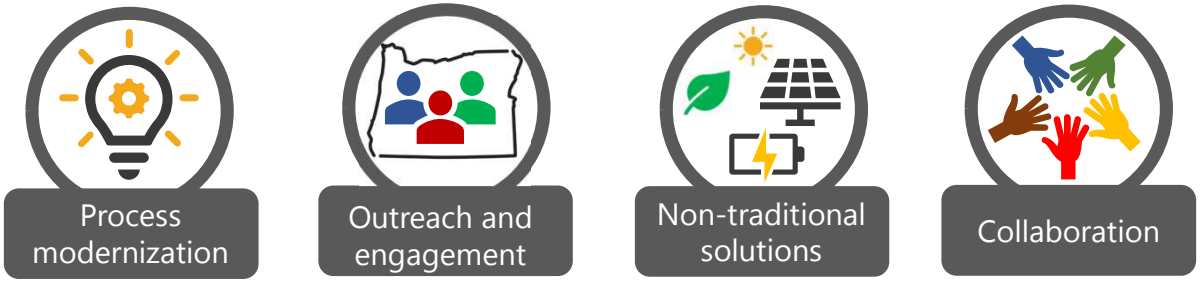
PacifiCorp
Distribution System Planning

March 18th, 2026

Presenter:
Shauna Thomas, Manager - Distribution System Planning
Cadogan Morgan - Sr. Engineer, Ian Hoogendam, Director - Reliability Standards and System Modeling



DISTRIBUTION SYSTEM PLANNING

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Workshop #2 Information

Microsoft Teams meeting
Join:
https://teams.microsoft.com/meet/25032941391466?p=g6W074I1kahskTO6LO
Meeting ID: 250 329 413 914 66
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+1 563-275-5003,,385351471# United States, Davenport
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Please add the following to the Teams Chat when you log on to the meeting:
- Your Name
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Please use the raise hand function in Teams if you would like to speak.

This meeting will be recorded and posted to the PacifiCorp DSP website.

Agenda

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Agenda


Workshop Objectives
Update on Filing
Historical and Forecasted Spend
Stakeholder Feedback
Study Area Reports
Lessons Learned
New Pilot Concept Approach
Evolution of Planning Tools
Status Update: New Pilot Concept Approach
Next Steps
Feedback and Questions

Workshop Objectives

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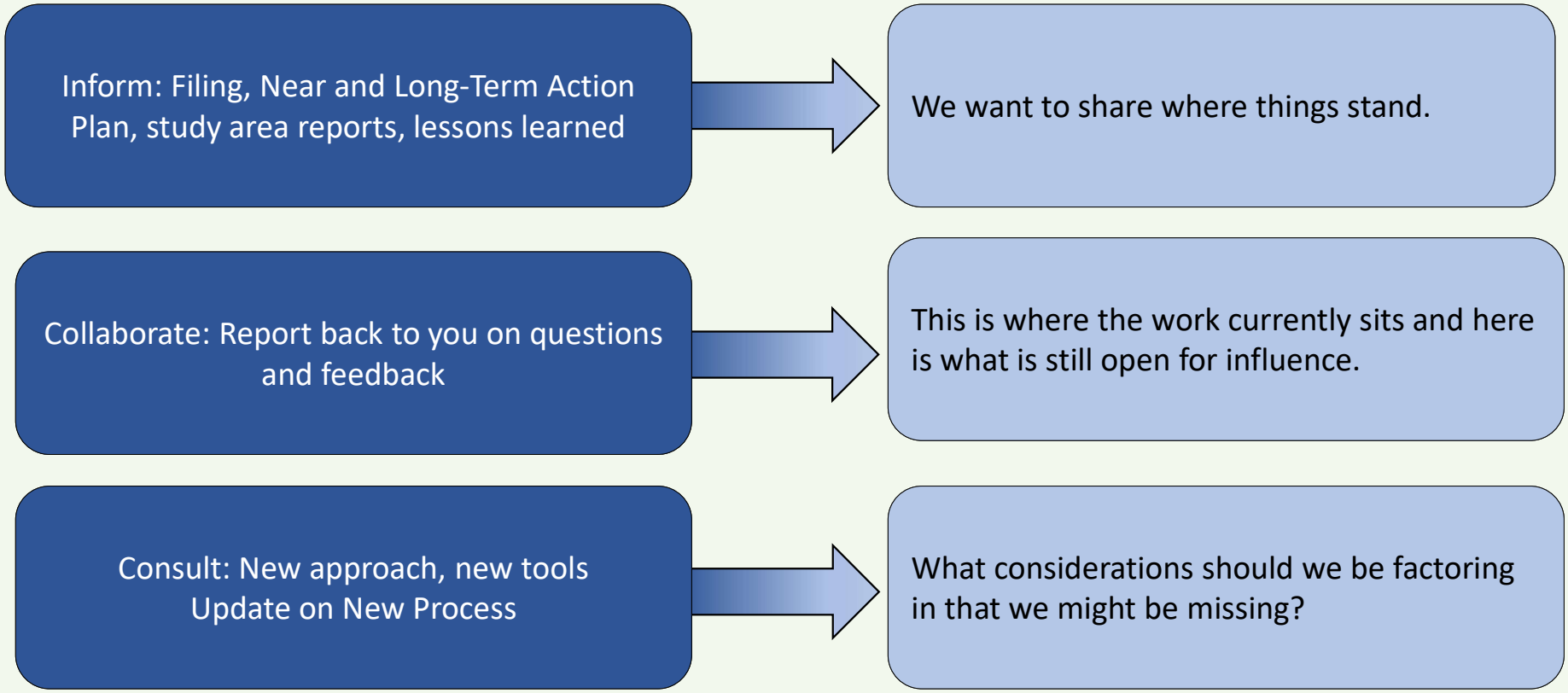
Objectives


Inform: Filing, Near and Long-Term Action Plan, study area reports, lessons learned
We want to share where things stand.
Collaborate: Report back to you on questions and feedback
This is where the work currently sits and here is what is still open for influence.
Consult: New approach, new tools Update on New Process
What considerations should we be factoring in that we might be missing?

Update on Filing

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Updated on Filing

Completed

- 2026-2035 Distribution Forecast Spend was approved in November 2025
- SSR RFP Bidding Cycle
- Content for 2026 Filing
- Reviewed characteristics of pilot concept proposal areas for nontraditional solutions

In Progress

- Collaborating with internal departments for pilot concepts proposals
- Exploring storage solutions
- Piloting new Customer Solution Programs

Upcoming

- Goal 2026 Pilot Concept Proposal
- New Engagement Plan Late Summer / Early Fall 2026

DSP Filing Chapters

CHAPTER 1

- Grid Needs
- Evolution of Distribution System Planning Process

CHAPTER 2

- Forecasting Load Growth
- Forecasting EV Adoption
- Forecasting DER Adoption

CHAPTER 3

- Solution Identification to Address Grid Needs
- Nontraditional Evaluation
- Lessons Learned

CHAPTER 4

- Near and Long-Term Action Plan

CHAPTER 5

- Engagement from our Study Areas
- Lessons Learned
- Future DSP Workshops

Historical Spend and Forecasted Spend

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Historical Spend

Upgrade and Reliability

Functional upgrades to distribution substations and circuits from new load and reliability work plans

Storm and Casualty

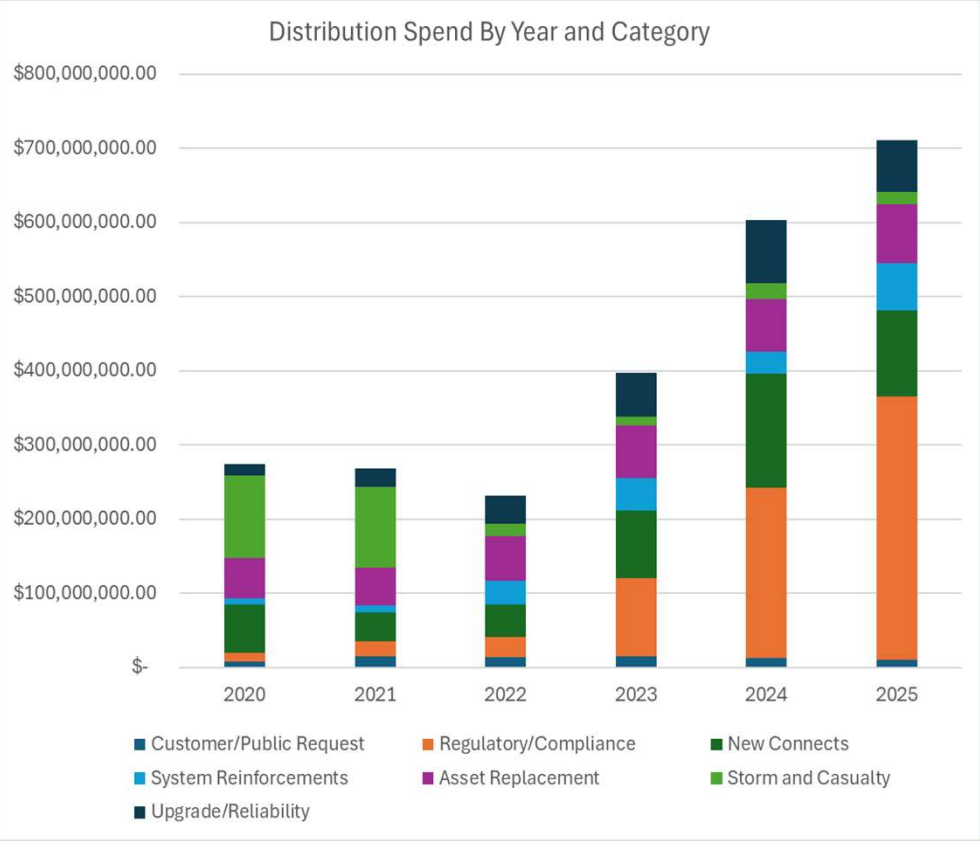
Storm damage and external events (car hits pole, vandalism)

Asset Replacement

Asset replacement of assets that are damaged, deteriorate, or obsolete

System Reinforcement

Improvement or reinforcements needed to maintain performance



New Connects

New connects for all customer classes

Regulatory and Compliance

Regulatory and compliance obligations, including Wildfire Mitigation Plans

Customer Public Requests

Highway Relocations, joint use, Right-of-Way Renewals

Forecast Spend

Upgrade and Reliability

Functional upgrades to distribution substations and circuits from new load and reliability work plans

Storm and Casualty

Storm damage and external events (car hits pole, vandalism)

Asset Replacement

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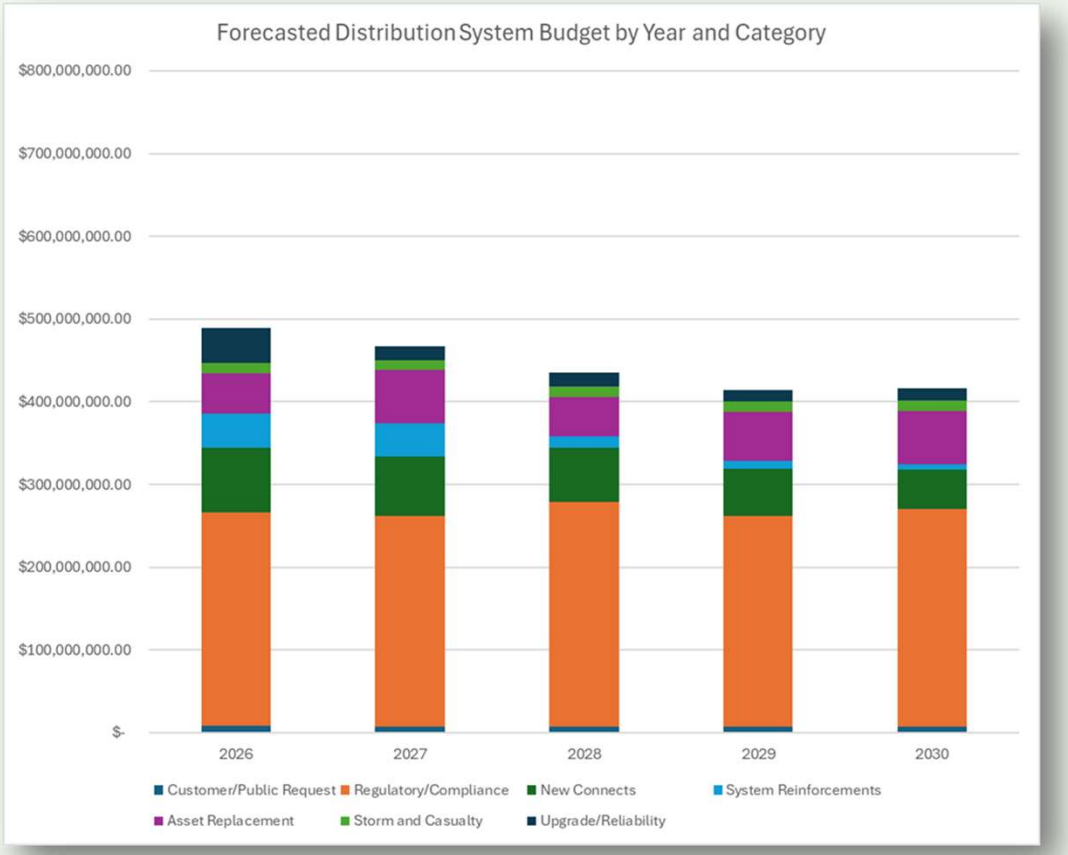

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New connects for all customer classes

Regulatory and Compliance

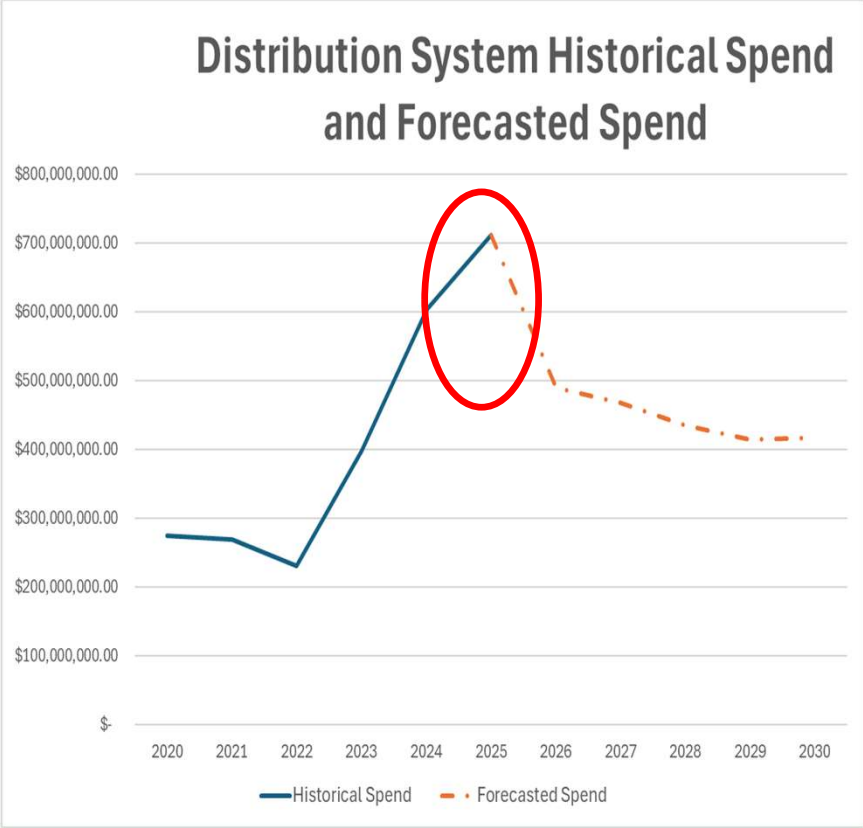
Regulatory and compliance obligations, including Wildfire Mitigation Plans

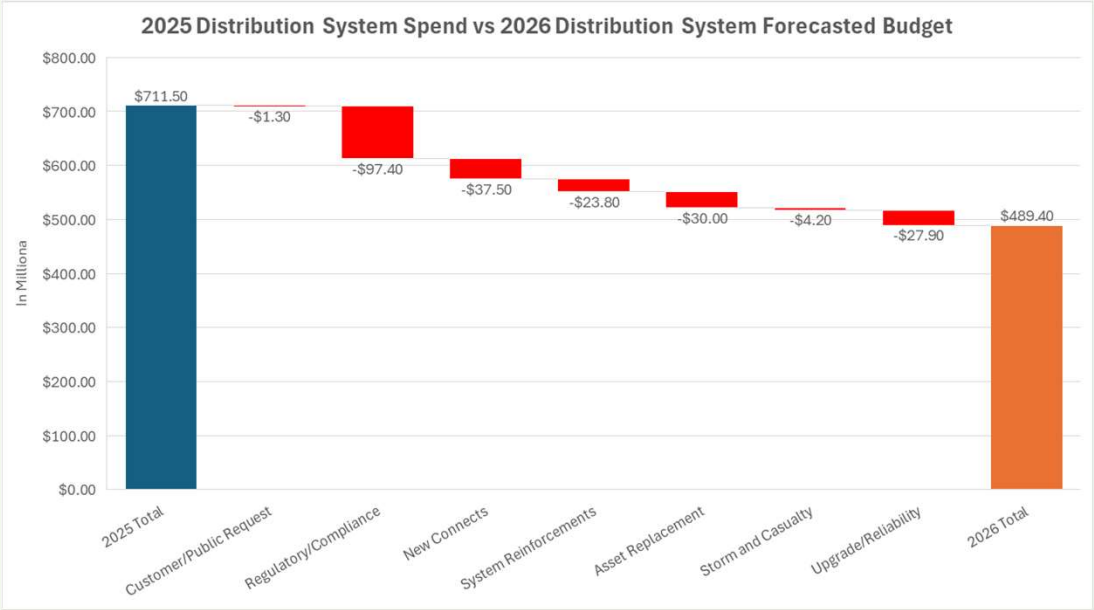
Customer Public Requests

Highway Relocations, joint use, Right-of-Way Renewals

***Approved budget as of Nov 2025, subject to change**

2025 Historical Spend vs 2026 Forecast Spend





Stakeholder Feedback

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Customer Feedback Question #1

Why are pilot concepts that the DSP team has presented focused only on specific areas of the distribution system and not the entire distribution system?

One mission of the DSP team is to identify grid needs and pilot nontraditional solutions. The team first identifies areas where grid needs exist and then tests nontraditional solutions in those areas. Once these solutions are successfully tested, they can be deployed more broadly across the distribution system.

Customer Feedback Question #2

The DSP team has presented possible programmatic solutions to local distribution problems from the utility perspective.

How has PacifiCorp approached the customer side of these programs? For example, how will customers benefit, how can customers engage, and how do program administrators ensure program benefits are equitably distributed?

Customer Feedback Question #2

Program	Program Manager
Energy efficiency	Administered by **Energy Trust of Oregon (ETO)**; Pacific Power is a major funder
Renewable energy	
Demand response	Administered directly by **Pacific Power**
Battery storage	Programs available through both **Pacific Power and Energy Trust**

- For more on ETO's program design and stakeholder feedback opportunities, the public is free and welcome to attend ETO's Conservation Advisory Council Meetings (energy efficiency programs) or Renewable Energy Advisory Council Meetings (renewable energy programs).
- Pacific Power's Community Benefits and Impacts Advisory Group (CBIAG) has a focus on equity and clean energy; the CBIAG regularly includes design discussions of, and provides stakeholder engagement opportunities regarding, the above customer programs.

Demand Response Program Design

Program design is informed by research, consultation, past experience, and stakeholder input

Programs typically target specific customer and equipment types, to allow for design to address key barriers

DR program design elements include

- Participation requirements (customer eligibility, equipment eligibility, curtailment required)
- Education, marketing and outreach channels and content
- Incentive amount, structure and timing
- Technician, trade ally or other support channels required

Continuous Improvement: Program performance is reviewed on an annual basis, including annual participant surveys, and reviewed for opportunities for improvement

- Pacific Power annual reports available under docket ADV 1383

Stakeholder Feedback

- Key part of program design process
- Solicit feedback for all programs prior to filing
- Present results and plans for program changes annually
- Primary channels for input on programs:
  - CBIAG: Oregon Community Benefits and Impacts Advisory Group
  - TN-CBIAG: Tribal Relations
- Other opportunities for stakeholder input:
  - IRP: IRP Public Input Process
  - CEP: Oregon Clean Energy Plan

Study Area Reports

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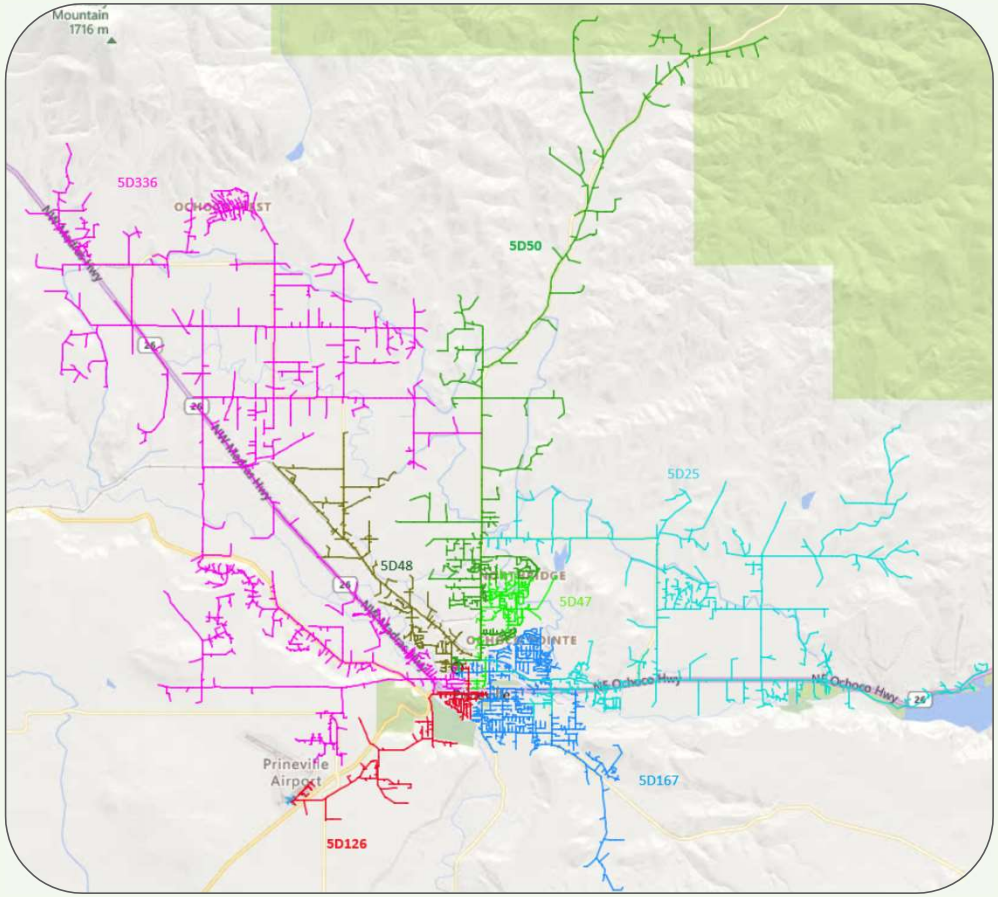
Short Overview of Study Process

- Two target areas per year
- Peak loads for each feeder
- 5-year loading history
- Loading projections for base load growth
- 5 and/or 10-year studies
- Determine conditions that require action
  - Overcapacity
  - Voltage
  - Protection
  - Power Factor
  - Reliability
- $250,000 cost threshold

Bagshaw, S. (2012) Capturing Oregon. https://traveloregon.com/things-to-do/trip-ideas/capturing-oregon-photographing-portland-at-night/

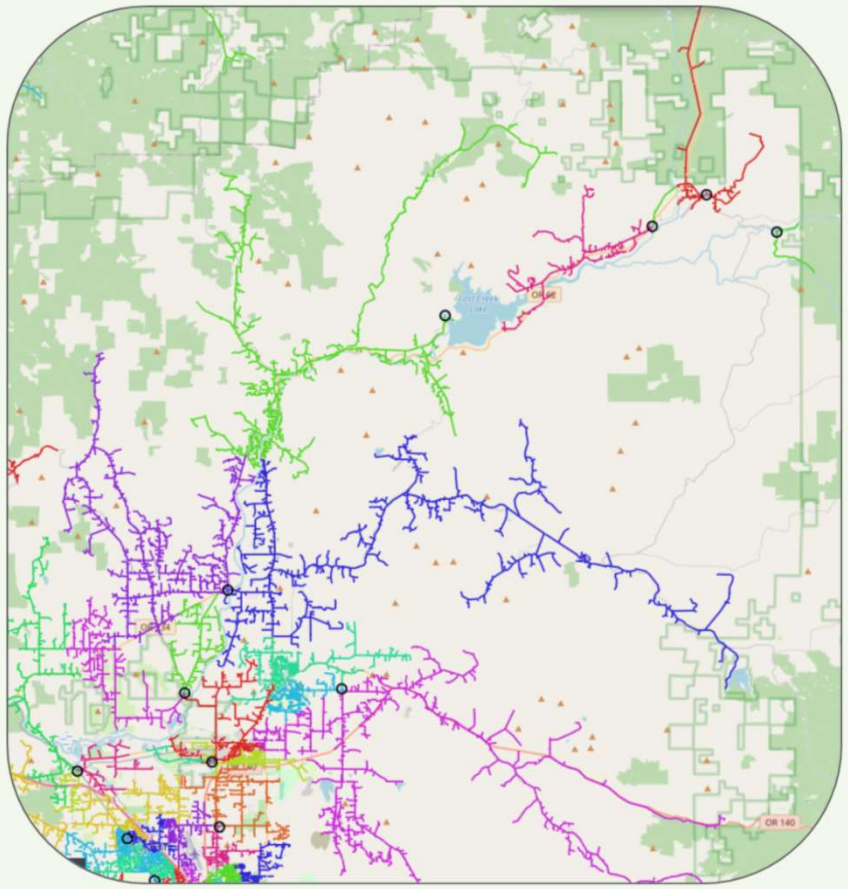
Prineville Study Area

- Grid Need: There are multiple transformers in the Prineville substation that are expected to approach capacity by 2035.
- Purpose and necessity: Delay or possibly even avoid construction of expensive new transformers, substations, and/or feeder lines.
- Traditional Solution: Purchase new transformers to increase substation capacity.
- Cost: ~ $3 Million per transformer.
- Non-Traditional Solution Proposal: Partnership with the Energy Trust of Oregon (ETO) to reduce the load on the Prineville substation using targeted energy efficiency.



Upper Rogue Study Area

- Grid Need: Loading on Takelma transformer is projected to exceed capacity by 2030.
- Purpose and necessity: Prevent damage to Takelma substation transformers and avoid outages to over 2700 customers.
- Traditional Solution: Upgrade substation transformer.
- Cost: ~ $3 Million per transformer.
- Non-Traditional Solution Proposal: Partnership with the Energy Trust of Oregon (ETO) to reduce the load on the Takelma substation using energy efficiency.



Nontraditional Solutions: ETO Proposals

Prineville	
Grid Need	Multiple transformers and feeders expected to approach maximum capacity by 2032
Capacity Requirement	3.8 MVA

	Traditional	ETO	ETO max
Solution	Build New Transformer	Energy Efficiency program	Energy Efficiency program
Capacity Reduction/ Improvement	30 MVA	600 kVA	1500 kVA
Cost	$3,000,000	$3,000,000	$25,000,000
Cost/kVA	$100/kVA	$5,000/kVA	$16,500/kVA

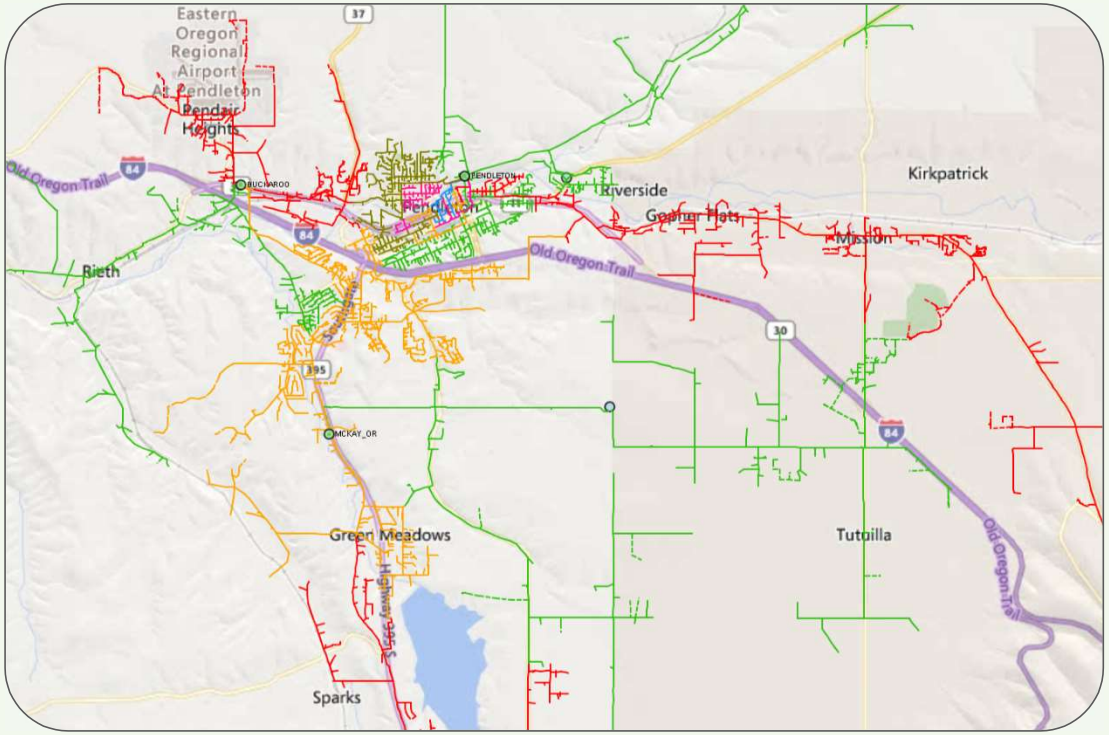
Upper Rogue	
Grid Need	Takelma Substation loading is expected to exceed maximum capacity by 2030
Capacity Requirement	1.7 MVA

	Traditional	ETO	ETO max
Solution	Build New Transformer	Energy Efficiency program	Energy Efficiency program
Capacity Reduction/ Improvement	12 MVA	387 kVA	820 kVA
Cost	$1,500,000	$2,600,000	$16,400,000
Cost/kVA	$125/kVA	$6,700/kVA	$20,000/kVA

Conclusion: Estimated load reduction from Energy Trust Programs were not enough to defer upgrade.

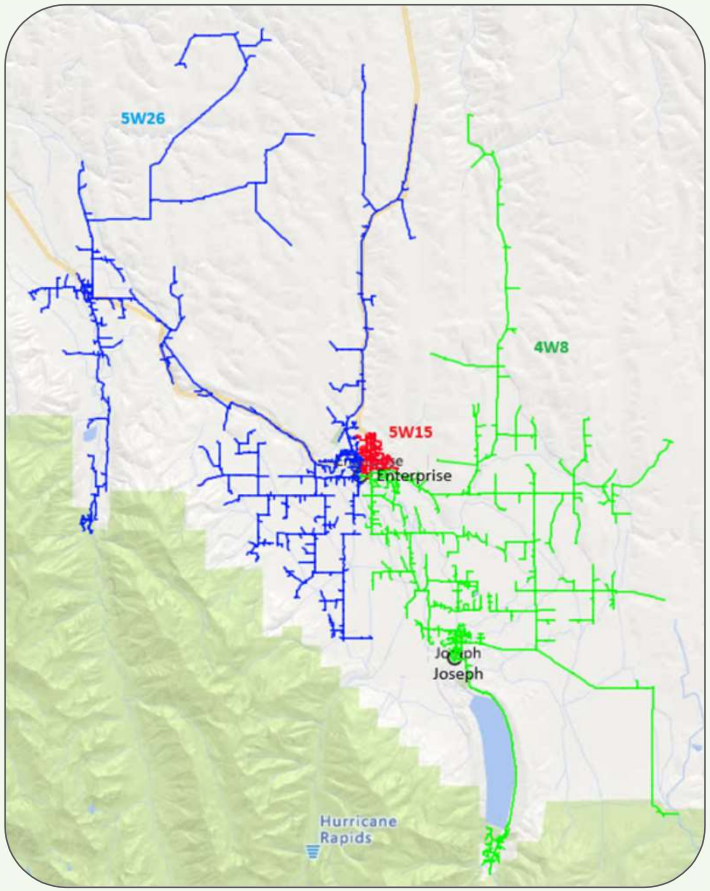
Pendleton Study Area

- Grid Need: The McKay Feeder (5W856) load will exceed 90% of capacity by summer of 2027.
- Purpose and necessity: Avoid damage to equipment and potential outages.
- Traditional Solution: Transfer 1.6 MVA (winter) peak load from McKay feeder (5W856) to Reith feeder (5W202). Transfer load from 5W856 to 5W202.
- Cost: $159,110
- Non-Traditional Solution Proposal: Solution did not pass $250,000 cost threshold for non-traditional solutions



Enterprise Study Area

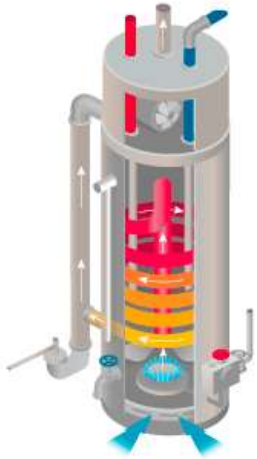
- Grid Need: Undersized conductor created deficiencies with the existing protection scheme on the distribution line between Enterprise and Joseph.
- Purpose and necessity: Avoid damage to equipment and outage to over 2000 customers.
- Traditional Solution: Replace existing conductor with thicker gauge, bringing it in compliance with existing protection parameters.
- Cost: $504,000
- Non-Traditional Solution Proposal: Immediacy of this need precluded any nontraditional solutions.



Optimal Time Rewards

- **Optimal Time Rewards was a demand management program that controlled customer smart thermostats and water heaters to reduce peak load**
- **Partnership with OATI-Armada**
- **Functionally replaced by PacifiCorp's Cool Keeper program**

Feb-24	Residential program to enroll **smart thermostats and electric water heaters** launched to customers
Aug-24	Participant data showed water heater capacity **70% lower** than expected
Oct-24	Determined even with potential changes to contract and program design, smart thermostat program not cost-effective without water heater component
Nov-24	**Program terminated Nov. 15**



Lessons Learned

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DSP Process – First Iteration

Based on PacifiCorp 5-year distribution planning study

Parameters

- All grid needs within 5 years
- Grid needs > $250,000 considered for nontraditional solutions
- Limited to designated study area

Solutions

- Nontraditional solutions only applied to immediate environs

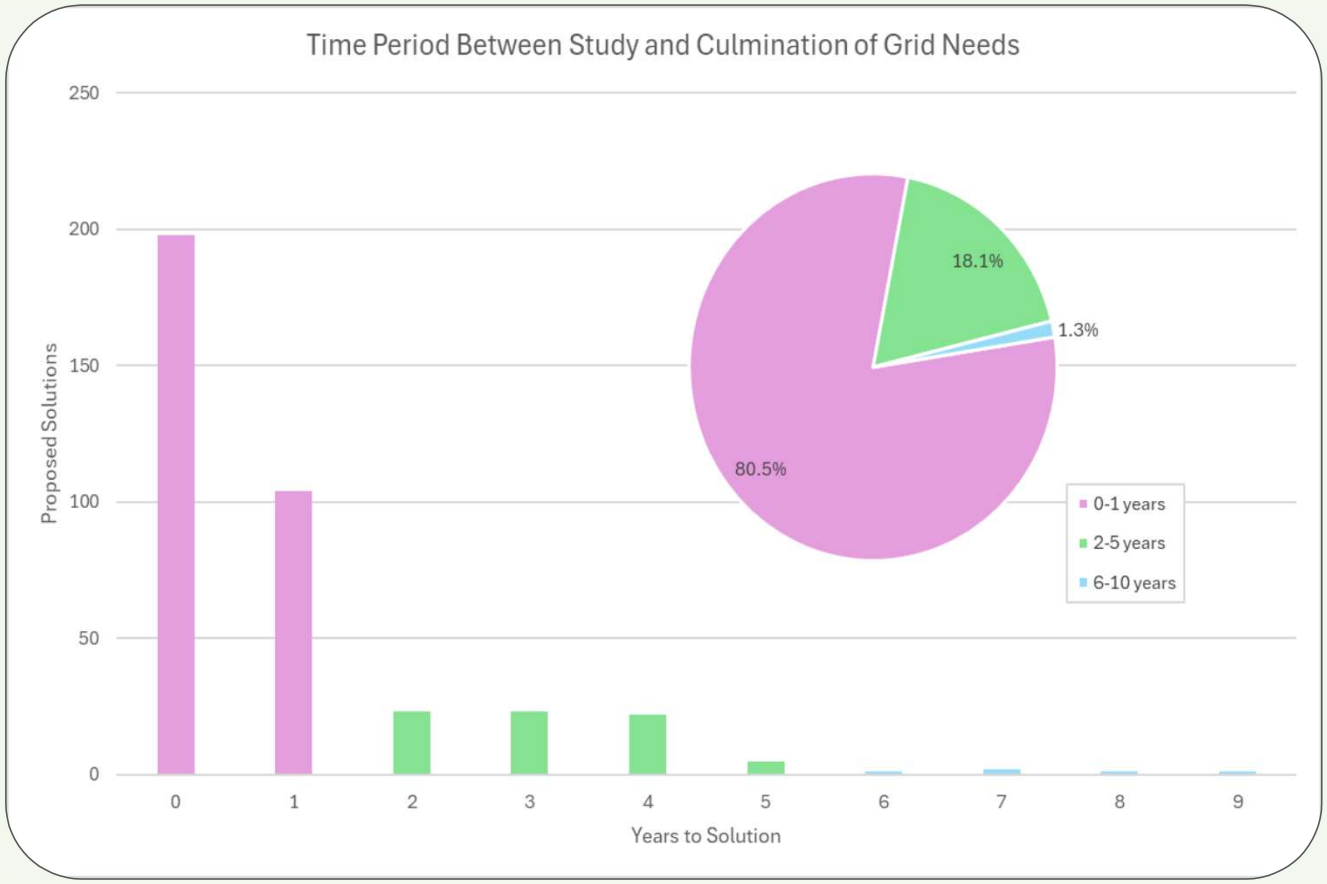
Scope - Time

Novel Nontraditional Solutions Require Time to Implement

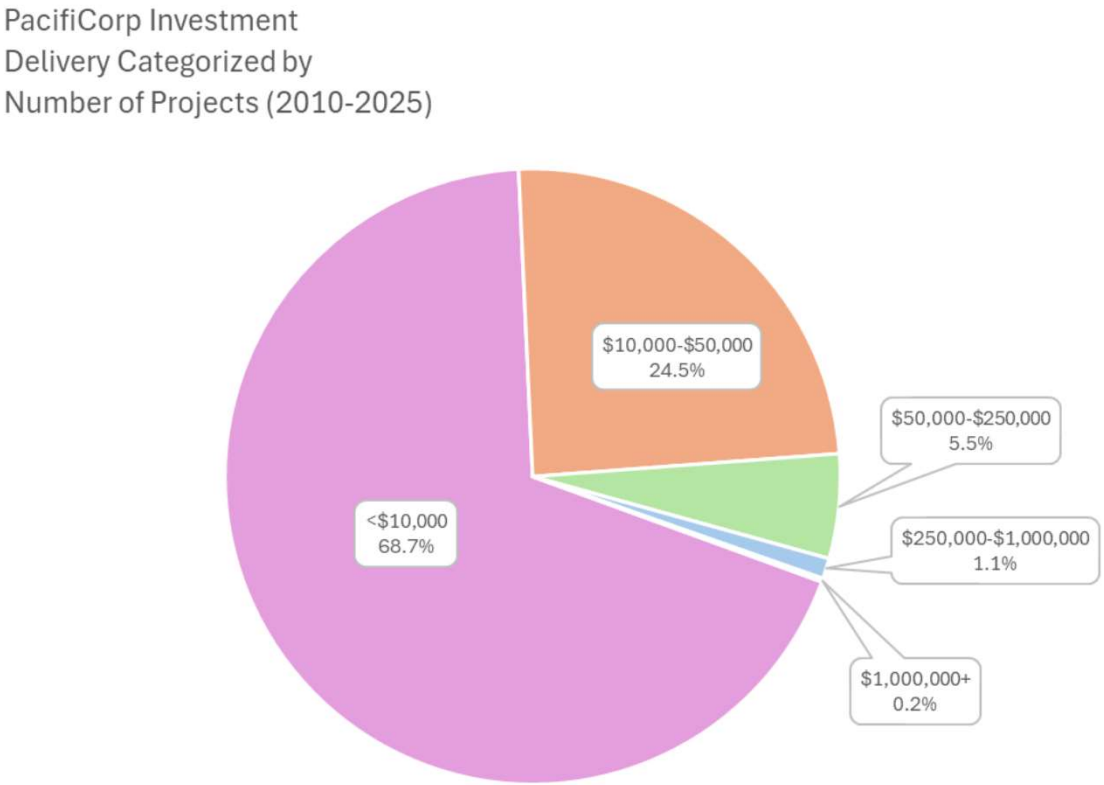
Scope - Time

80% of Grid Needs require action within two years

- **Longer term needs may be packaged into shorter term fixes.**
- **Studies identify issues where the grid may have changed rapidly in intervening years**



Scope - Cost



Only 1.3% of grid needs found met the cost requirements to be considered for non-traditional solutions (greater than $250,000)

Only 0.2% of grid needs exceeded $1,000,000

Over 2/3 of grid needs are items that cost less than $10,000.

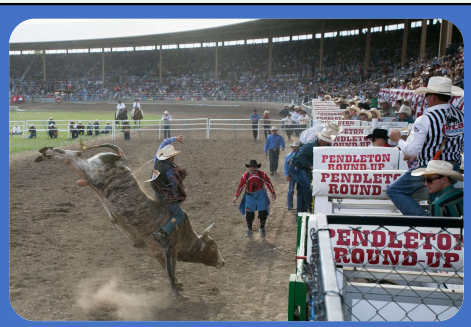
- **Half of those needs cost under $1,000**
- **The remainder are normally distributed**

Scope - Geography

Three years of studies yielded only two grid needs that were potentially addressable through non-traditional solutions

Wallowa County:
0 NTS-eligible grid needs

Prineville:
1 NTS-eligible grid need



Pendleton:
0 NTS-eligible grid needs

Upper Rogue:
1 NTS-eligible grid need

Needs in Prineville and Upper Rogue were only made available by expanding the initial timeline from 5 to 10 years

Scope - Geography

Current NTS Pilot Concept Areas

- Assets Identified by Area Planning
- Largely consist of transformers with high replacement costs
- High chance of overcapacity in 5-10 years
- 39 Feeders in 8 separate districts

Major Process Changes

New Approach (Process & Methodology Enhancements)

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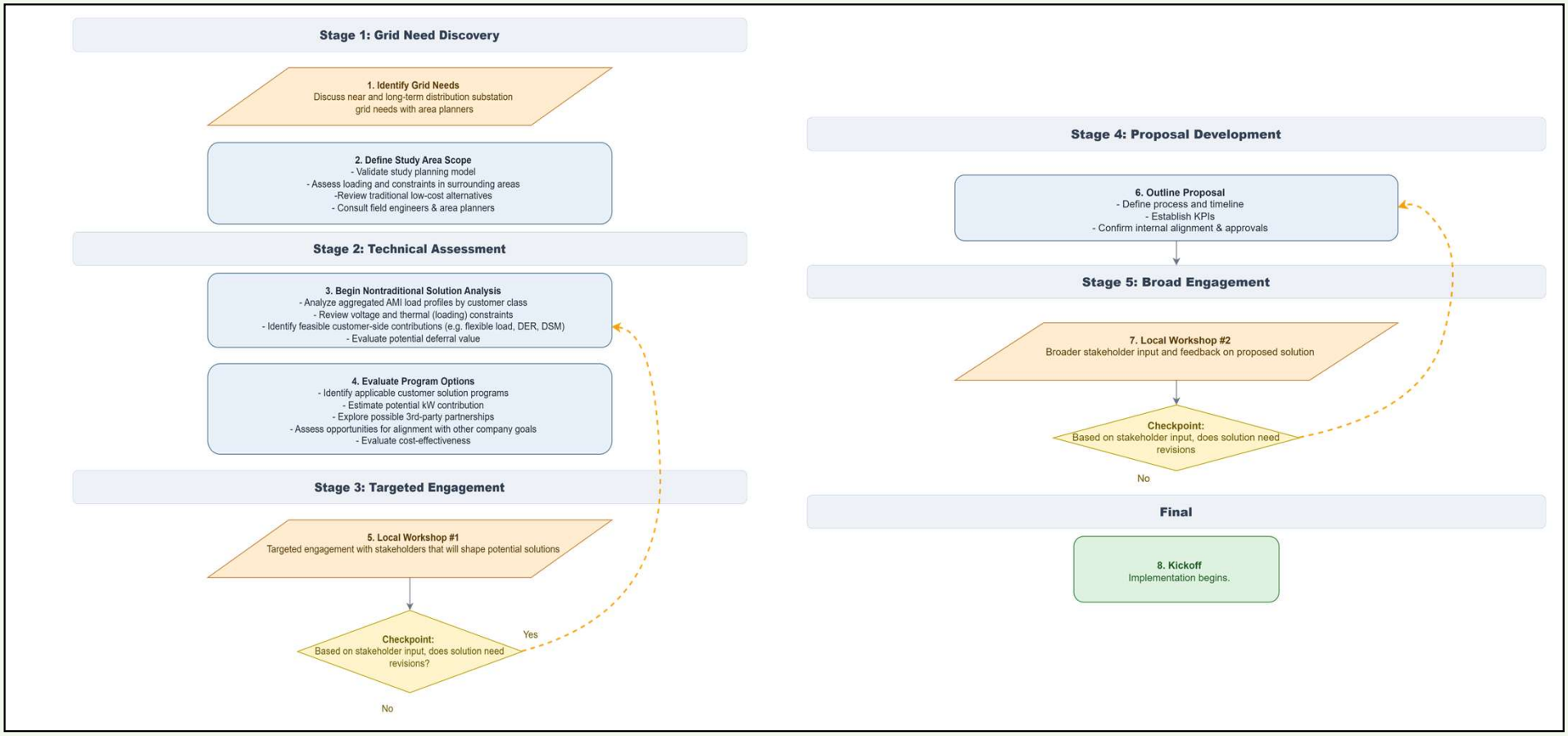
Spend and Action Plan Overview



Step 1: Grid Need Discovery

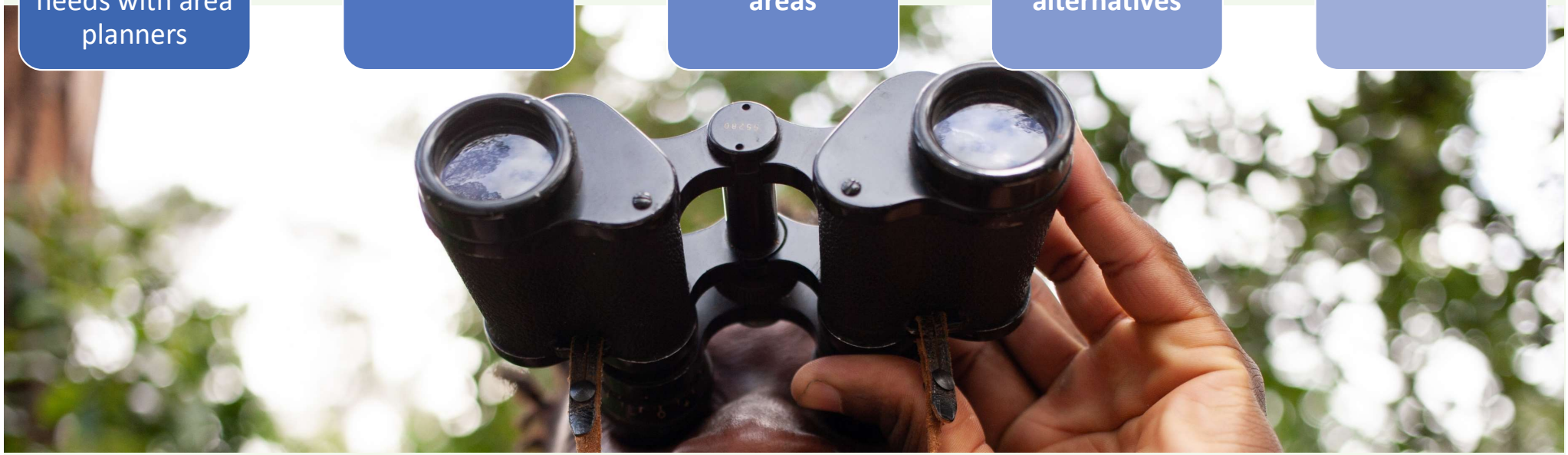
Discuss near and long-term distribution substation needs with area planners

Validate study planning model

Assess loading and constraints in surrounding areas

Review traditional low-cost alternatives

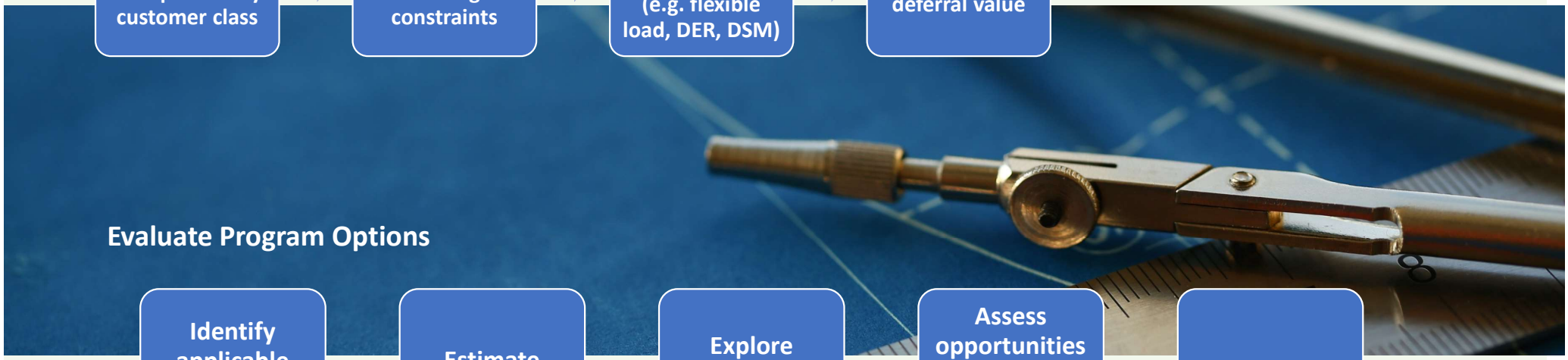
Consult field engineers and area planners



Step 2: Technical Assessment

Begin Non-traditional Solution Analysis

- Analyze Aggregated AMI load profiles by customer class
- Review voltage and thermal loading constraints
- Identify feasible customer-side contributions (e.g. flexible load, DER, DSM)
- Evaluate potential deferral value



Evaluate Program Options

- Identify applicable customer solution programs
- Estimate potential kW contribution
- Explore possible 3rd-part partnerships
- Assess opportunities for alignment with other company goals
- Evaluate cost-effectiveness

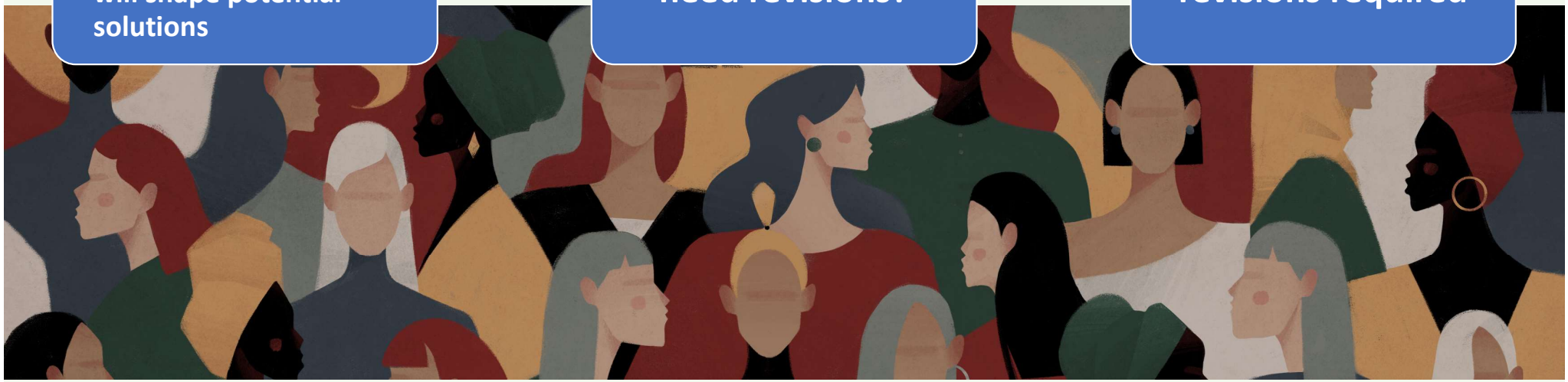
Stage 3: Targeted Engagement

Local Workshop #1

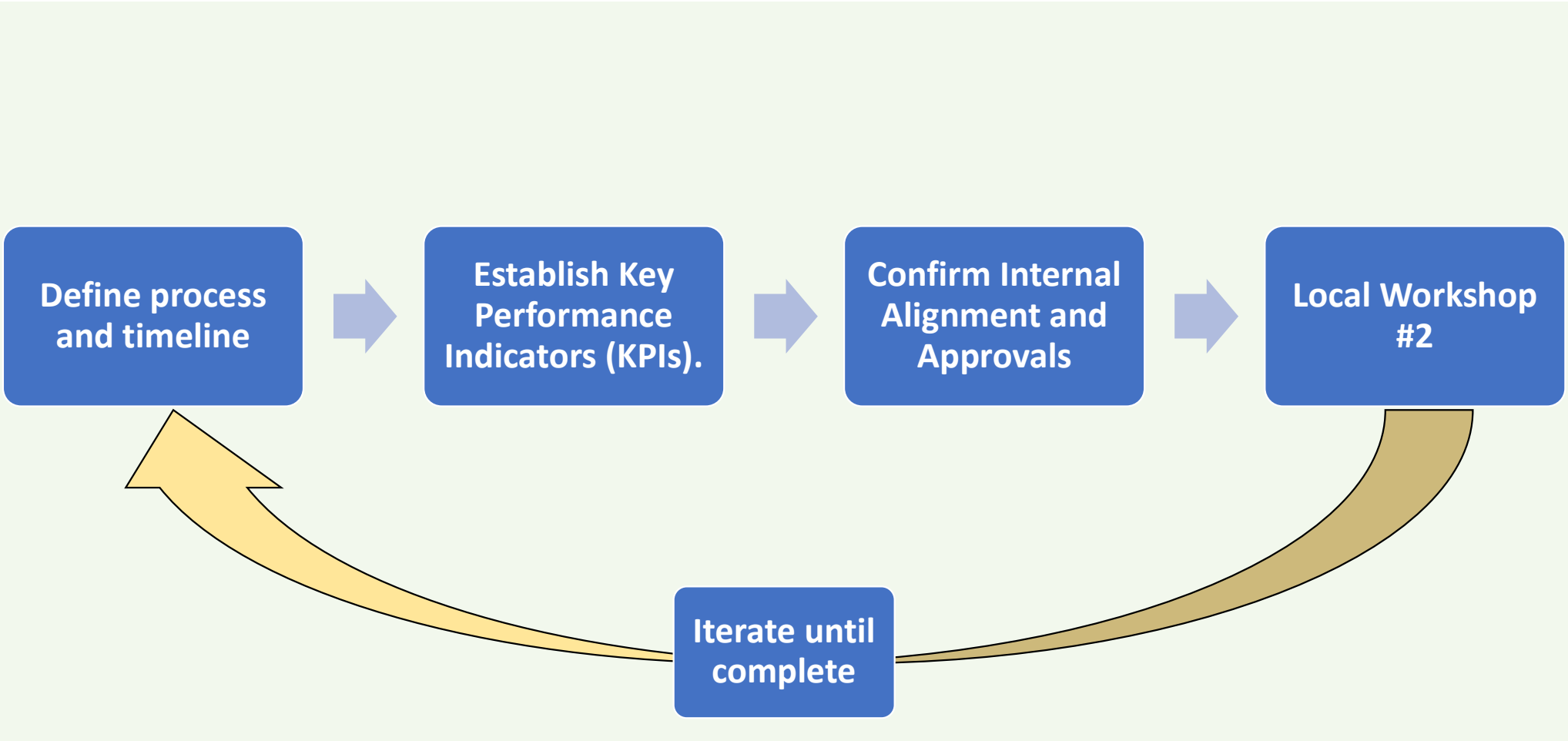
- Targeted engagement with stakeholders that will shape potential solutions

Based on stakeholder input, does solution need revisions?

Return to Technical Assessment if revisions required



4: Proposal Development and 5: Broad Engagement



Evolution of Planning Tools

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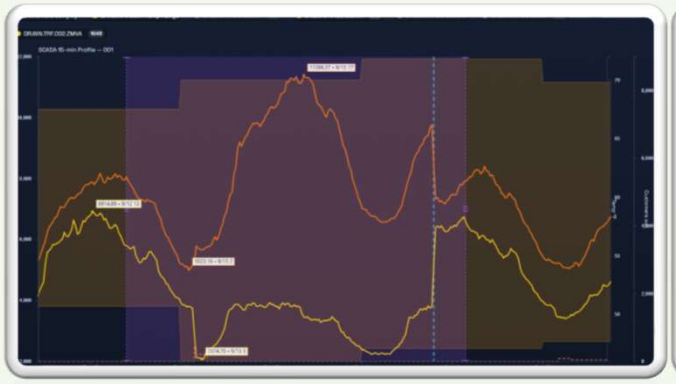
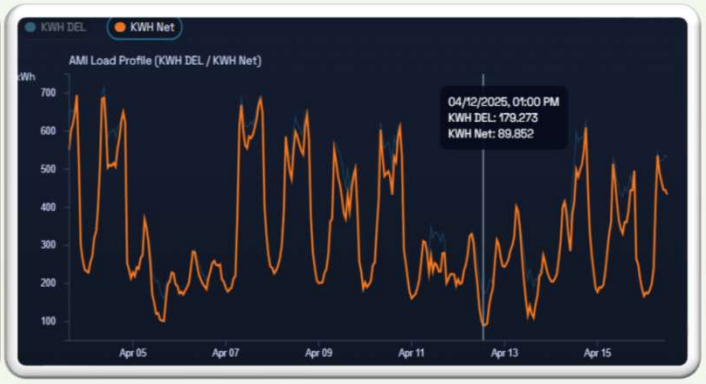
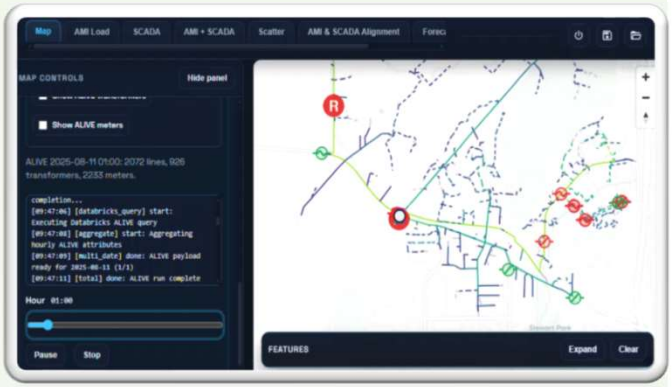
Evolution of DSP Developed Tools Leveraging AMI and SCADA







Enhanced forecasting accuracy

- Automated abnormal peak detection and likely cause identification:
  - Outage restoration activity
  - Temporary load transfers
  - Measurement errors
- Weather-normalization and automated forecasting capabilities (in development)

Better visibility where SCADA coverage is limited

- Multi-year hourly AMI profiles for trending and forecasting
- Break-down load by phase, customer class, and generation vs load
- Identify minimum loading for interconnection protection requirements

ALIVE integrations and expanded planning outputs

- Full interactive network model by substation
- Timeline enabled spatial visualization network congestion, and voltage conditions for historical dates
- Compare peak events across years to visualize how and were load and generation are shifting at any point on the system
- Ability to run scenarios for new load, DER and alternative network configurations

Status Update on Pilot Process

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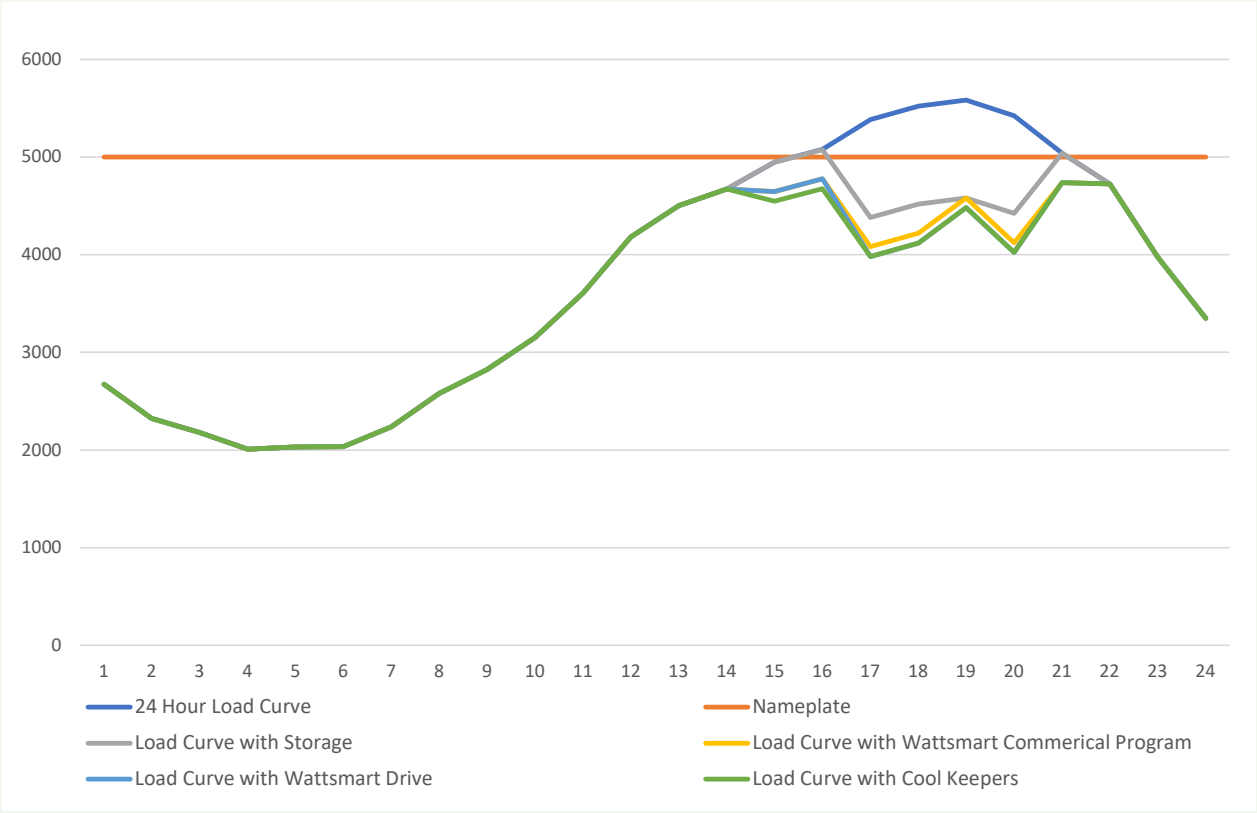
Update on Pilot Process



Wattsmart Drive and Cool Keepers

Current

- Programs are brand new, limited adoption across service area
- Current program are used up to 30 minute.s sustained shut off for ESM

Next Step

- Collaborate with Program Managers to determine if these programs could be used in DSP Pilot Proposal.

Next Steps

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Next Steps

2026 Distribution System Filing

- Final review of the Filing
- Submit filing March 31st 2026

Advance Analytical Tools & Data Integration

- Continue to expand ALIVE capabilities
- Enhance forecasting tools, including weather normalization
- Integrate EV and DER adoption scenarios in planning tools

Build Pilot Project Proposal

- Storage solutions options
- Increase Wattsmart Business Demand Response adoption
- Collaborate with Program Managers of Wattsmart Drive and Cool Keepers

Engagement

- Piloting new 1x1 Engagment approach
- Maintain updates through the DSP webpage and community meeting

Questions & Discussion

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Thank You!

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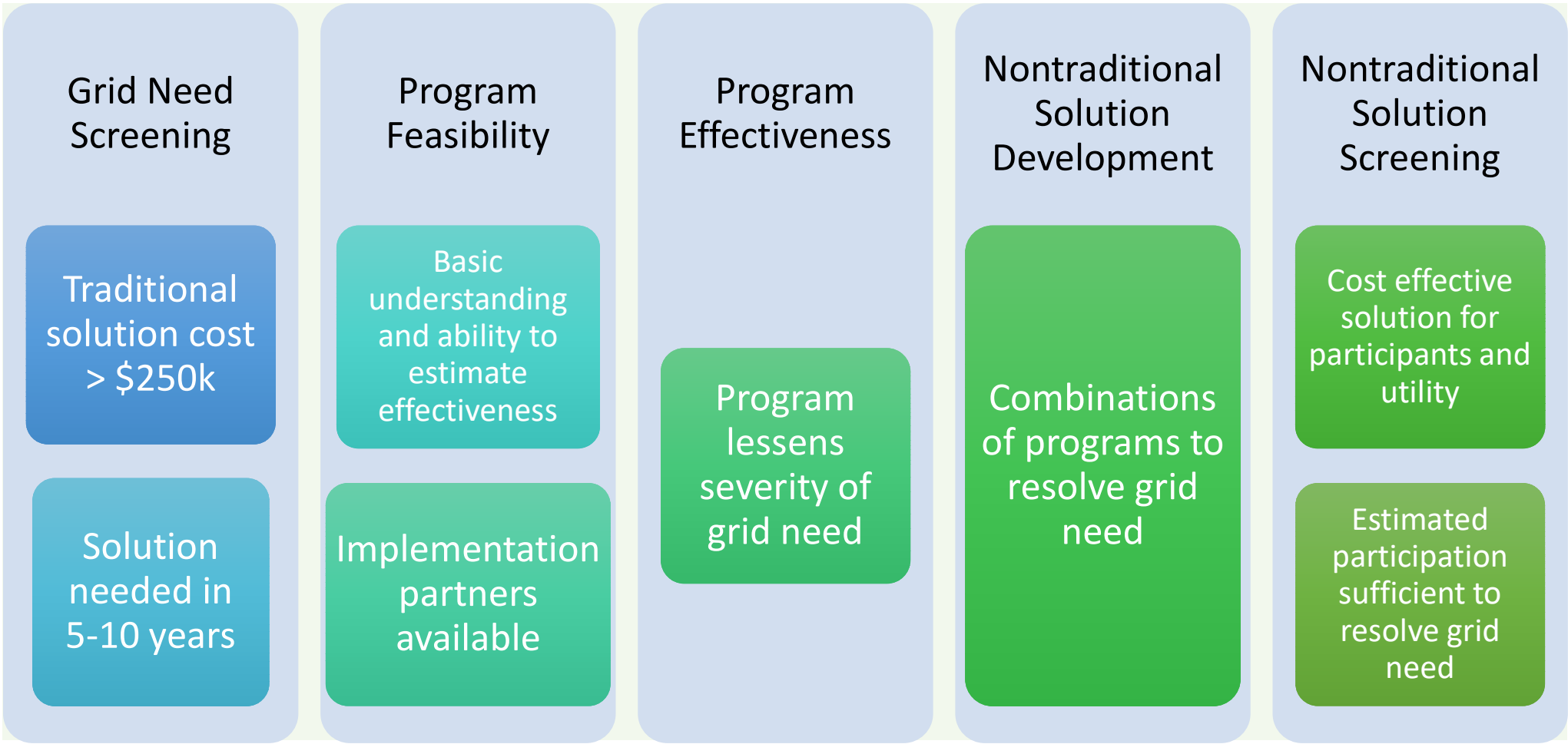
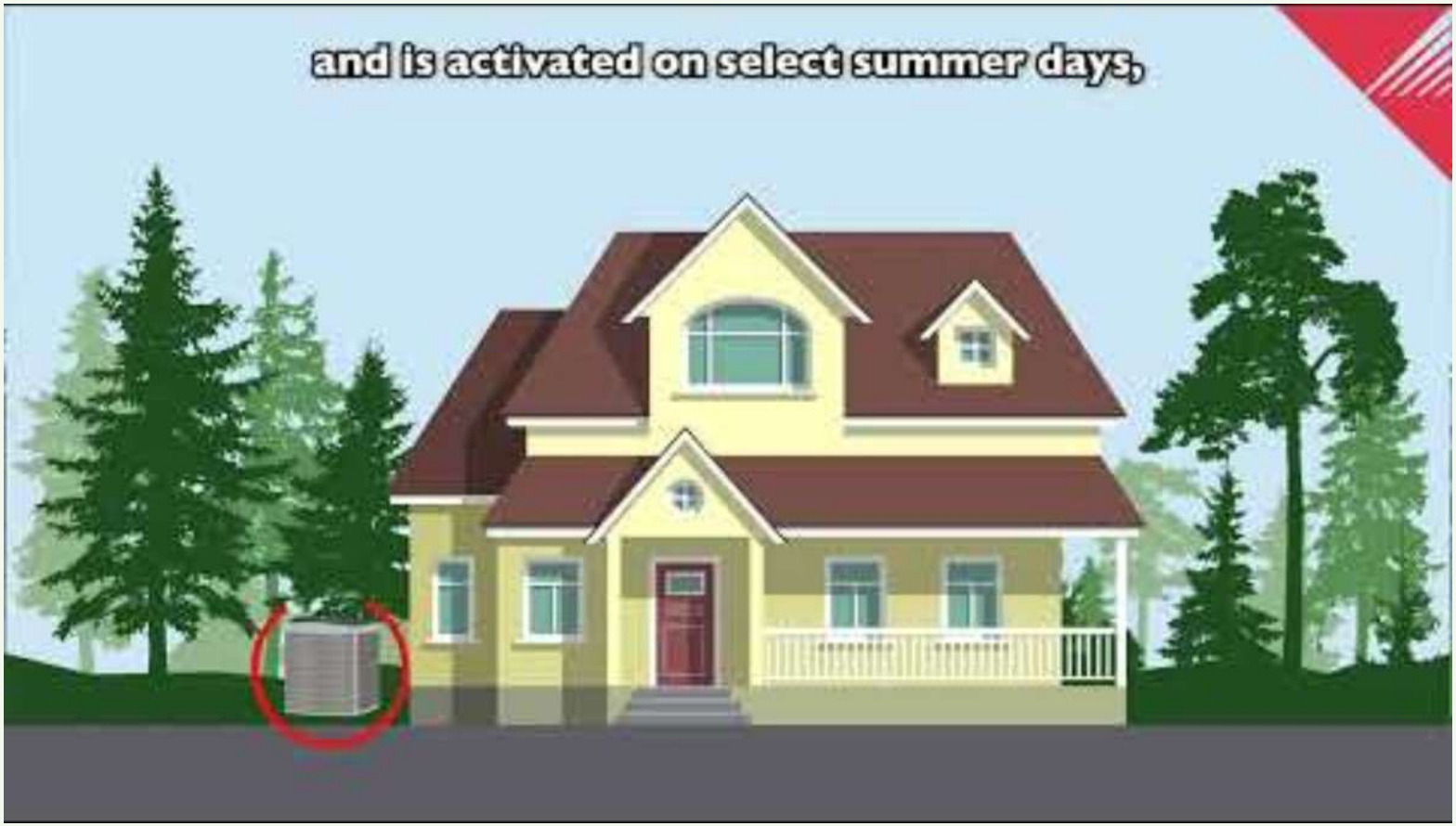
Grid Need Screening and Nontraditional Solution Development



Spend and Action Plan Overview

Learned from Study Area Process
Data/Modeling insights
Why new approach?

Appendix 1: Cool Keeper



Potential Nontraditional Solutions

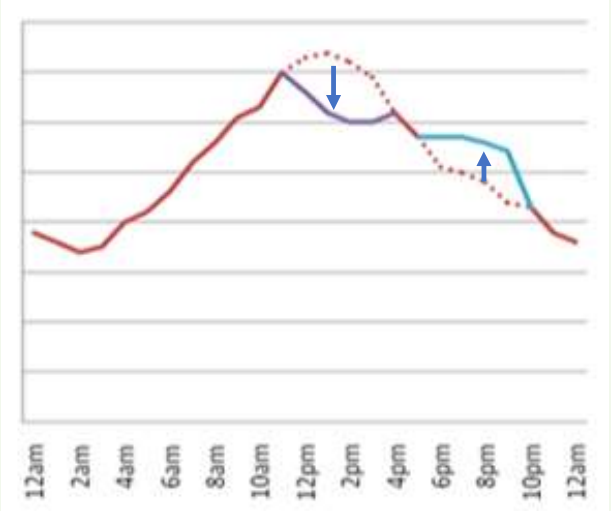
DSP non-traditional solution guidelines*:

- Time: forecasted grid need occurs in 5-10 years
- Cost: traditional solution cost > $250k

*Guidelines have some flexibility

Additional steps to determine viability:

- ❑Check peak time and grid need amount
- ❑Check customer type, count and load patterns
- ❑Check PV output for peak time and location
- ❑Compare PV vs storage amounts
- ❑Check existing offers for energy efficiency or time of use rates



Customer Feedback Question #1

- This feedback has made the DSP team aware that there are gaps in the pubic and stakeholders understanding of the DSP process

- The DSP team is working to inform the public of the details of our process
  - -Public presentations such as this one
  - -Information on our website
  - -Presenting out process in greater detail

- DSP team is looking for further feedback on information availability

Customer Feedback Questions

- How customer feedback changed current plan. This will be informed by answers by customer solutions
- If we were to make changes to these programs, how would that information be communicated to the public?
- Give an overview of how outreach for our customer solutions programs is effectively implemented and how do we receive feedback on those programs?

Customer Feedback Questions

Can you talk about how incentives are determined? Is any consideration to how this will be advantageous to customers?

How are programs developed so customers understand the advantageous / benefits to them

Give an overview of outreach for during implemented, KPIs considered during implementation, and how do we receive feedback on those programs?

Scope - Systems

Load can be transferred between neighboring circuits.

This is often used to alleviate feeders that are facing capacity problems

If load can be transferred between feeders, then effectively capacity can be transferred between feeders.

This means that if a non-traditional solution is not applicable for a given feeder, it may be used to free up transferable capacity on a neighboring feeder.