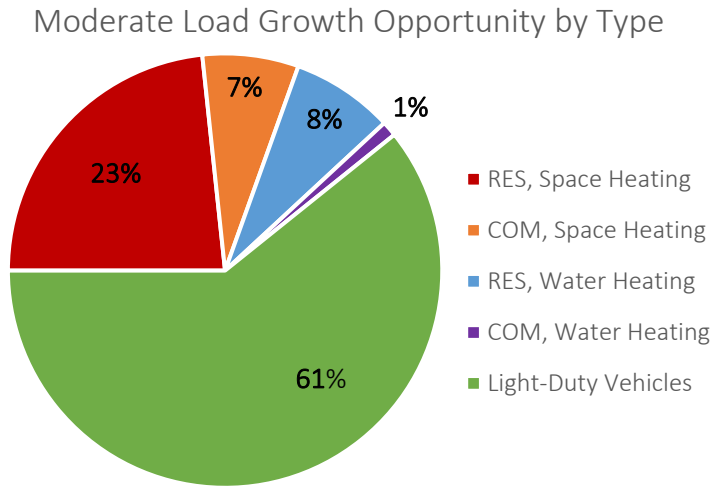


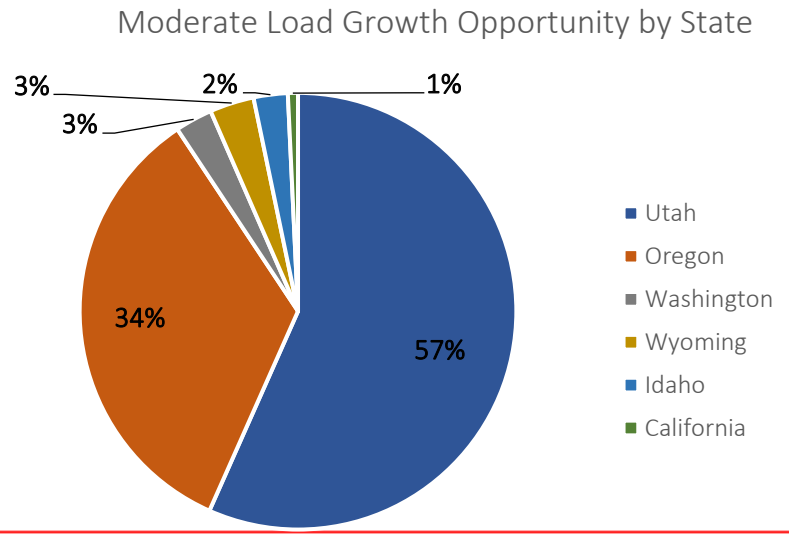
Low Growth



Key Electrification Findings

- **Key findings** include:
  - By 2032, Territory-wide opportunity for residential and commercial buildings and light-duty vehicles ranges from a “Low” of 963 GWh to a “High” of 4,502 GWh.
  - Light-duty vehicle electrification makes up over half of the load opportunity for all scenarios
  - By 2032, Utah makes up over half of potential, followed by Oregon. Due primarily to number of customers (i.e. cars) and high proportions of natural gas equipment (for Utah) and policies.
  - Both residential and commercial buildings in the Washington, California, and Oregon territories are having higher electric saturations and as a result the electrification load opportunity is limited.
  - Large-scale commercial-building gas equipment lacks a technically mature electric alternative (such as a heat pump replacement for a large, central boiler)





Future Improvements

The company continually reviews methods and examines new approaches and data for forecasting. Looking forward, key areas of focus include:

1. Improved MDV/HDV vehicle accounting
2. Investigate differences in VMT by state
3. Investigate industrial electrification opportunities more fully
4. Evaluate cooking electrification potential
5. Update turnover rates and measure assumptions with information in the latest CPA

Infrastructure Investment and Jobs Act (IIJA) Funding

Rohit Nair, Director of Engineering Standards and Grid Modernization

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Key IIJA Programs for PacifiCorp

IIJA allocates over $15B towards upgrading utility relevant T&D infrastructure, and additional funds for Electric Charging infrastructure

IIJA Section	PacifiCorp's Eligibility as Applicant	Total Funds over 2022-2027	Formula / Competitive	Program Timelines
Grid Resilience - Competitive (40101c)	Can apply to DOE directly	2.5B	Competitive	Currently open for award for 40% of total funds (covers FY 2022-23)
Grid Resilience - Formula (40101d)	Can apply to states	2.5B	Formula	States to submit their project plans by March 2023 for receiving their formula share of 1st year funds
Smart Grid (40107)	Can apply to DOE directly	3B	Competitive	Currently open for award for 40% of total funds (covers FY 2022-23)
Grid Innovation (40103b)	Can be a sub-applicant to state entity	5B	Competitive	Currently open for award for 40% of total funds (covers FY 2022-23)
Grid Innovation - Rural (40103c)	Can apply to DOE directly (to be confirmed)	1B	Competitive	To be announced

GRIP - IIJA Programs of Immediate Relevance

Three separate IIJA programs consolidated under *Grid Resilience Innovation & Partnership program (GRIP)* are currently open for competitive awards

Topic Area Title	Eligible Applicants	Anticipated Number of Awards	Anticipated Maximum Award Size for Any One Individual Award (DOE Share)	PAC's Proposed Projects
Grid Resilience Grants (40101c)	• Electric grid operators, electricity generators, electricity storage operators, transmission owners or operators, distribution providers, fuel suppliers, and other relevant entities	10	$100 million	**Scope** • Wildfire mitigation projects **Geography**: Oregon & California
Smart Grid Grants (40107)	• Institutions of higher education • For-profit entities • Nonprofit entities • State and local governmental entities, and tribal nations	25 – 40	$50 million	**Scope** • Situational awareness • System automation disturbance monitoring **Geography**: All 6 states
Grid Innovation Program (40103b)	• A state • A combination of two or more states • Indian tribe • Unit of local government • Public utility commission	4 – 40	$250 million ($1 billion per award for interregional transmission projects)	**Scope** • Transmission Capacity Enhancement • System resiliency for wildfire mitigation and Microgrid **Geography**: PAC territory **Applicant**: Utah and Wyoming

IIJA GRIP Process Flow & Timelines

Funding Opportunity Announcement (FOA): Nov 18, 2022

OVERALL PROCESS

1 Concept Paper Deadline

- 12-page overview; 5-page community benefit plan; 5-page appendix of capabilities
- Applicants should cover how the project meets the eligible uses for a topic area and team capabilities & qualifications

Dec'22-Jan'23

2 Decision Notification

- Applicants will be notified via email if they are encouraged or discouraged to apply
- Full applications can be submitted regardless of outcome

Jan-Feb'23

3 Full Application Deadline

- Applicants will submit 16-21 unique documents
- Applications must include a Community Benefits Plan (Community and Labor Engagement, Justice40, Buy America)

Mar-May'23

4 Award Negotiation

- Award negotiation process is expected to take 60 days
- Awardees will be publicly announced
- Expected award notification Topic 1&2 in Summer 2023 and Topic 3 in Fall 2023

May-Jul'23

5 Negotiations Completed

- Award disbursed to selected candidates and follow up on next steps

Aug-Oct'23

SPECIFIC TIMELINES

1 Concept Paper

GRIP Component	Due Date
Grid Resilience Grants (40101c)	16-Dec-22
Smart Grid Grants (40107)	16-Dec-22
Grid Innovation Program (40103b)	13-Jan-23

2 DOE Feedback on Concept Paper

GRIP Component	Due Date
Grid Resilience Grants (40101c)	15-Feb-23
Smart Grid Grants (40107)	15-Feb-23
Grid Innovation Program (40103b)	24-Feb-23

3 Full Application

GRIP Component	Due Date
Grid Resilience Grants (40101c)	6-Apr-23
Smart Grid Grants (40107)	17-Mar-23
Grid Innovation Program (40103b)	19-May-23

Grid Resiliency Formula Grants (Section 40101d)

>$350M to be allocated to PacifiCorp's six states during FY 2022-26

	CA	OR	WA	ID	UT	WY
Total Formula Grant	169M	50M	59M	23M	29M	20M
Annual Allocation for 40101d	34M	10M	12M	5M	6M	4M
PacifiCorp's Activities	Expected to be competitive	Expected to be competitive	Expected to be competitive	Awarded $450k for 2022 2023-2026 Expected to be competitive	Ongoing discussions	Ongoing discussions

- State applications for FY22 will be due March 31, 2023. PacifiCorp has initiated discussions with all six state energy offices to provide any required support
- Each state will determine its own process for allocating its funds. None of the six states have finalized the process.
- Eligible uses of funds – Utility pole management, system hardening, undergrounding, replacement of old overhead conductors and underground cables, relocation of power lines or reconductoring of power lines with low-sag, advanced conductors, vegetation and fuel-load management, weatherization technologies and equipment, fire-resistant technologies and fire prevention systems, monitoring and control technologies, DERs for enhancing system adaptive capacity during disruptive events, including microgrids, and battery storage subcomponents, adaptive protection technologies, and advanced modeling technologies

Cellular Field Area Network (CFAN) & Interactive Volt-Var Optimization (IVVO)

Rohit Nair, Director of Engineering Standards and Grid Modernization

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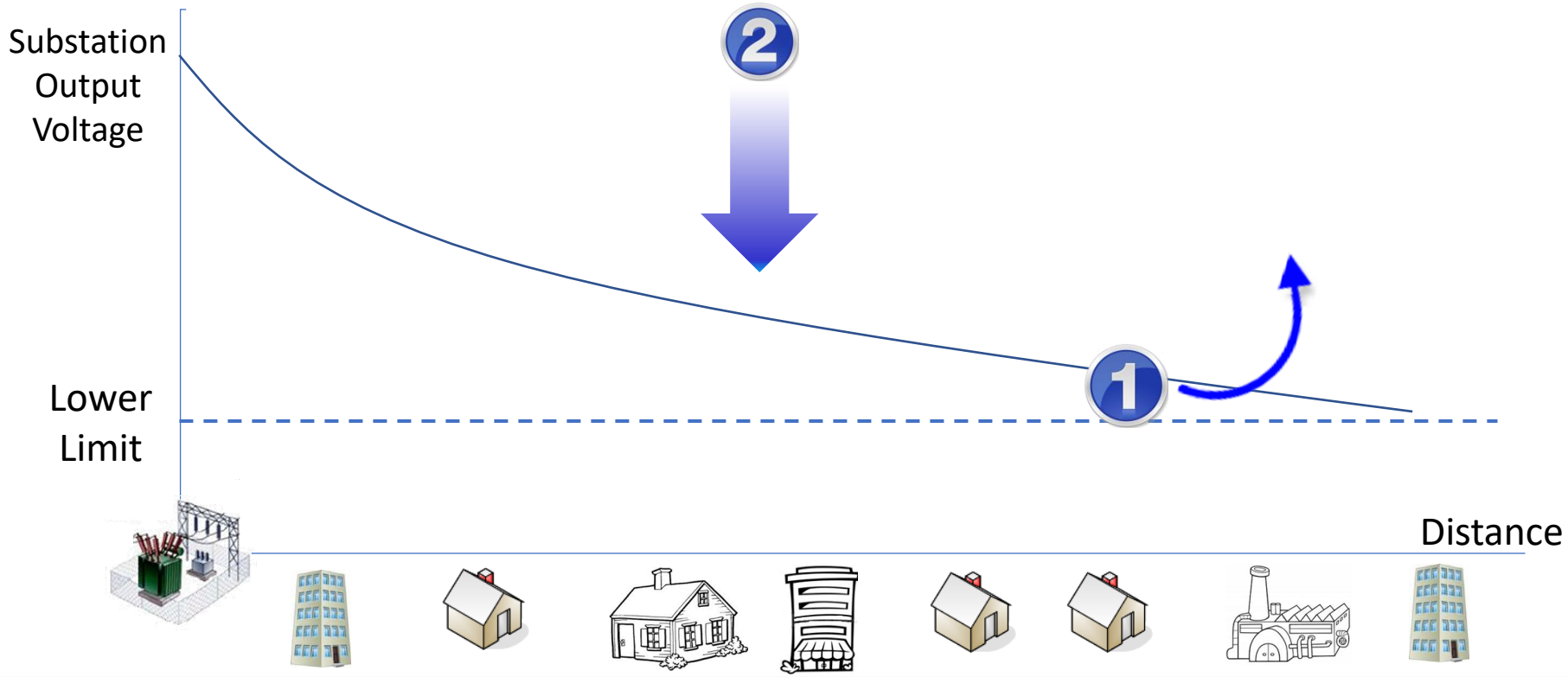
Cellular Field Area Network (CFAN)

- CFAN program delivered a secure and scalable solution that provided a new option for communications with field-based intelligent electronic devices (IEDs) using commercially available cellular networks
- Established a standard back-end infrastructure and a set of operational processes for installation, management and support of the CFAN technologies
- Telecom engineers use new standard as another method for field asset communications, in addition to existing methods such as microwave radio, direct fiber, leased line, or other private wireless
  - Adopted cellular communications to allow the ability to reach locations that are currently cost prohibitive using traditional communication methods.
  - Enables enhanced situational awareness for efficient outage management to improve SAIDI
  - Installed at 27 sites and plans for further installations in 2023 and 2024

Integrated Volt-Var Optimization

- First flatten voltage profile, then lower it
- Reduced energy use from some customers
- Δ Energy = Factor x Δ Voltage



Integrated Volt-Var Optimization

- To maintain the voltage within the specified range across the entire distribution circuit the voltage at the distribution substation bus is controlled by some combination of a load tap change (LTC), substation regulator(s) and substation capacitor(s)
- For circuits whose load is primarily resistive (typical of residential loads), a lower distribution voltage can reduce system demand and energy
- In 2012, PacifiCorp initiated a four-circuit CVR pilot in Washington State
- Company has found that its existing voltage management and system improvement practices are much better than assumed by some regional and national estimates. This reduces the level of cost-effective savings available with additional voltage reduction measures
  - *Many circuits are not viable due to low voltage settings, low energy usage, etc.*
  - *Complex analysis is still required for accurate ΔE prediction*
  - *Accurate M&V appears infeasible for circuits with small ΔE*

Questions

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