2025 Natural Gas Integrated Resource Plan

Technical Advisory Committee Meeting No. 4 Agenda

Wednesday, June 5, 2024
Virtual Meeting

Topic	Time (PTZ)	Staff
Feedback from prior TAC	9:00	Tom Pardee
Distribution System Modeling	9:10	Terrence Browne
OPUC Recommendation on NPA	10:10	OPUC Staff
Targeted Energy Efficiency	10:35	ETO
Weather Futures and Peak Planning	11:00	Tom Pardee
TAC feedback	11:50	All

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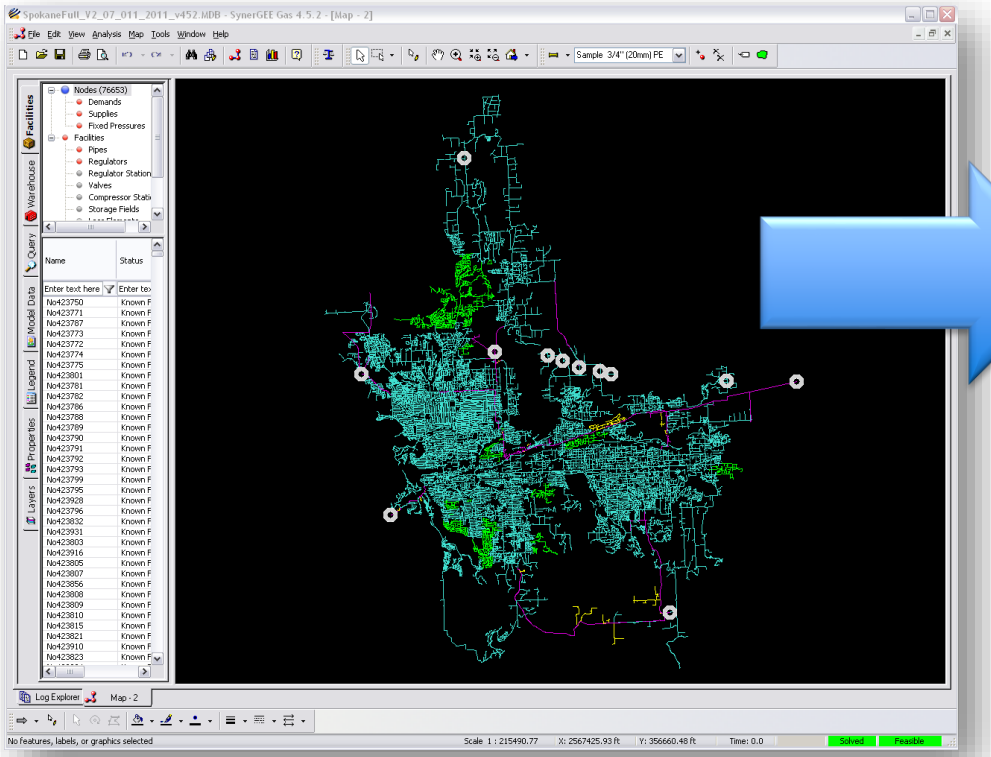
Distribution System Planning

Terrence Browne PE, Principal Gas Planning Engineer

Natural Gas Technical Advisory Committee
June 5, 2024

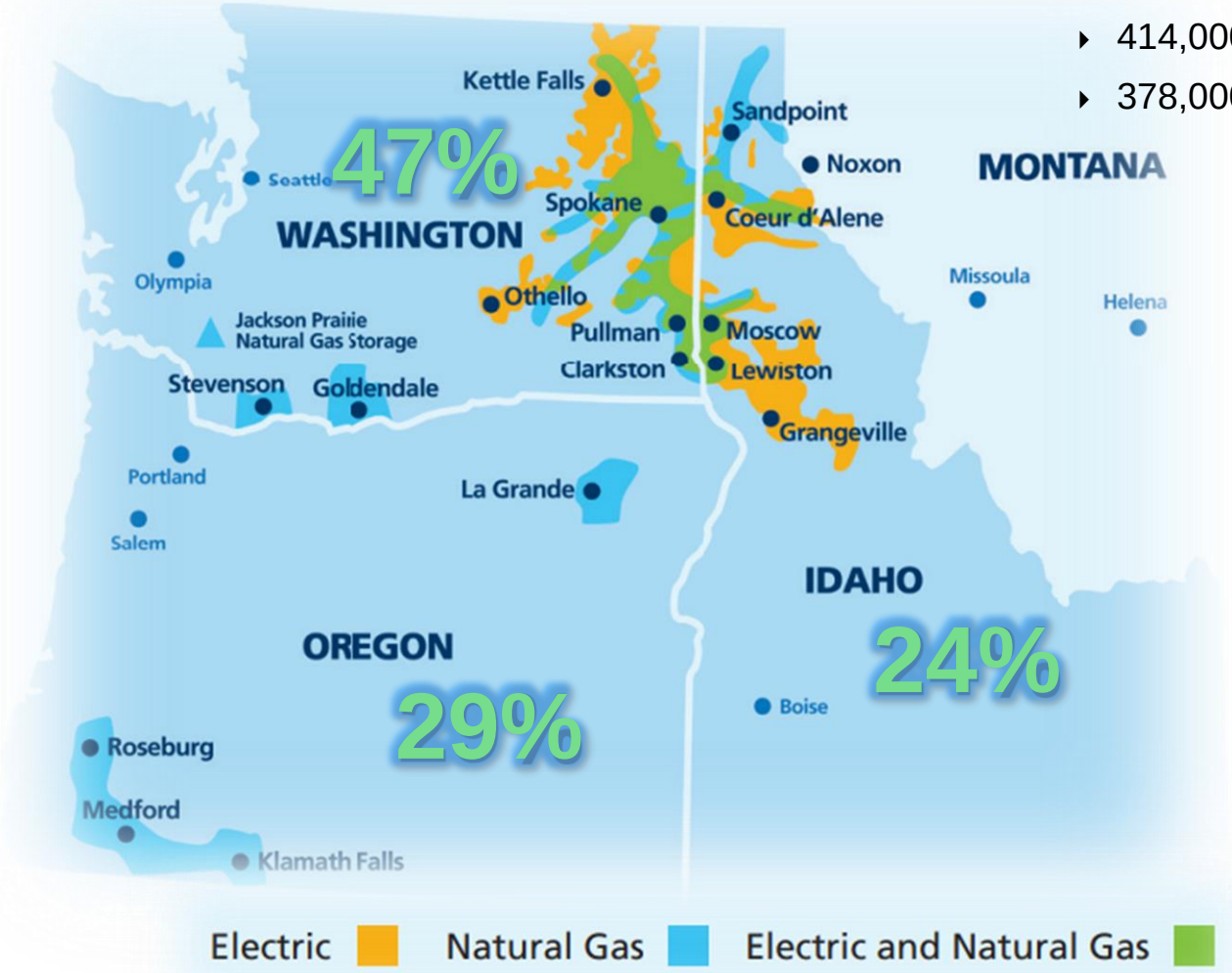
Mission

- Using technology to plan and design a safe, reliable, and economical distribution system



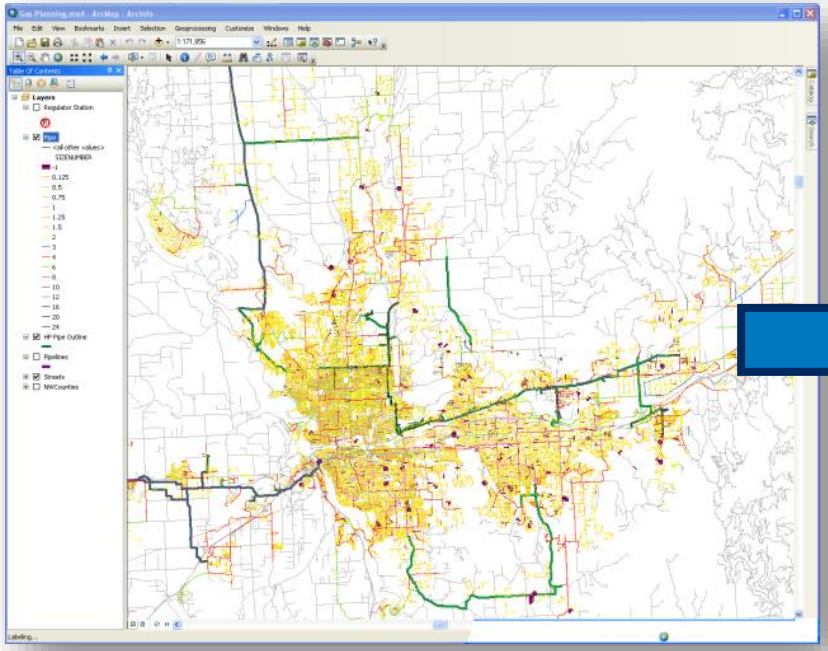
Service Territory and Customer Overview

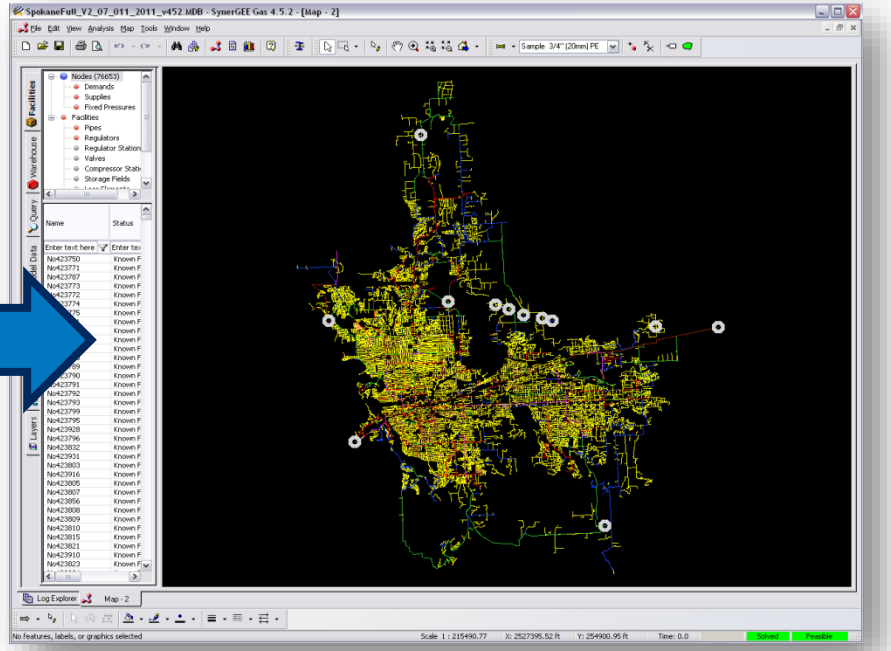
- Serves electric and natural gas customers in eastern Washington and northern Idaho, and natural gas customers in southern and eastern Oregon
  - Population of service area 1.7 million
    - 414,000 electric customers
    - 378,000 natural gas customers



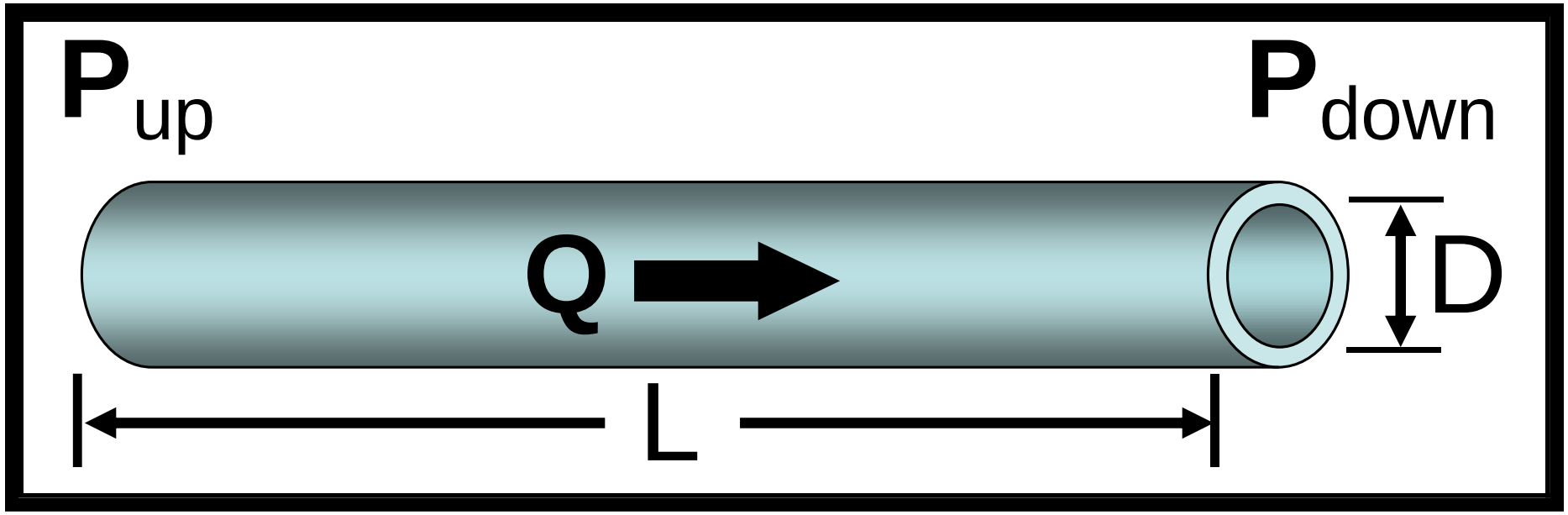
Our Planning Models

- 8,000 miles of distribution main
- 120 cities
- 40 load study models

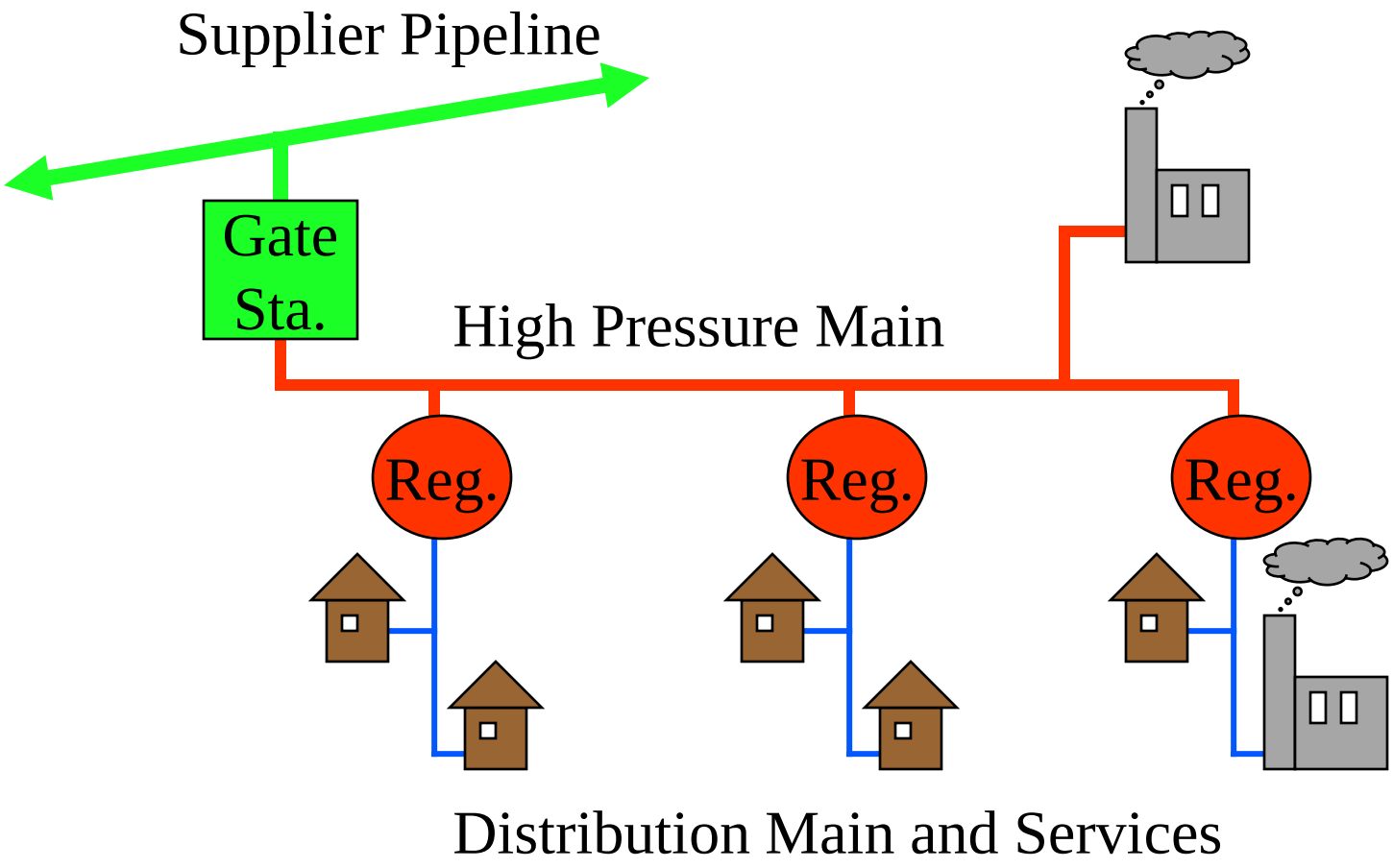




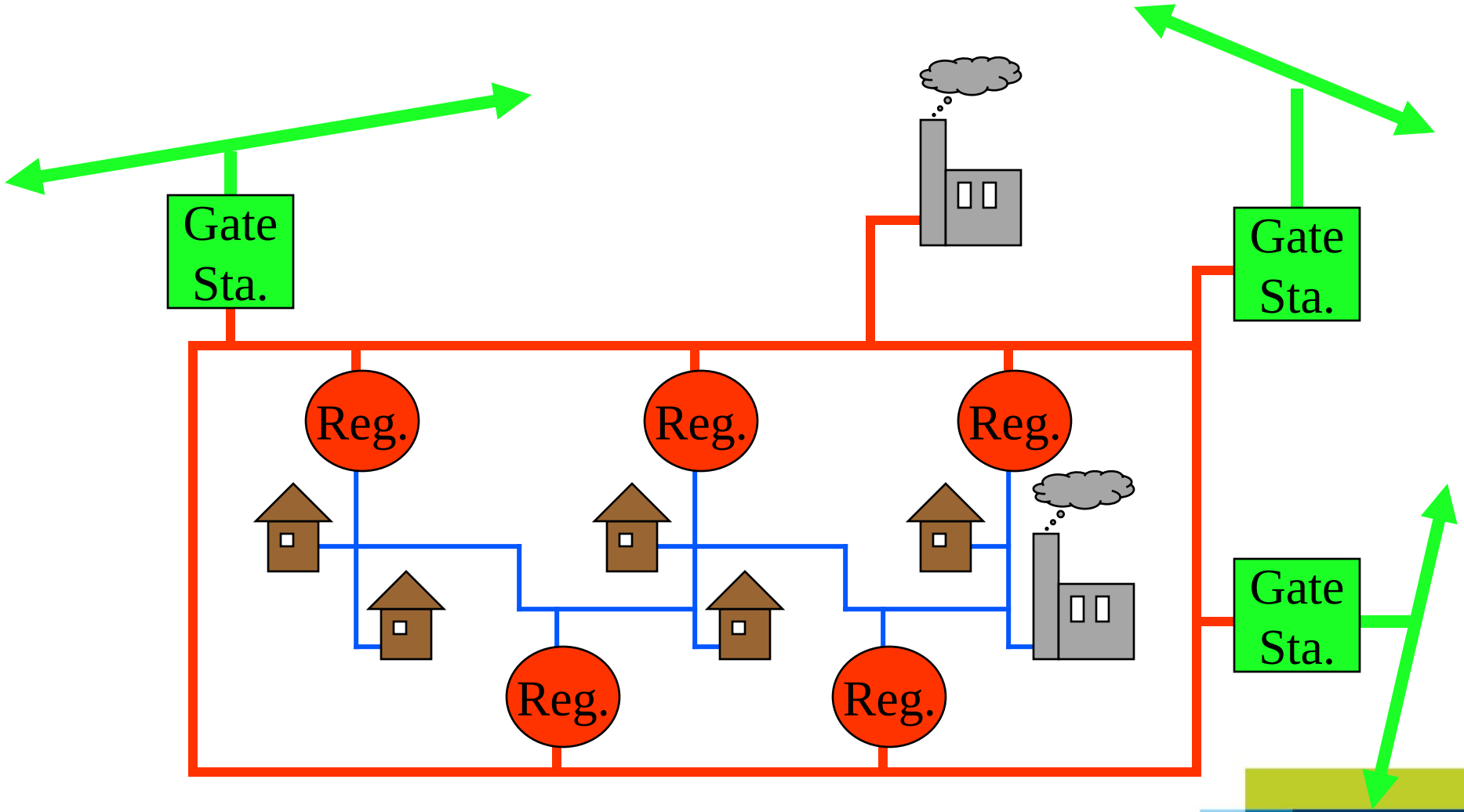
5 Variables for Any Given Pipe



Scope of Gas Distribution Planning

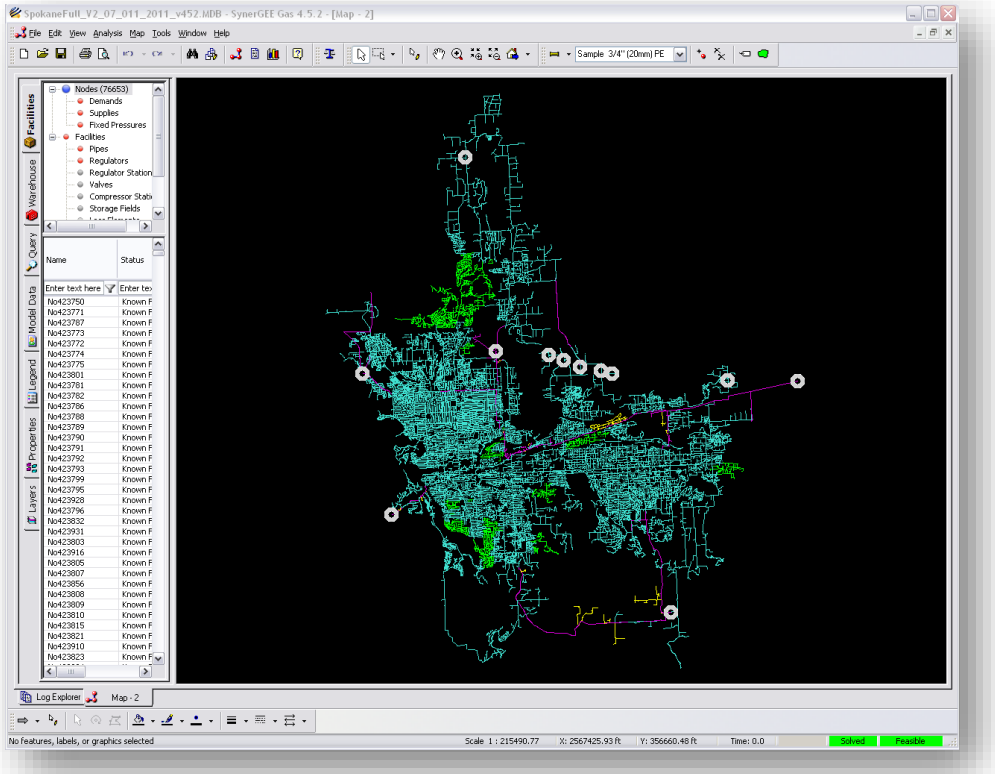


Scope of Gas Distrib. Planning cont.



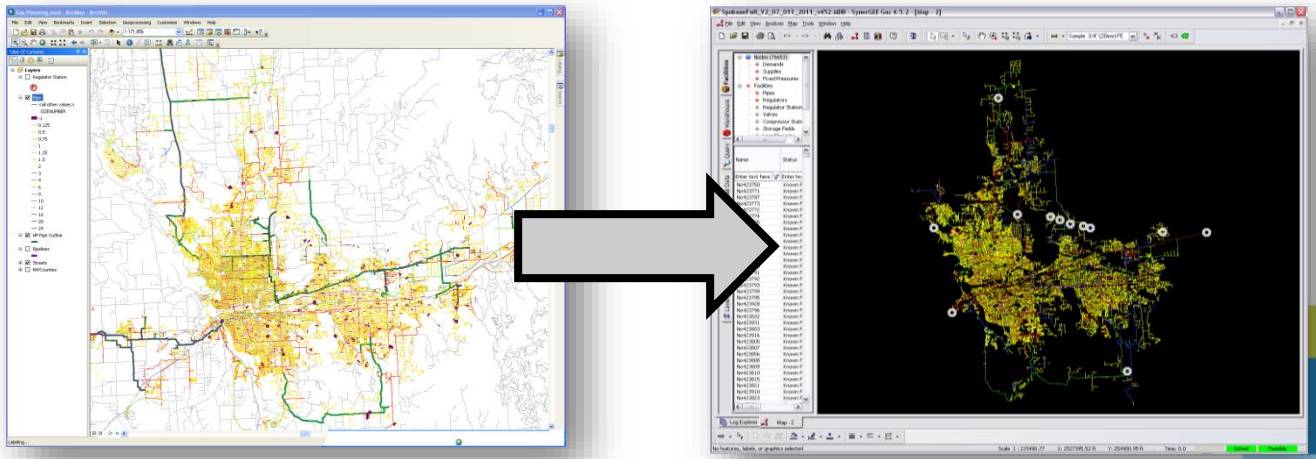
SynerGi (SynerGEE, Stoner) Load Study

- Simulate distribution behavior
- Identify low pressure areas
- Test reinforcements against future growth/expansion
- Measure reliability



Creating a Pipeline Model

- Elements
  - Pipes, regulators, valves
  - Attributes: Length, internal diameter, roughness
- Nodes
  - Sources, usage points, pipe ends
  - Attributes: Flow, pressure



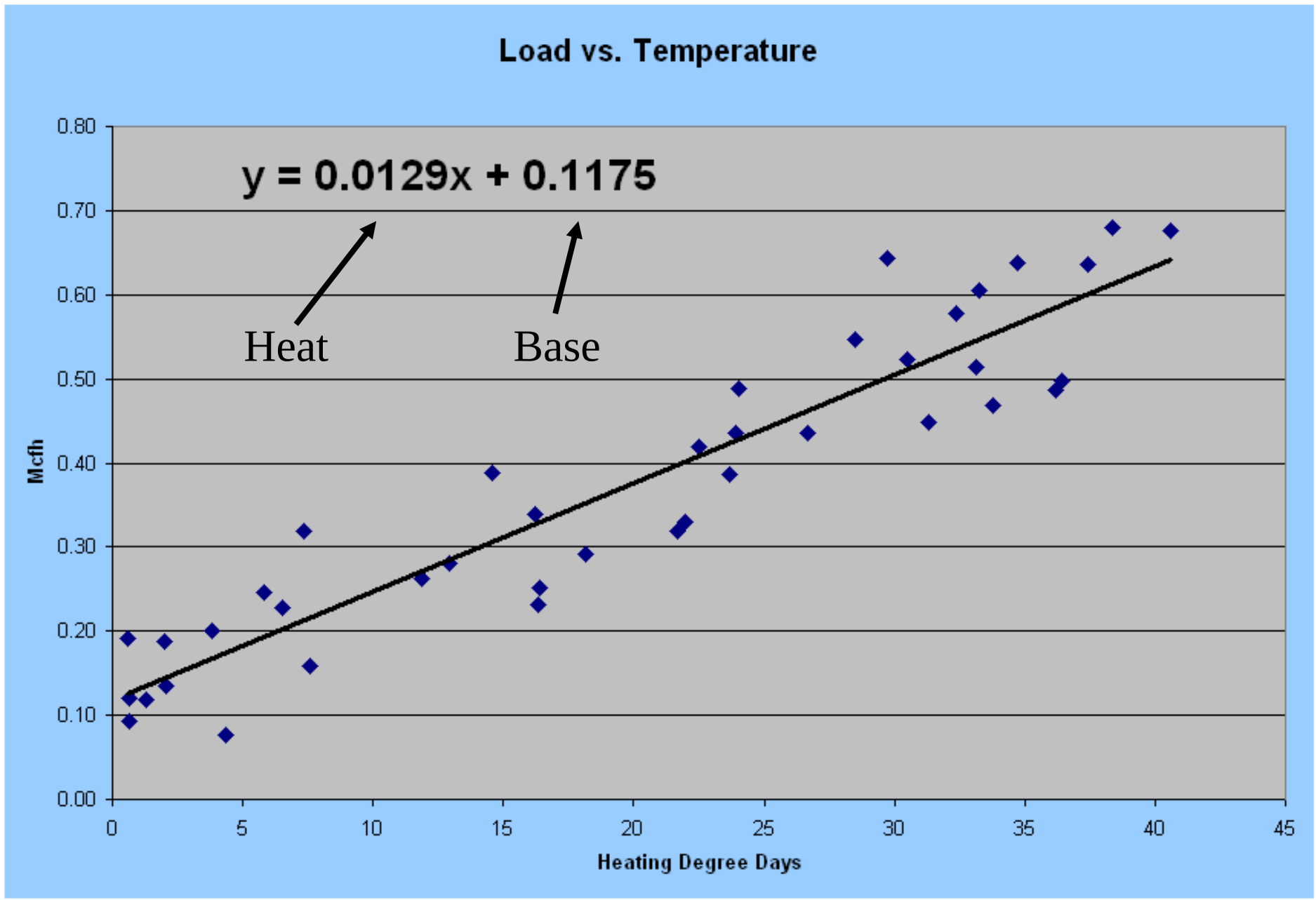
Estimating Customer Usage

- Gathering Data
  - Days of service
  - Degree Days
  - Usage
  - Name, Address, Revenue Class, Rate Schedule…

Estimating Customer Usage cont.

- Degree Days
  - Heating (HDD)
  - Cooling (CDD)
- Temperature - Usage Relationship
  - Load vs. HDD's
  - Base Load (constant)
  - Heat Load (variable)
  - High correlation with residential

Avg. Daily Temperature ('Fahrenheit)	Heating Degree Days (HDD)	Cooling Degree Days (CDD)
85		20
80		15
75		10
70		5
65	***0***	***0***
60	5	
55	10	
50	15	
45	20	
40	25	
35	30	
30	35	
25	40	
20	45	
15	50	
10	55	
5	60	
4	61	
0	65	
-5	70	
-10	75	
-15	80	


Load vs. Temperature
y = 0.0129x + 0.1175
Heat
Base
Mcfh
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
5
10
15
20
25
30
35
40
45
Heating Degree Days

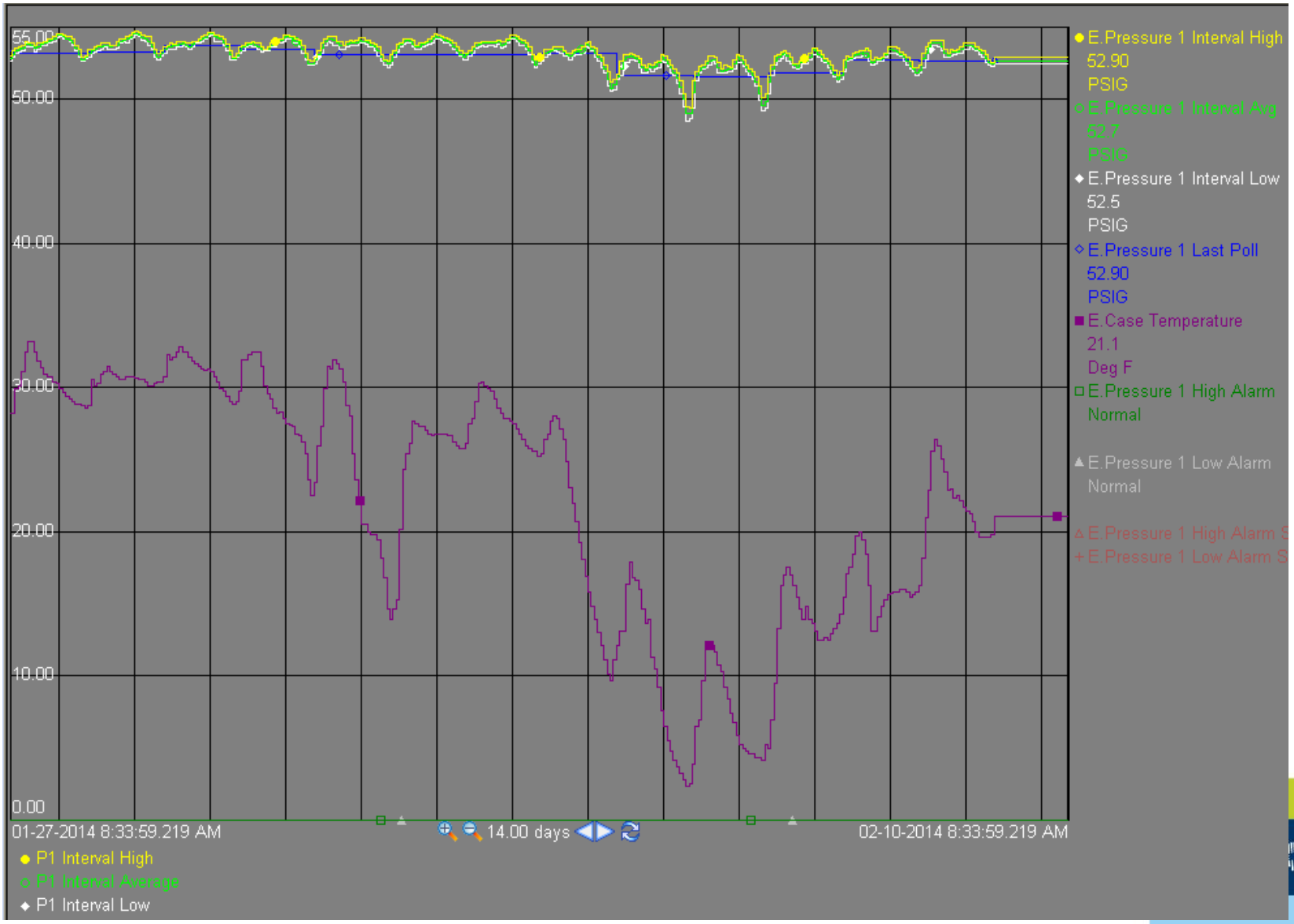
Monitoring Our System

- Electronic Pressure Recorders
  - Daily Feedback
  - Real time if necessary
- Validates our Load Studies

Validating Model

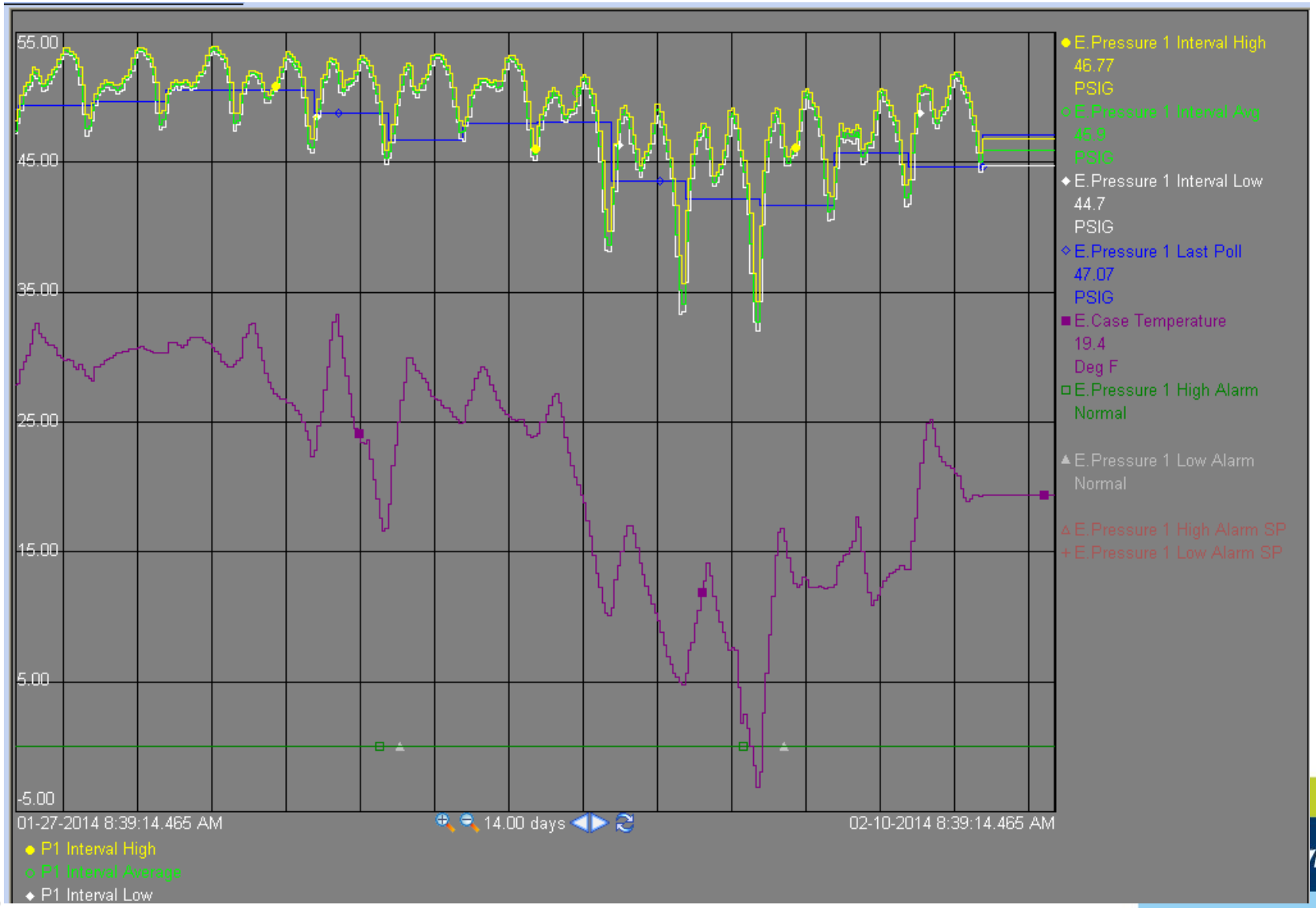
- Simulate recorded condition
- Electronic Pressure Recorders
  - Do calculated results match *field* data?
- Gate Station Telemetry
  - Do calculated results match *source* data?
- Possible Errors
  - Missing pipe
  - Source pressure changed
  - Industrial loads

Post Falls State Line



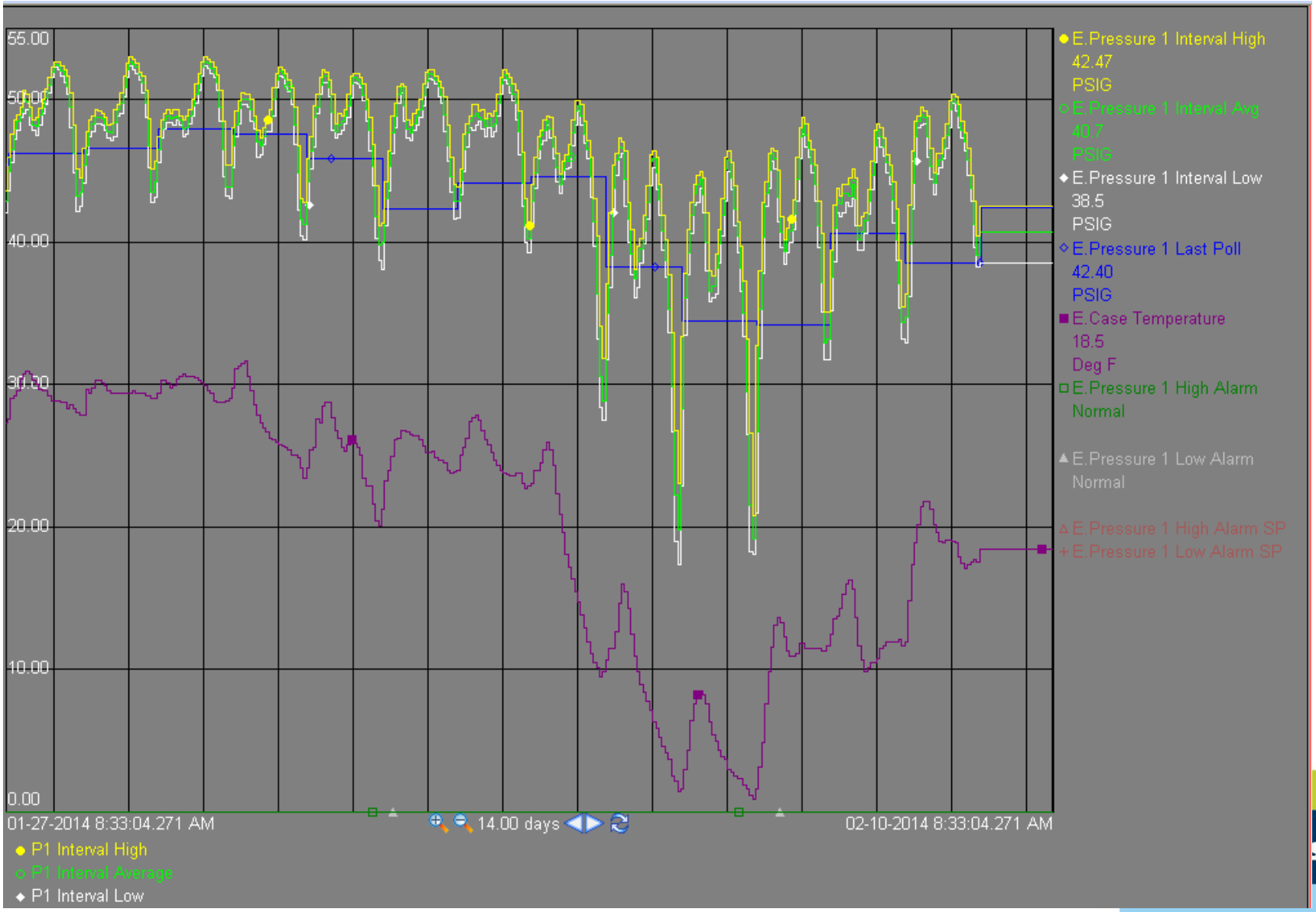
2362 E Bozanta, Hayden Lake ID

Hayden Lake



E. 3203 Crestwood Ct ,Hayden Lake ID

South Hayden Lake



Planning Criteria – 2023

- Reliability during design HDD
  - Spokane **76 HDD** *(avg. daily temp. -11' F)*
  - Medford **49 HDD** *(avg. daily temp. 16' F)*
  - Klamath Falls **72 HDD** *(avg. daily temp. -7' F)*
  - La Grande **72 HDD** *(avg. daily temp. -7' F)*
  - Roseburg **46 HDD** *(avg. daily temp. 19' F)*

- Maintain minimum of 15 psig in system at all times
  - 5 psig in lower MAOP areas
  - 3 psig in Medford 6 psig systems

Fixes and Reinforcements

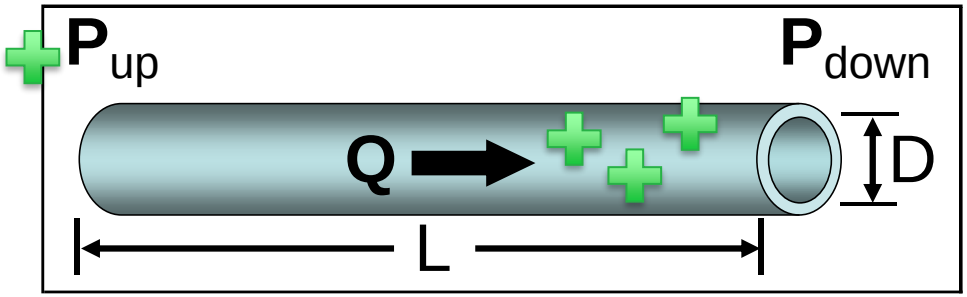
- Identify Low Pressure Areas
  - Number of feeds
  - Proximity to source
- Looking for Most Economical Solution
  - Length (minimize)
  - Construction obstacles (minimize)
- Lead Times:
  - Design and engineering; 12 months
  - Real estate, permits, and environmental; 6-24 months
  - Material ordering and delivery; 3-6 months

Non-Pipe Alternatives (NPAs)

- System Pressure Uprates
- Conservation
- Electrification

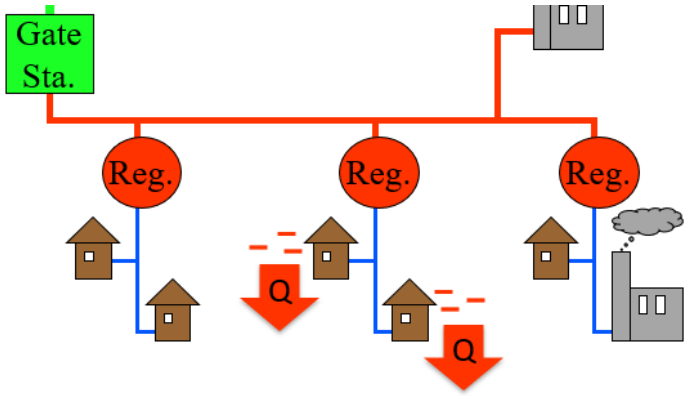
NPA: System Pressure Uprates

- Objective
  - Raise source pressure to increase capacity
- Process
  - Deep dive into records
  - Series of leak surveys
- Challenges
  - Remaining opportunities?
- Lead time
  - 6-12 months



NPA: Conservation

- Objective
  - Reduce customer demand on distribution
- Process
  - Targeted Load Management (TLM) programs
    - Identify opportunities and energy efficiency potential
    - Implement energy efficiency measures
- Challenges
  - Minimal benefits realized at distribution locations
  - More effective on supply side
- Lead time
  - 3-5 years



NPA: Conservation

- Results of Energy Trust TLM analysis (Oct 5th 2023)

Avista TLM: Total Potential and Program Activity

Area	Utility Target Goal	Total Efficiency Resource	Historic Annual Average
Medford	691	479	11
Sutherlin	121	158	2

peak hour therms

three-year total efficiency resource; cost-effective achievable potential

- Resource assessment modelling results demonstrate there is not enough peak reduction to meet AVI load reduction targets.
  - The Medford AVI target is **144%** of resource potential.
  - The Sutherlin AVI target is **77%** of resource potential.
- Program history shows the targets are 60x greater than a typical year of program activity.

NPA: Conservation

- Results of Energy Trust TLM analysis (Oct 5th 2023)

Avista TLM: Forecast Using NWN Pilot Results

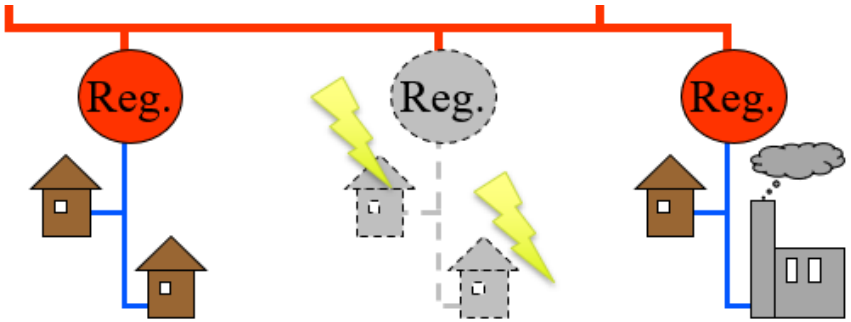
Area	**Utility Target Goal**	**Pilot Total Resource Results**	**Pilot Historical Results**
Medford	691	66	63
Sutherlin	121	18	12

peak hour therms
assumes three-year TLM project
29 years needed to achieve targets at NWN pilot rate

- NWN Pilot achieved 4% of resource potential in two years of enhanced incentives.
  - Generalizing to a three-year project this equates to roughly 12% of Avista's targets.
- NWN Pilot nearly doubled historical acquisition.
  - This would result in about 9% of Avista's targets in a three-year period.

NPA: Electrification

- Objective
  - Eliminate customer demand on distribution
- Process
  - Identify customers in deficient areas
  - Transition to electric appliances/load
- Challenges
  - Transition may be expensive (cost of appliances)
  - Limited capacity and infrastructure of electric utility
    - Who pays for upgrade
- Lead time
  - 1-?? years



Areas Currently Monitoring for Low Pressure and Proposed Solutions*

- Medford 6 psig system, OR
- Airway Heights, WA
- South Hill Spokane, WA
- Schweitzer Resort, ID
- Moscow, ID
- *Notes:
  - List not comprehensive
  - projects are subject to change and will be reviewed on a regular basis

City Gate Stations Currently Monitoring and Proposed Solutions*

- Sutherlin, OR: *rebuild/enhance in 2024+*
- Malin, OR: *observe, rebuild/enhance in 2025+*
- Medford, OR: *work with pipeline to increase capacity*
- Rathdrum – Chase, ID: *rebuild/enhance in 2024+*
- Pullman, WA: *work with pipeline to increase capacity*
- *Notes:
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  - projects are subject to change and will be reviewed on a regular basis

Questions and Discussion

Mission

Using technology to plan and design a safe, reliable, and economical distribution system

Avista 2025 Gas IRP
TAC 4

STAFF'S PROPOSAL FOR NON PIPE ALTERNATIVES

Nick Sayen
Senior Utility Analyst
June 5, 2024

Oregon Public Utility Commission

Oregon Public Utility Commission

Staff's Proposal

….Staff expects the Company to update its distribution system planning practices and IRP processes to include:

- *Guidance from Attachment A to Staff's Report in Order No. 23-023;*
- *Direction provided by Order No. 23-281;*
- *Practices agreed to through Stipulation Item 21 in Order No. 23-384; and*
- *Several of the extensions of Stipulation Item 21 suggested by Climate Advocates.*

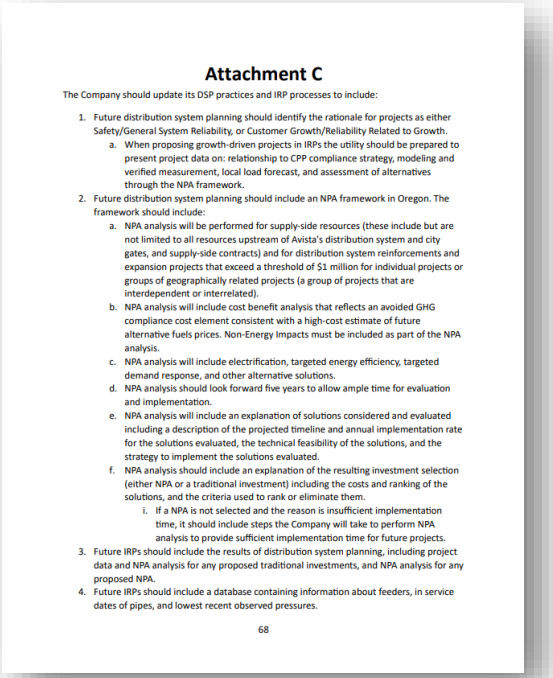
Specific elements of Staff's expectation are included in Attachment C. ***Staff emphasizes this expectation does not include significant, new concepts.*** *With the exception of three items (2e., 2f., and 3) all of these practices have already been included in Commission Orders. Staff's expectation* ***simply assembles these concepts into a more cohesive package****.*

Staff's Second Errata Final Comments on 2023 IRP (Docket No. LC 81), page 45, https://edocs.puc.state.or.us/efdocs/HAC/lc81hac326154032.pdf

Oregon Public Utility Commission

Attachment C

1. Future distribution system planning should identify the rationale for projects as either Safety/General System Reliability, or Customer Growth/Reliability Related to Growth.
    a. When proposing growth-driven projects in IRPs the utility should be prepared to present project data on: relationship to CPP compliance strategy, modeling and verified measurement, local load forecast, and assessment of alternatives through the NPA framework.



Attachment C

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2. Future distribution system planning should include an NPA framework in Oregon. The framework should include:
    a. NPA analysis will be performed for supply-side resources (these include but are not limited to all resources upstream of Avista's distribution system and city gates, and supply-side contracts) and for distribution system reinforcements and expansion projects that exceed a threshold of $1 million for individual projects or groups of geographically related projects (a group of projects that are interdependent or interrelated).
    b. NPA analysis will include cost benefit analysis that reflects an avoided GHG compliance cost element consistent with a high-cost estimate of future alternative fuels prices. Non-Energy Impacts must be included as part of the NPA analysis.
    c. NPA analysis will include electrification, targeted energy efficiency, targeted demand response, and other alternative solutions.
    d. NPA analysis should look forward five years to allow ample time for evaluation and implementation.
    e. NPA analysis will include an explanation of solutions considered and evaluated including a description of the projected timeline and annual implementation rate for the solutions evaluated, the technical feasibility of the solutions, and the strategy to implement the solutions evaluated.
    f. NPA analysis should include an explanation of the resulting investment selection (either NPA or a traditional investment) including the costs and ranking of the solutions, and the criteria used to rank or eliminate them.
        i. If a NPA is not selected and the reason is insufficient implementation time, it should include steps the Company will take to perform NPA analysis to provide sufficient implementation time for future projects.
3. Future IRPs should include the results of distribution system planning, including project data and NPA analysis for any proposed traditional investments, and NPA analysis for any proposed NPA.
4. Future IRPs should include a database containing information about feeders, in service dates of pipes, and lowest recent observed pressures.

68

Attachment C

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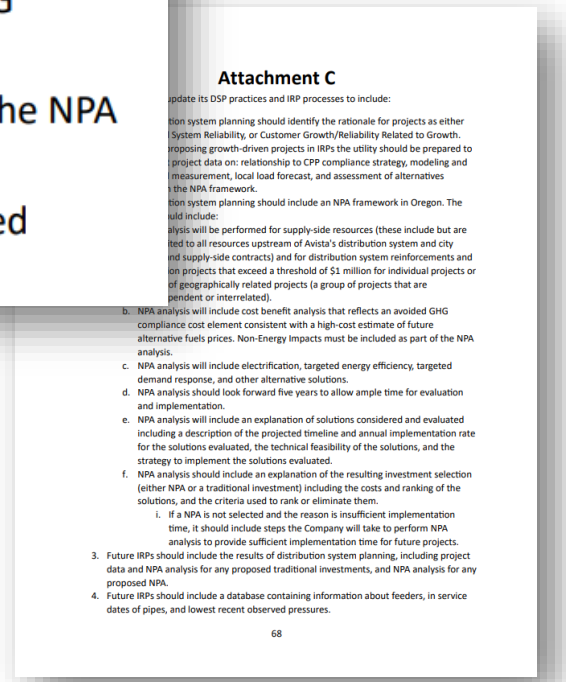

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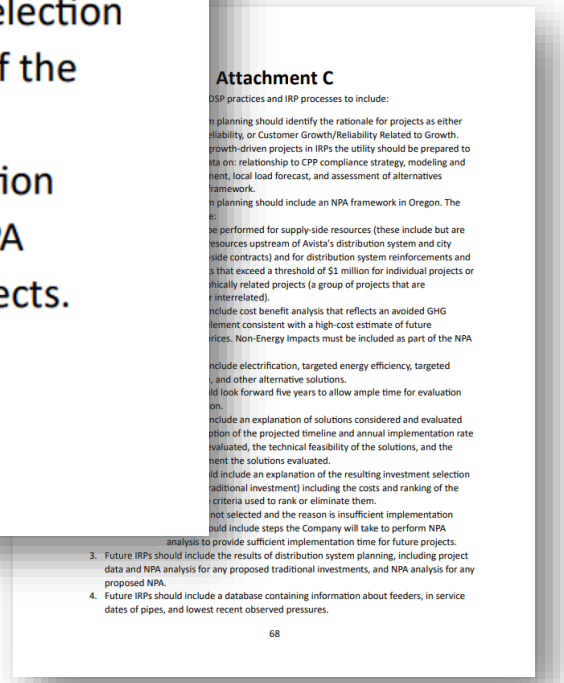

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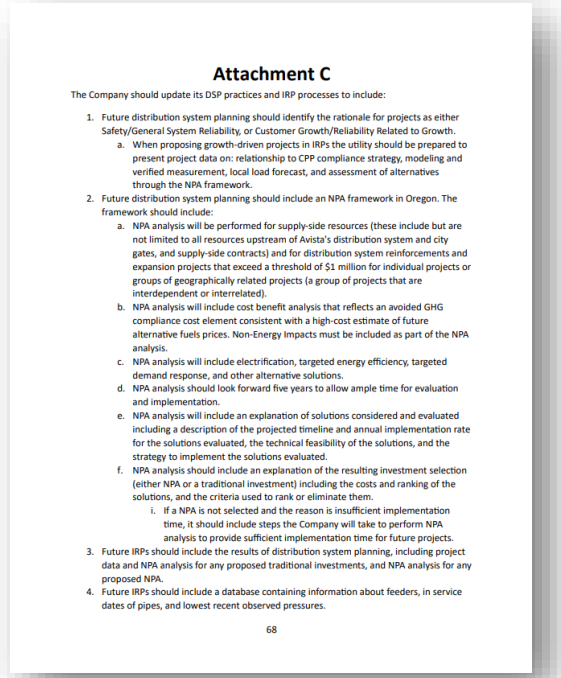

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Thank you

Nick Sayen

Senior Utility Analyst

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Oregon Public Utility Commission

Targeted Load Management Overview

Energy Trust and Avista

June 2024

Energy Trust of Oregon

Agenda

- What is TLM at Energy Trust?
- TLM Process Phases
- Program Implementation Strategies
- Prior TLM Examples- Medford and Sutherlin

What is TLM at Energy Trust?

A range of planning, program and community services:

- Market intelligence and characterization
- Resource potential analysis
- Program design and delivery strategies
- Customer and community engagement

Objectives:

- Determine whether targeted energy efficiency can meet local utility system needs
- Deliver benefits to utility and local communities

Targeted Load Management Process Phases

*Could include funding beyond current PPC funds

Program Implementation Strategies

Previous TLM efforts included:

- **Increased incentives**: maximum based on cost effectiveness, and max allowed based on localized avoided costs
- **Increased Trade Ally (TA) engagement**: training, participation agreements, single point of contact support, incentive form assistance
- **Increased Trade Ally Business Development Funds**: to subsidize and support TA sponsored marketing efforts
- **Increased Marketing**: local newspapers, social media, tabling at local events, TLM landing page
- **Increased Customer outreach and engagement**: proactive contact with large commercial and industrial customers

Avista TLM Analysis:
Medford and Sutherlin

Avista TLM: Load Forecast Composition

Customer Segment	**Medford**	**Sutherlin**
Residential	62%	64%
Commercial	37%	25%
Industrial	1%	10%

- The load forecast and premise IDs identified in each TLM area are primarily residential with some commercial and industrial.
  - ➢ This load breakdown was used as input to the resource assessment model

Avista TLM: Total Potential and Program Activity

Area	**Utility Target Goal**	**Total Efficiency Resource**	**Historic Annual Average**
Medford	691	479	11
Sutherlin	121	158	2
peak hour therms *three-year total efficiency resource; cost-effective achievable potential*			

- Resource assessment modelling results demonstrate there is not enough peak reduction to meet AVI load reduction targets.
  - The Medford AVI target is **144%** of resource potential.
  - The Sutherlin AVI target is **77%** of resource potential.
- Program history shows the targets are 60x greater than a typical year of program activity.

Thank you!

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Supplemental Slides

Resource Assessment Overview

What is a resource assessment?

- Estimate of energy efficiency resource potential at a range of costs that is achievable over a defined number of years
- Identifies opportunities for energy efficiency measures within a territory based on existing conditions of building stock

What is it used for?

- The purpose is to help Energy Trust and utilities strategically plan future investments in both demand side and supply side resources
- Provides a cost-effective resource estimate of annual and peak savings
- For localized efforts, it helps inform a go/no-go decision

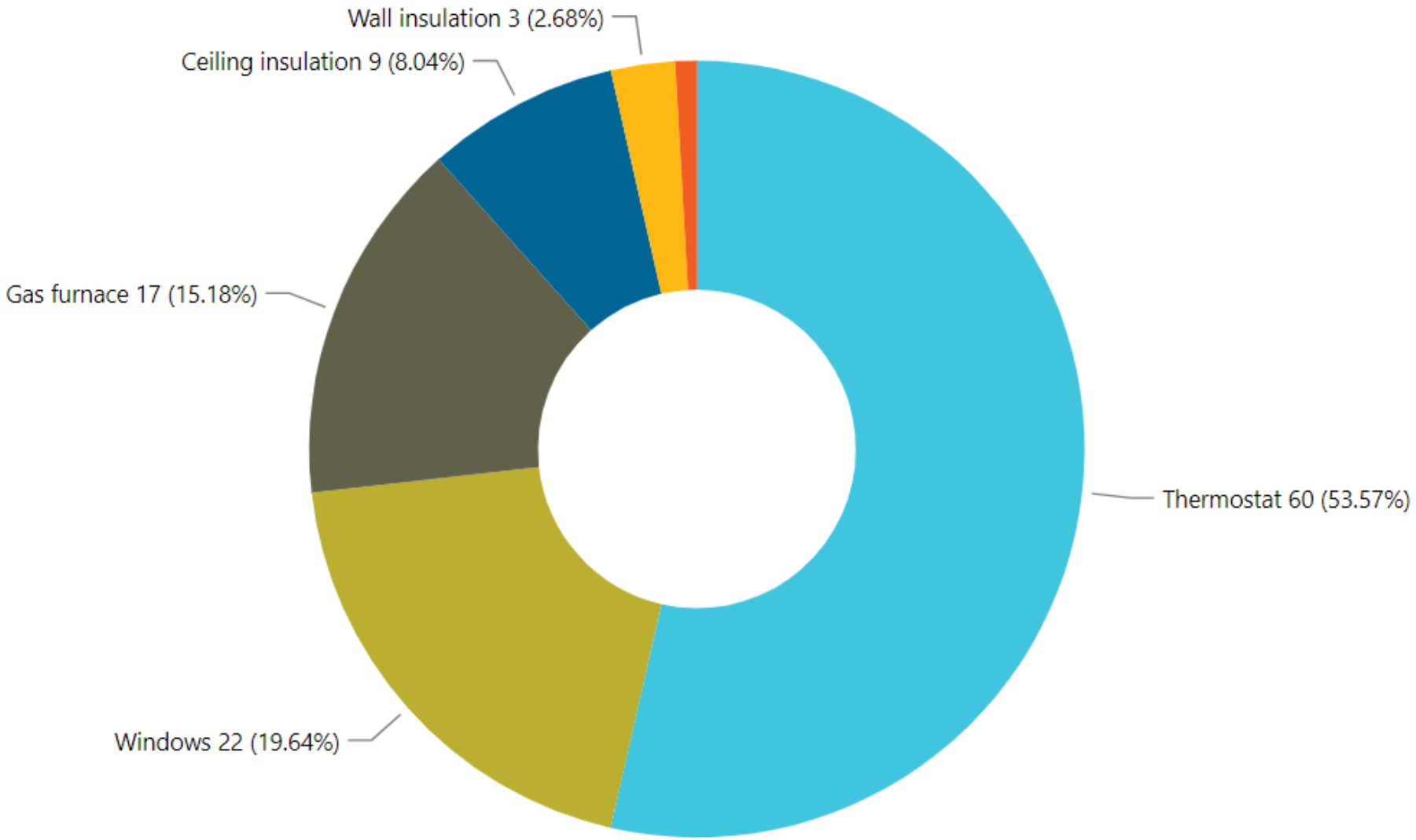
Is the locational potential enough to meet utility targets?

Avista TLM: Forecast Using NWN Pilot Results

Area	**Utility Target Goal**	**Pilot Total Resource Results**	**Pilot Historical Results**
Medford	691	66	63
Sutherlin	121	18	12
peak hour therms *assumes three-year TLM project* *29 years needed to achieve targets at NWN pilot rate*			

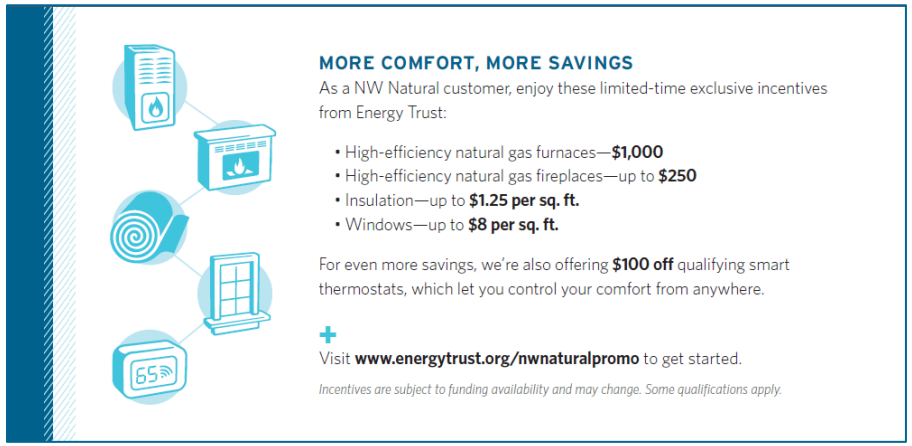
- NWN Pilot achieved 4% of resource potential in two years of enhanced incentives.
  - Generalizing to a three-year project this equates to roughly 12% of Avista's targets.
- NWN Pilot nearly doubled historical acquisition.
  - This would result in about 9% of Avista's targets in a three-year period.

Past TLM Example: Gas efficiency measure mix



Past TLM examples: Marketing materials

TLM – Residential bill insert



TLM – Commercial Postcard

Phase/ Aspect	Identify constrained areas and utility needs	Analyze resource potential (one or many sites)	Develop program planning and strategies to meet localized needs	Go/No-Go decision with Energy Trust and utility partner	Build out budget and strategies for annual ETO budget	TLM Implementation
Energy Trust	Collaborates with utility partner to understand various utility needs (e.g., peak demand, flexible load, carbon)	Use Resource Assessment (RA) Model to estimate potential in local areas	Use existing suite of measures/offers mapped to each TLM area need; Consider local community needs for design and delivery	**Joint decision needed for Energy Trust's budget cycle**	Owns the program delivery strategy and implementation plan	Lead all aspects of implementation for EE and distributed RE (for electrics)
Utility Partner	Analyzes grid needs and grid constraints, typically through IRP (historical) and new processes like DSP or CEP	Provides data on specific feeder(s) and any market verticals; Provides localized avoided costs estimates	Collaborate on Distributed Energy Resources (DERs) beyond EE, including DR/flex load, storage, EVs		Agrees to overall play through 1) overall budget process; 2) any additional funding	Collaborate in key areas – regional account management/ outreach, CBAIGs, marketing
Community	*Potential to further automate early analysis with feeder data and RA model;* ***Establish project leads with decision-making authority at each utility***	*Consider ETO Neighborhood Reports and/or Market Characterization Reports at this stage*	*To network with community partners early and often*	*Consider how both Energy Trust and utilities represent insights from community engagements*	*Demonstrate input via existing channels: Advisory Councils, outreach/ community networks*	*Share insights of "how this is impacting communities"*

Additional Program Delivery Strategies

- Fixed Price Promotions
- Community Partner Funding (CPF) promotions
- Community Based Organization (CBO) engagement
- Income qualified offers
- No-cost offerings (incentive covers full cost of measure)
- Direct Install offerings: Energy Trust coordinates install and pays full cost of measure
- Introduction of new measures such as: duct sealing and duct insulation

Weather

Avista 2025 IRP

TAC 5 – June 5th, 2024

Tom Pardee

Weather Forecasts

Data by Planning Region

- Klamath Falls
- La Grande
- Medford
- Roseburg
- Spokane

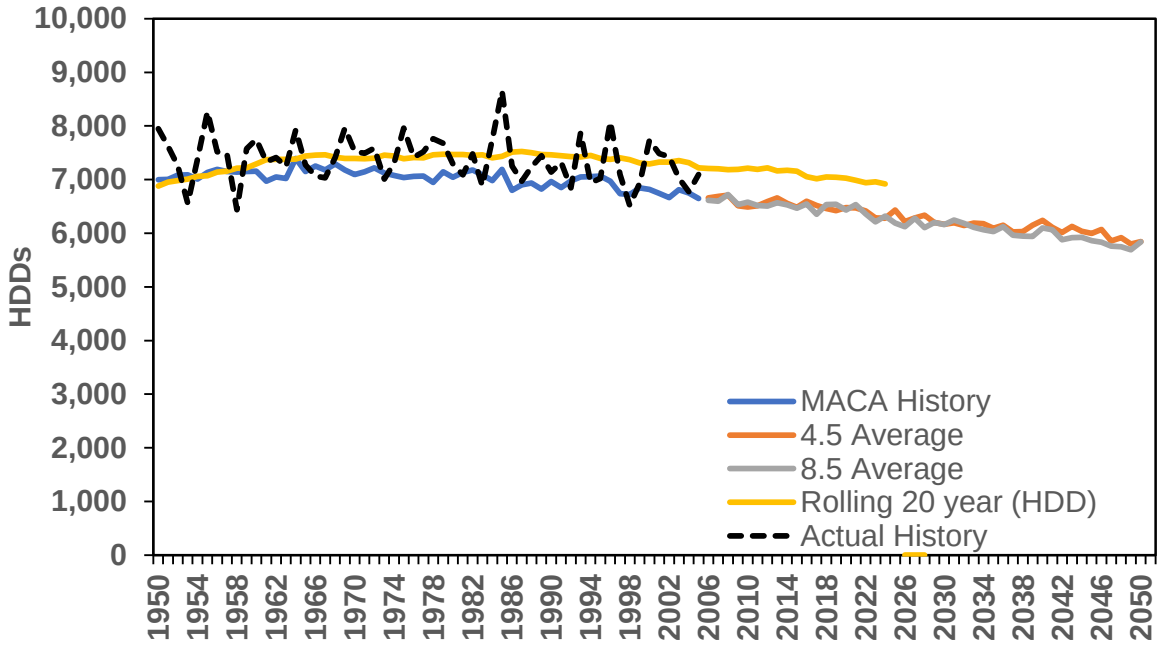
MACA 4.5 data[1]

- Multivariate Adaptive Constructed Analogs (MACA)
- Median HDD values of available studies by planning region
  - HDD calculated from Average of Min/Max by study
- Trended HDDs from 2026 – 2045
- Rolling 20-year blend (historic and MACA HDDs)

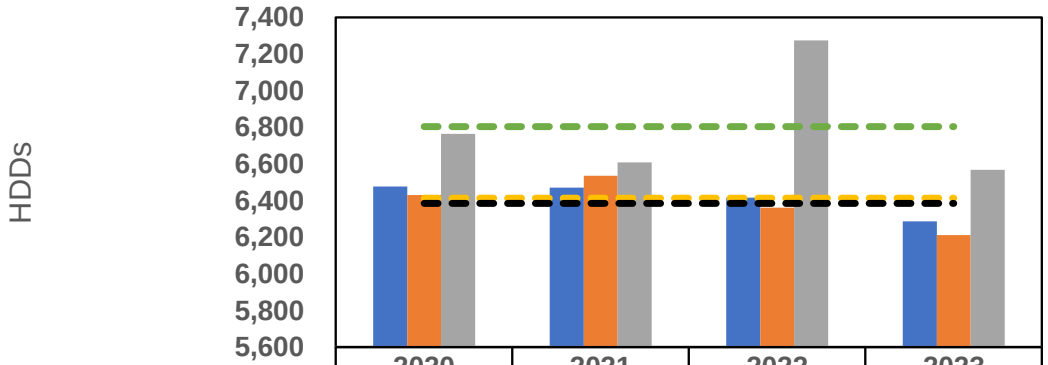
1MACA Statistical Downscaling Method (northwestknowledge.net)

MACA versus Actual Weather (Spokane)

Weather Comparison

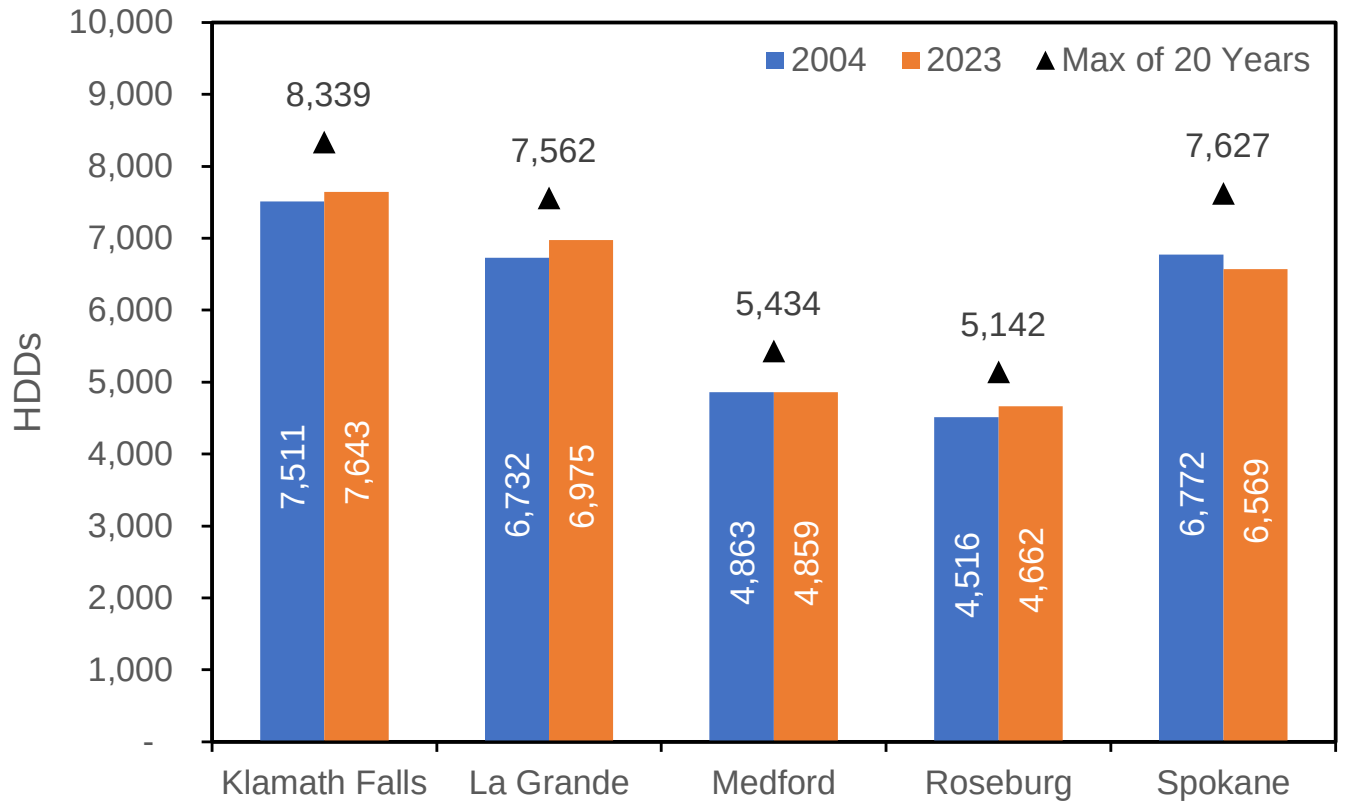


2020 – 2023 Comparison

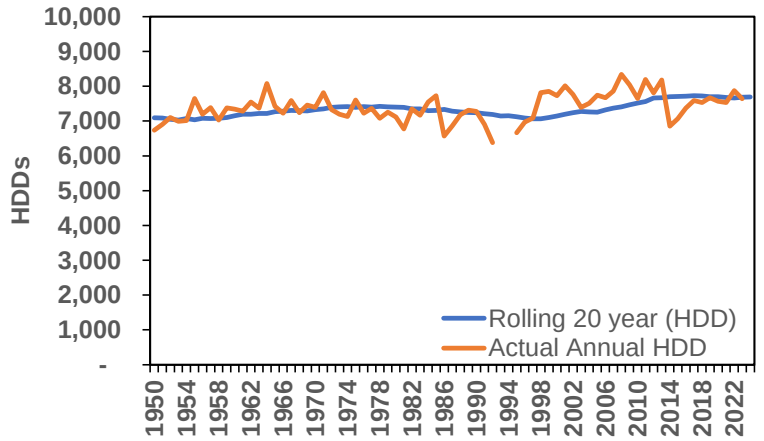


	2020	2021	2022	2023
4.5 Median	6,477	6,471	6,416	6,288
8.5 Median	6,431	6,535	6,361	6,213
Actual History	6,766	6,609	7,276	6,569
Average 4.5	6,413	6,413	6,413	6,413
Average 8.5	6,385	6,385	6,385	6,385
Average History	6,805	6,805	6,805	6,805

Weather History Comparison



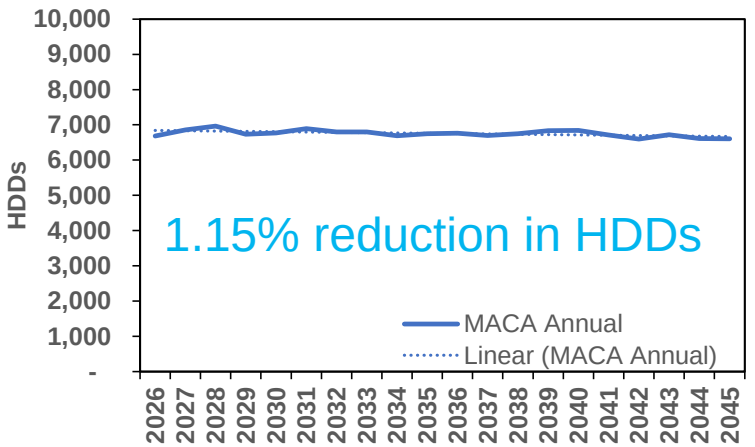
Klamath Falls
Weather History and 4.5 MACA



Weather History

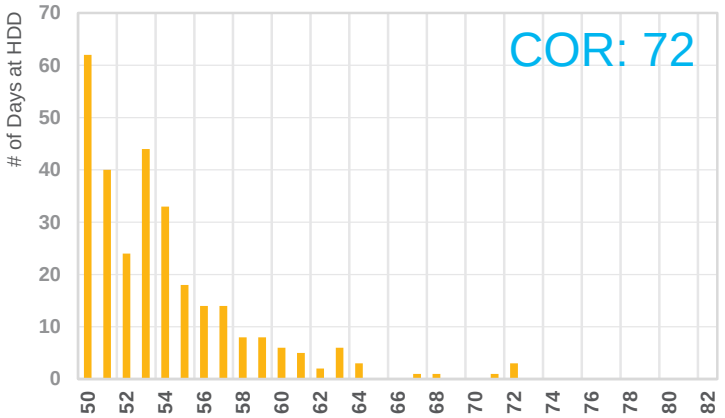
20 Year rolling HDD daily average of 7,695 HDDs

(2004-2023)



4.5 MACA

Trended reduction in HDDs from 2026 to 2045



Peak HDDs

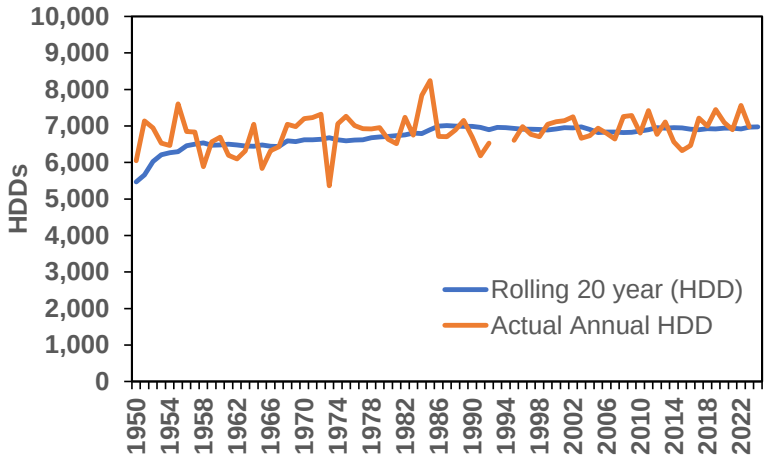
Coldest on Record Dates:

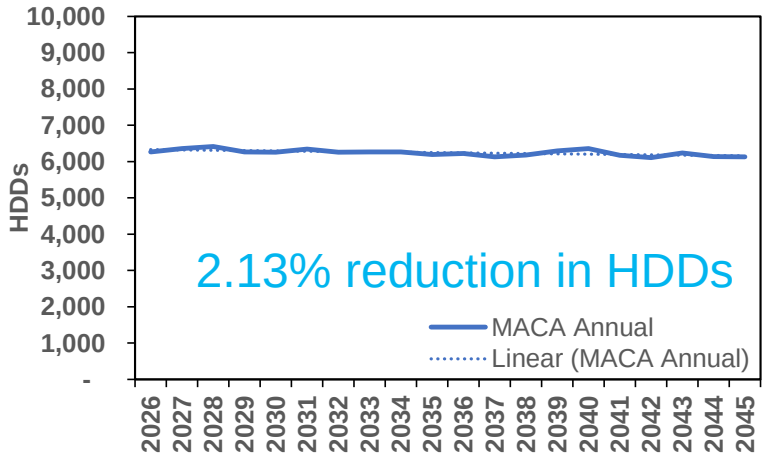
12/21/1990

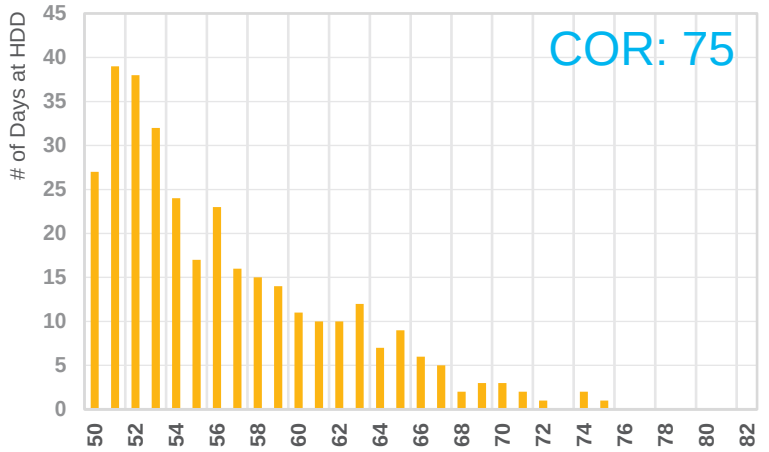
12/8/2013

1/6/2017

La Grande
Weather History and 4.5 MACA







Weather History

20 Year rolling HDD daily average of 6,978 HDDs

(2004-2023)

4.5 MACA

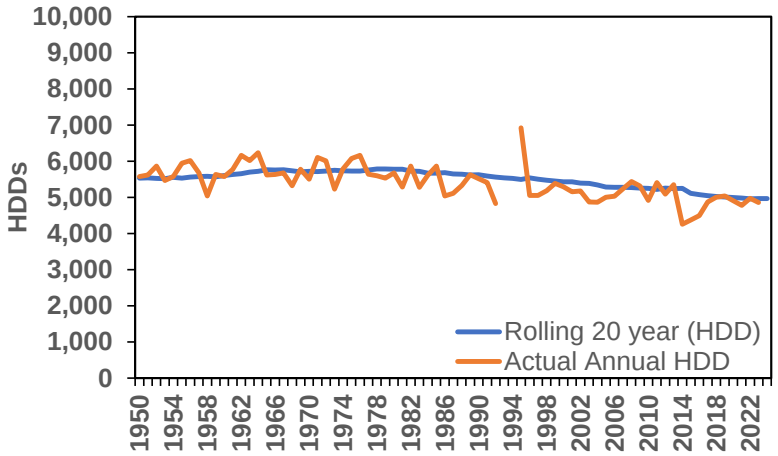
Trended reduction in HDDs from 2026 to 2045

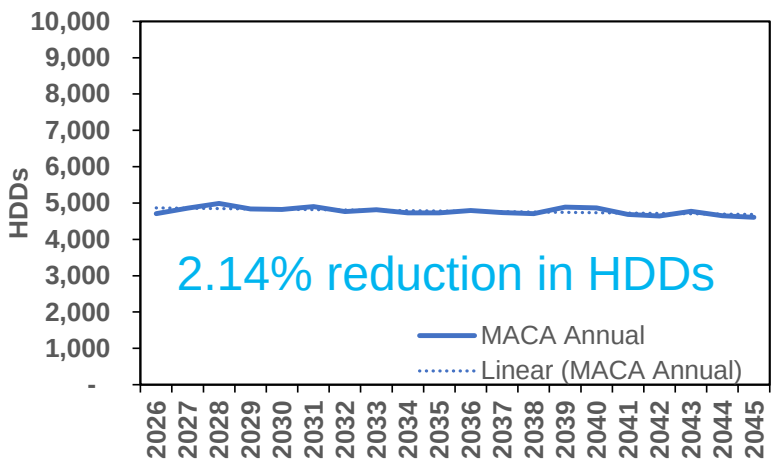
Peak HDDs

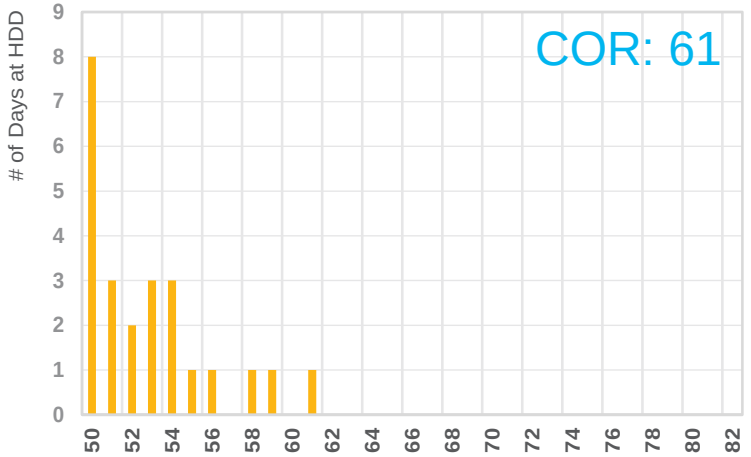
Coldest on Record Dates:

1/31/1996

Medford
Weather History and 4.5 MACA







Weather History

20 Year rolling HDD daily average of 4,965 HDDs

(2004-2023)

4.5 MACA

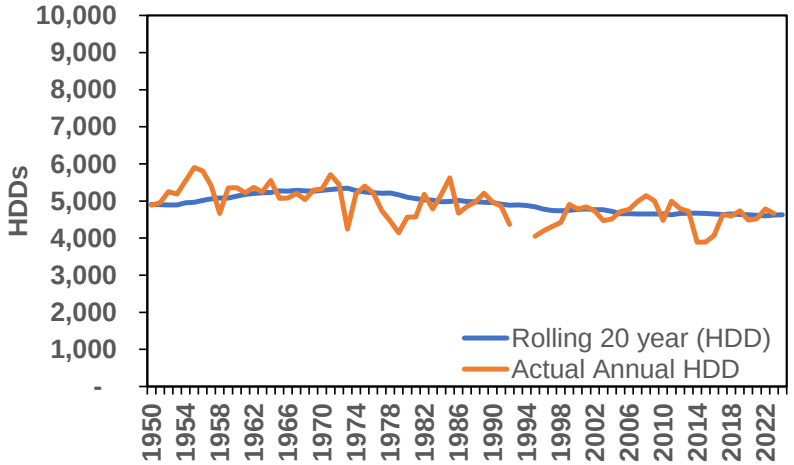
Trended reduction in HDDs from 2026 to 2045

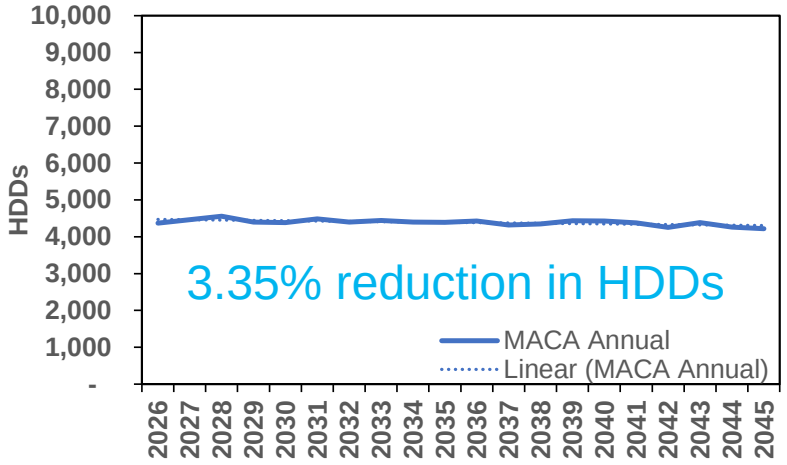
Peak HDDs

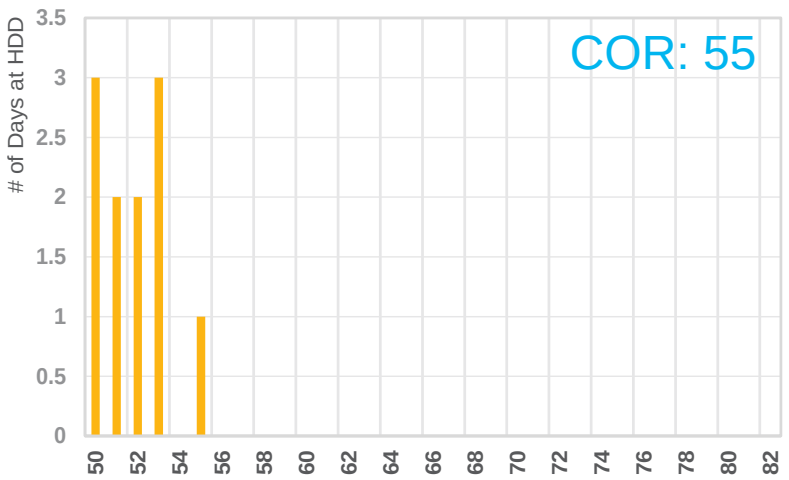
Coldest on Record Dates:

12/9/1972

Roseburg
Weather History and 4.5 MACA







Weather History

20 Year rolling HDD daily average of 4,627 HDDs

(2004-2023)

4.5 MACA

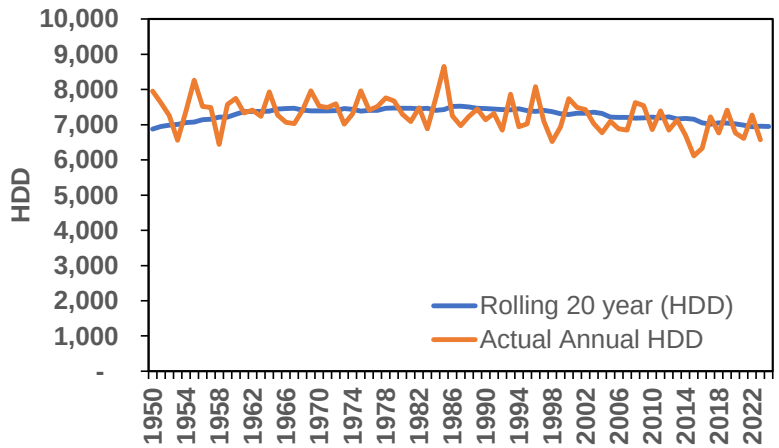
Trended reduction in HDDs from 2026 to 2045

Peak HDDs

Coldest on Record Dates:

12/22/1990

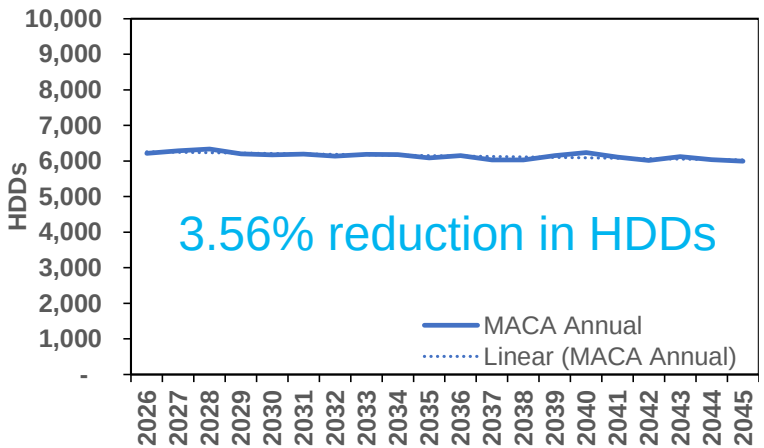
Spokane
Weather History and 4.5 MACA



Weather History

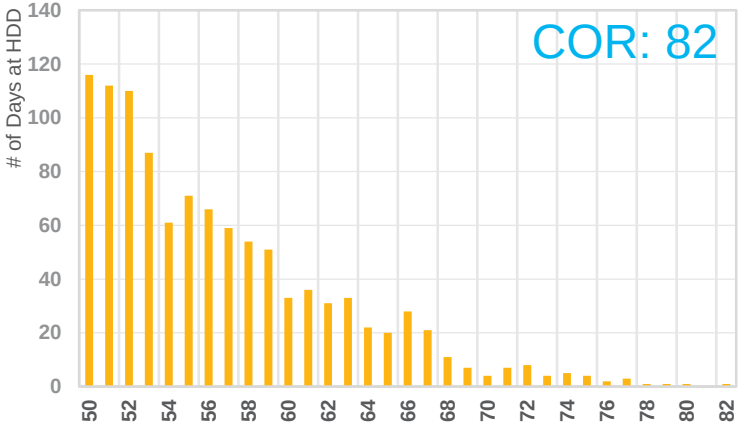
20 Year rolling HDD daily average of 6,946 HDDs

(2004-2023)



4.5 MACA

Trended reduction in HDDs from 2026 to 2045



Peak HDDs

Coldest on Record Dates:

12/30/1968

Peak Day Options

99% Probability

Weather futures are higher than coldest on record and drastically increases the peak day for each area

Max daily temp across all weather futures

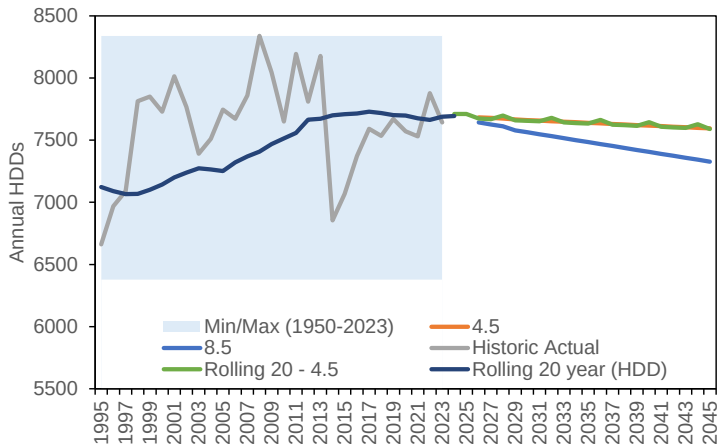
Coldest on Record (COR)

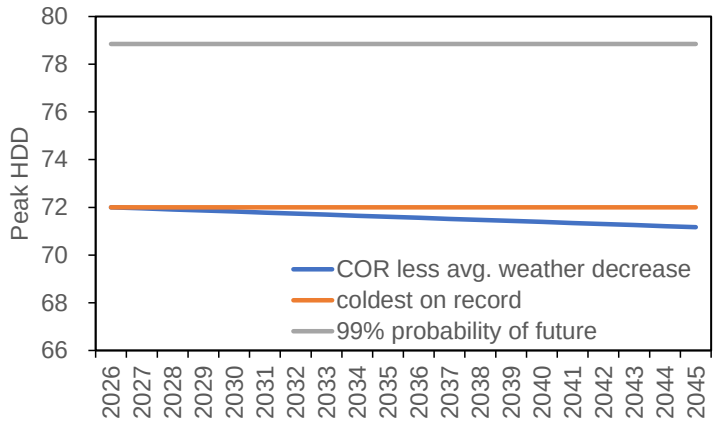
Some coldest on record temps have not occurred in recent history

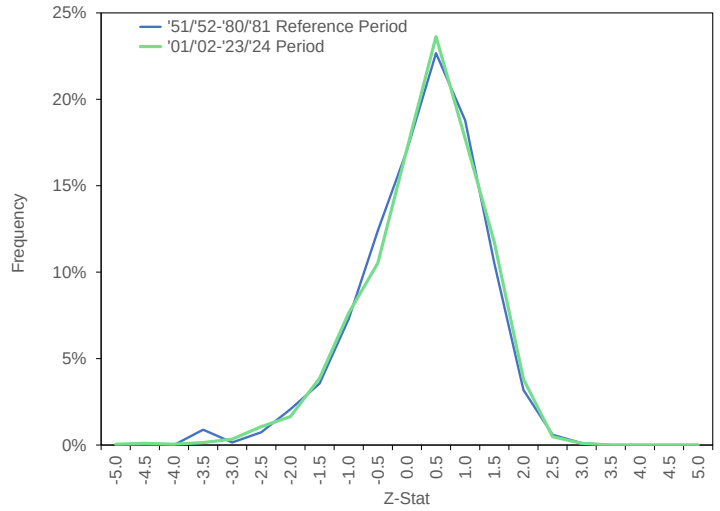
COR less decrease in HDDs

Uses a coldest on record less the average decrease in temps from 2026 - 2045

Klamath Falls







4.5 MACA

- 4.5 Median of future weather studies
- 20 year rolling average (historic + forecast)

Peak

Coldest on Record less average forecasted annual decrease (2026-2045)

2025 IRP: 71 HDD peak planning

(89% probability in MACA 4.5)

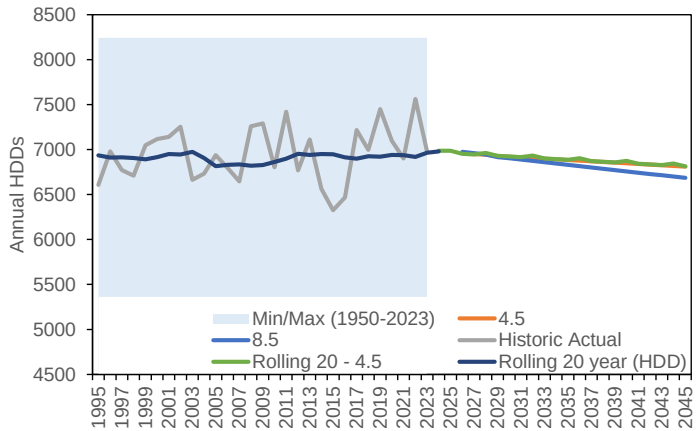
Historic Weather Comparison

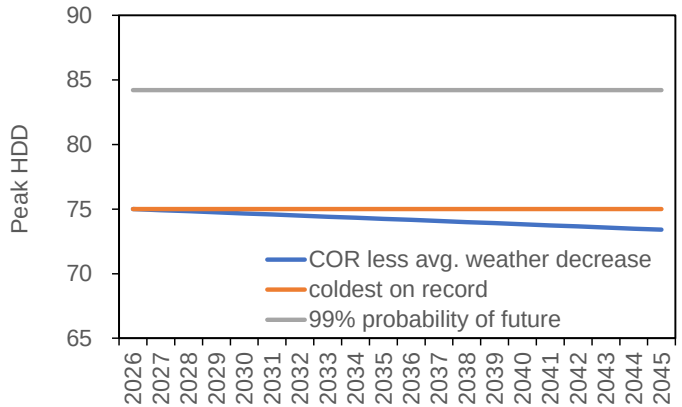
1951 – 1981 Winters (Dec, Jan, Feb)

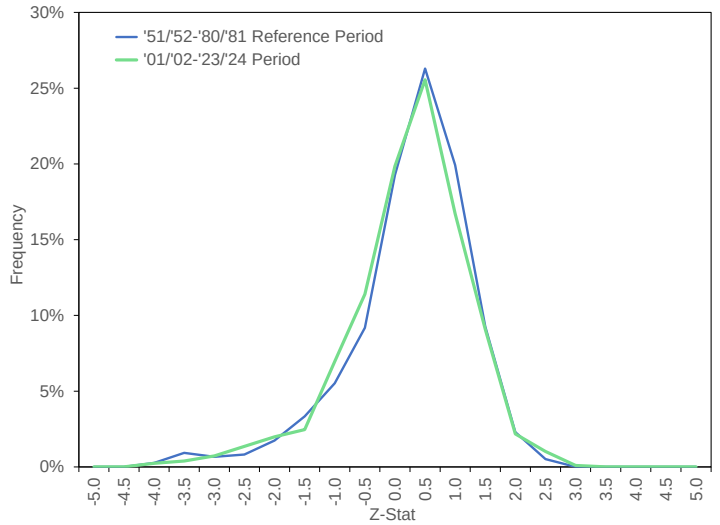
Compared to:

2001 – 2023 Winters (Dec, Jan, Feb)

La Grande







4.5 MACA

- 4.5 Median of future weather studies
- 20 year rolling average (historic + forecast)

Peak

Coldest on Record less average forecasted annual decrease (2026-2045)

2025 IRP: 73 HDD peak planning

(69.5% probability in MACA 4.5)

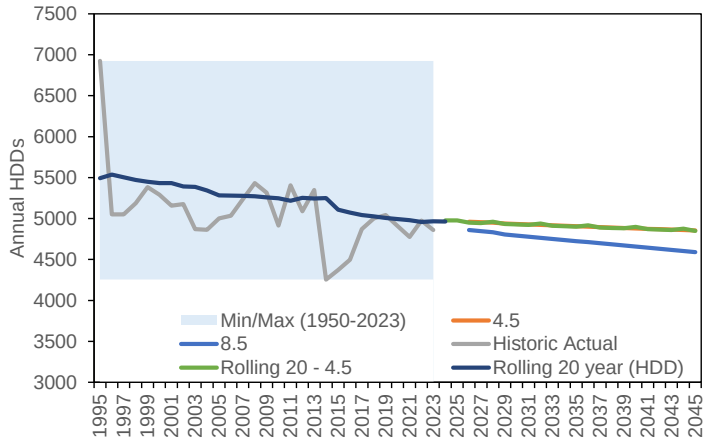
Historic Weather Comparison

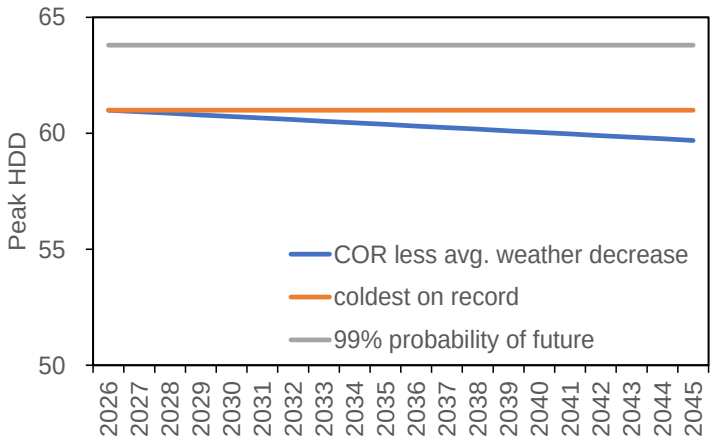
1951 – 1981 Winters (Dec, Jan, Feb)

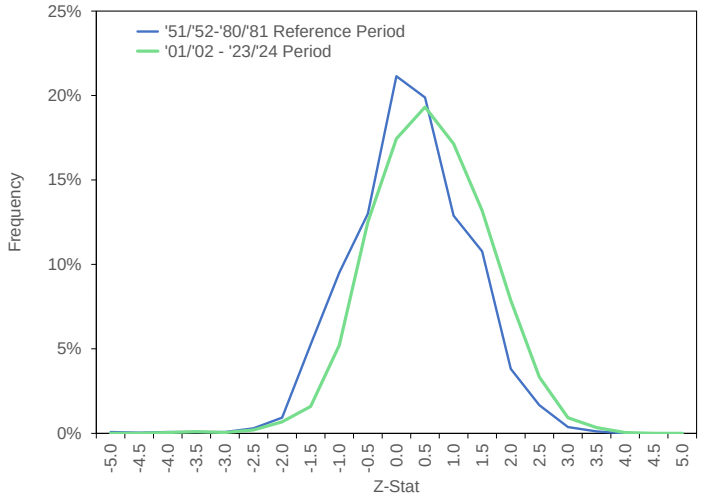
Compared to:

2001 – 2023 Winters (Dec, Jan, Feb)

Medford







4.5 MACA

- 4.5 Median of future weather studies
- 20 year rolling average (historic + forecast)

Peak

Coldest on Record less average forecasted annual decrease (2026-2045)

2025 IRP: 60 HDD peak planning

(96% probability in MACA 4.5)

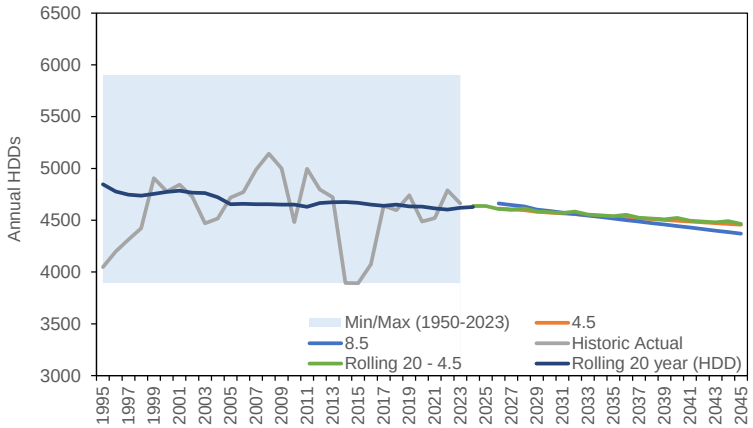
Historic Weather Comparison

1951 – 1981 Winters (Dec, Jan, Feb)

Compared to:

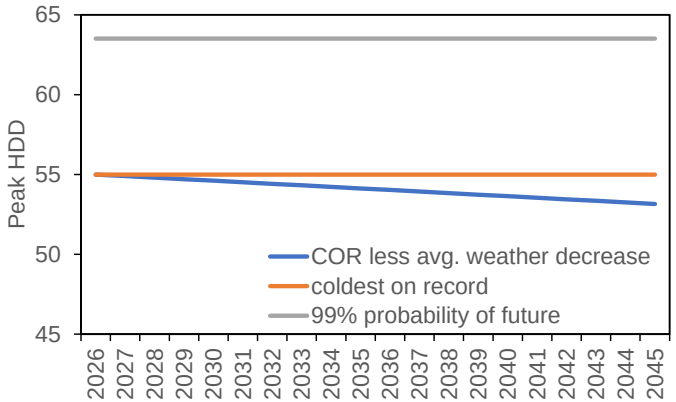
2001 – 2023 Winters (Dec, Jan, Feb)

Roseburg



4.5 MACA

- 4.5 Median of future weather studies
- 20 year rolling average (historic + forecast)

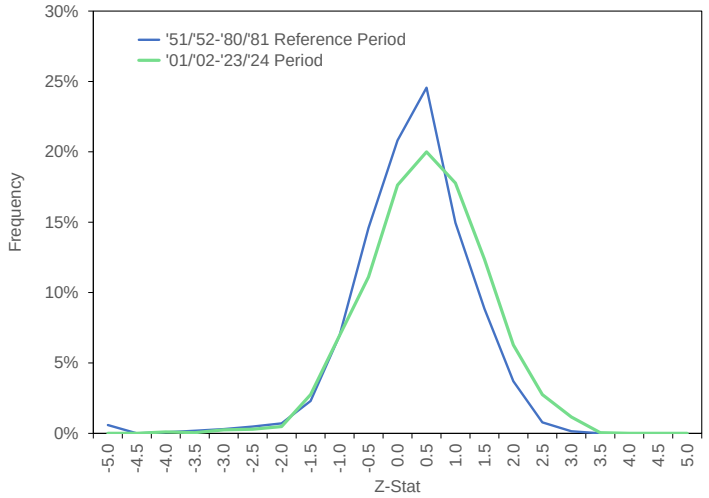


Peak

Coldest on Record less average forecasted annual decrease (2026-2045)

2025 IRP: 53 HDD peak planning

(75.5% probability in 4.5 MACA)



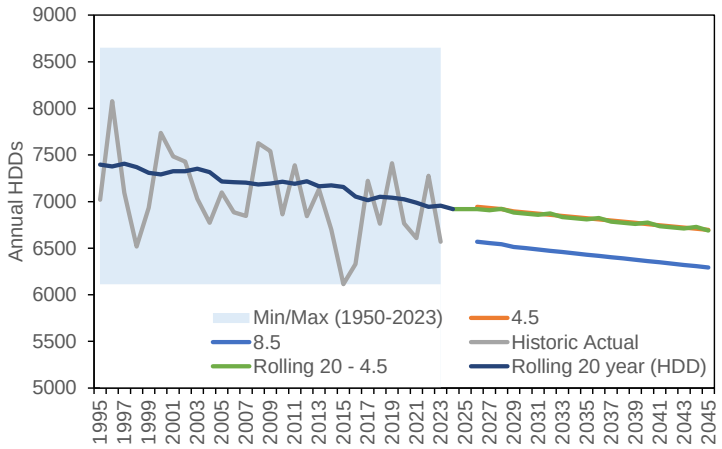
Historic Weather Comparison

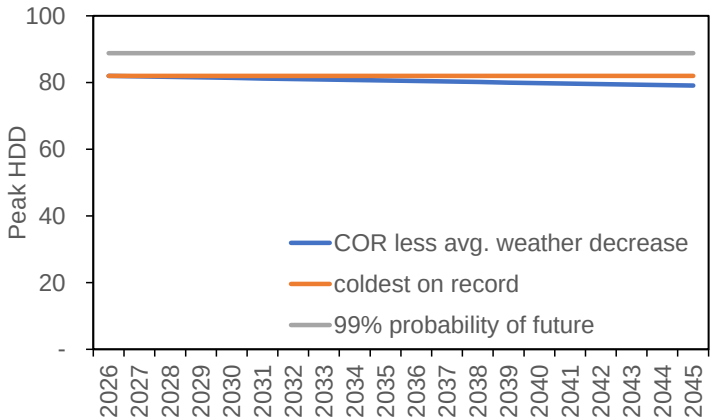
1951 – 1981 Winters (Dec, Jan, Feb)

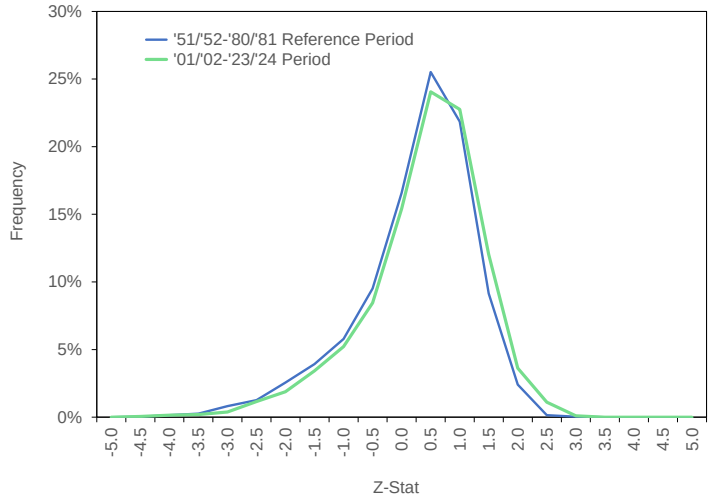
Compared to:

2001 – 2023 Winters (Dec, Jan, Feb)

Spokane







4.5 MACA

- 4.5 Median of future weather studies
- 20 year rolling average (historic + forecast)

Peak

Coldest on Record less average forecasted annual decrease (2026-2045)

2025 IRP: 79 HDD peak planning

(80% probability in MACA 4.5)

Historic Weather Comparison

1951 – 1981 Winters (Dec, Jan, Feb)

Compared to:

2001 – 2023 Winters (Dec, Jan, Feb)

*Weather used for Idaho and Washington

Summary

- MACA 4.5 weather median futures trended from 2026 – 2045 by planning area and combine with historical actual data into a rolling 20-year average

- Peak Planning: coldest on record less average decrease in HDDs from 2026 - 2045