Resource Planning Advisory Group Meeting

2027 Integrated System Plan

July 28, 2026

PUGET SOUND ENERGY

Welcome to the meeting!

Use the **React** feature to raise your hand or respond to content with emojis

RPAG members and PSE staff are welcome to use the **Chat** feature*

Click **Show Captions** to see real-time closed captioning

**To ensure members of the public can see RPAG questions and comments, please select "Everyone" in the chat dropdown menu*

Facilitator requests

1. Engage constructively and courteously towards all participants
2. Respect the role of the facilitator to guide the group process
3. Avoid use of acronyms and explain technical questions
4. Use the feedback form or email isp@pse.com for additional input to PSE
5. Aim to focus on the webinar topic
6. Public comments will occur after PSE's presentations
7. To ensure members of the public can see the RPAG chat, please select "Everyone" from the chat dropdown menu

SAFETY MOMENT

Prepare for peak wildfire season!

Create a household **emergency plan** and build an emergency kit

Make sure your **PSE account contact information** is up to date

Using a home medical device that relies on electricity? **Apply for Life Support status** on your account

Get your free **Wildfire Ready Plan** from the WA Department of Natural Resources

Today's speakers

Hilary Wilkinson
Facilitator, Maul Foster & Alongi (MFA)

Jennifer Coulson
Director, Resource Planning Analytics, PSE

Dan Aas
Energy and Environmental Economics (E3)

Niecie Weatherby
Manager, Gas Systems Integrity, PSE

Lorin Molander
Manager, Load Forecasting and Analysis, PSE

Today’s discussion topics

1:05

Where we’ve been and where we’re going

Jennifer Coulson, PSE

1:10

Electrification Potential Assessment results

Niecie Weatherby, PSE · Dan Aas, E3

2:05

Draft scenario demand forecasts results

Lorin Molander, PSE

2:45

Next steps & public comment opportunity

Hilary Wilkinson, MFA

What we need from you

Share your questions, reflections, and advice on today's topics

Let us know if anything is missing or unclear

Flag areas where deeper discussion is needed

Help us identify risks, tensions, or points of misalignment early

Where we've been and where we're going

Jen Coulson, Director, Resource Planning Analytics, PSE

July 28, 2026

PUGET SOUND ENERGY

Where we’ve been and how you’ve guided us

1
September 2024
ISP kickoff **(consult)**

2
October – December 2024
Scenario development **(involve)**

3
January – September 2025
Methodology review and development **(involve)**

4
January 2025 – July 2026
Sensitivity development **(involve)**

5
October 2025
ISP Modeling Feedback Memo published **(consult)**

6
October 2025 – present
Equity considerations including cost test and decision framework **(involve)**

7
May – June 2026
Reference case results and implications **(consult)**

Participation levels are based on the International Association of Public Participation (IAP2) Spectrum of Public Participation

Modeling process to date

1 The challenge

AURORA initially produced no feasible reference case from RPAG and public inputs. A solution must meet **effective peak capacity**, **CETA renewable & non-emitting resources**, and **energy demand**. With the 2045 peak need driving the gap, PSE removed build limits on commercially available technology, but the model still could not solve.

2 Reference A: forced to solve but unrealistic

Transmission limits maxed out wind and solar — still short of a solution, so the model was forced to add an unrealistic amount of 4-hour battery storage.

3 Reference B: more realistic

Allowing emerging technologies produced a workable solution — options for selection included small modular reactors (SMR), advanced geothermal, mid- and long-duration storage, renewable peakers, and offshore wind.

4 What's next? Reference B (reference case) is the starting point for developing the preferred portfolio; scenarios and sensitivities inform certain planning aspects that could be incorporated as part of preferred portfolio development.

What we heard and what we are doing with it (themes)

Third reference case
Add an option between Reference A and B
→ **Sensitivity analysis**

Fossil resource assumptions
Don’t inadvertently advantage fossil resources
→ **Full costs included**

Non-wire alternatives
Evaluate electric delivery system success rates
→ **Testing 20 / 30 / 40%**

WAC definition
Use the formal WAC definition for emerging resources
→ **Broadened definition to solve**

Emerging-tech timing and cost
Examine timing and cost effects, especially geothermal and long-duration storage
→ **Testing via sensitivities**

Where are we going

Near-term milestones

Ongoing

5-6 stakeholder meetings remaining this year

August

Revised ISP workplan refining plans for remaining meetings

December/January

Draft ISP executive summary, materials & comment period

Areas of focus for the remainder of the year

- Scenario and sensitivity analysis
- Decision-making and preferred portfolio
- Distribution of benefits
- CETA targets and goals
- Developing and publishing draft ISP executive summary

Electrification Potential Assessment

Niecie Weatherby

Manager, Gas Systems Integrity

Dan Aas

Energy & Environmental Economics (E3)

July 28, 2026

PUGET SOUND ENERGY

Objectives

Electrification potential assessment

- **Purpose of this session**
  - *Inform* RPAG on the Electrification Potential Assessment (EPA) results
  - *Consult* on potential changes or adjustments for future Integrated System Plan (ISP) cycles
- **What PSE needs from you**
  - Initial reactions and reflections on the results
  - Feedback on methodology for the next ISP cycle
- **How your feedback will be used**
  - Informs how we incorporate the results into the ISP
  - Methodology feedback will be tracked for use in future ISP cycles

Today's feedback questions

1 Initial reactions

What are your initial reactions to the results of PSE's first electrification potential assessment?

2 Methodology ideas

What ideas do you have for improving the methodology in the next planning cycle?

ISP rules require assessment of infrastructure investments and non-pipeline alternatives, including targeted electrification

Electrification Potential Assessment
WAC 480-96-040(1)(b)

Informs

Delivery System Assessment and 20-year gas infrastructure needs
WAC 480-96-040(3)(a)

Includes evaluation

Delivery System Assessment – non-pipeline alternatives
WAC 480-96-040(3)(b)

Results from these assessments inform the scenario and sensitivity analysis and provide key inputs to development of the preferred portfolio

Regulatory definitions establish foundation for analysis

Electrification potential assessment: WAC 480-96-040 (1 b)
Assessment of cost-effective electrification that encompasses the potential for **geographically targeted electrification**

Geographically targeted electrification WAC 480-96-020 (26) –
Geographically targeted transition of a portion of gas customers of the large combination utility with an intent to electrify loads of such customers and, in conjunction, to reduce capital and operational costs of gas operations of the large combination utility serving such customers

Delivery system assessment -nonpipeline alternative - WAC 480-96-040 (3 b)
The integrated system plan must assess nonpipeline alternatives, including geographically targeted electrification and gas demand response, as an alternative to replacing aging gas infrastructure or expanded gas capacity

Nonpipeline alternative -WAC 480-96-020 (38)
This means activities or investments that delay, reduce, or avoid the need to build, upgrade, or repair gas plant, such as pipelines or service lines.

Energy+Environmental Economics

PSE Integrated System Plan
Non-Pipeline Alternatives (NPA) Analysis

RPAG Presentation

July 2026

Dan Aas
Sean Smillie
Vivan Malkani
Dan Alberga
Aneri Shah
Anna Clark

Project Goals and PSE Overview

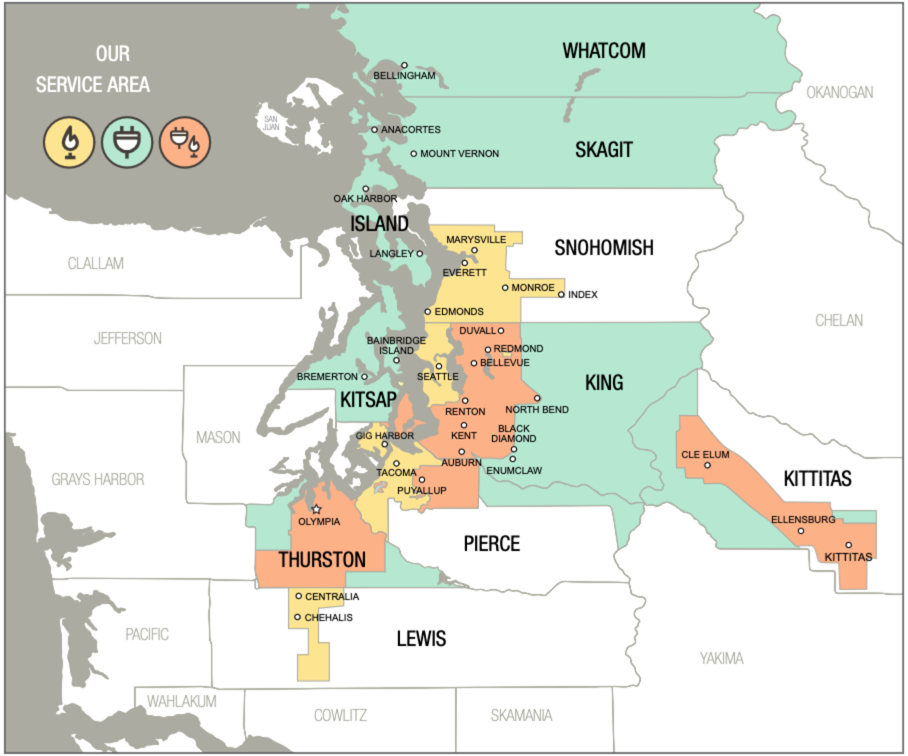
PSE PUGET SOUND ENERGY

1.1 million electric customers
900,000 natural gas customers

E3 Project Goals:

- Develop a service-territory-wide non-pipeline-alternative (NPA) suitability and cost-benefit analysis across planned gas infrastructure projects
- Support PSE in integrating this analysis into its Integrated System Plan (ISP) across gas and electric businesses, as well as ongoing NPA planning

Analysis supports PSE's ISP filing to the WA Utilities and Transportation Commission



Study Approach

Energy+Environmental Economics

Electrification Potential Assessment Framework

Planned Gas Projects*

- ***Specific.*** *7 large projects across Tx and Dx systems to support reliable service*
- ***Dupont.*** *170 miles of 1970s-vintage DuPont Dx pipeline slated for replacement*
- *Other NPA-suitable gas project types*

→

Technical Potential

Hydraulic feasibility of avoiding gas system investment through customer-facing NPAs

→

Economic Potential

Cost-effectiveness screening comparing avoided project costs to incurred NPA costs

→

Adoption-feasible Potential

Consider adoption feasibility given historical vs. required adoption rates

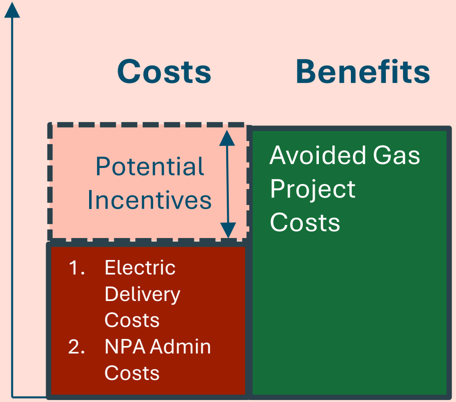
*approximately 40% of planned ISP Reference Scenario investments from 2028-2033 included in NPA screening

Project Cost-Effectiveness Perspectives to Inform NPA Evaluation

Customer incentives assumed to cover <u>full upfront cost of electrification</u> measures to secure sufficient conversion rate

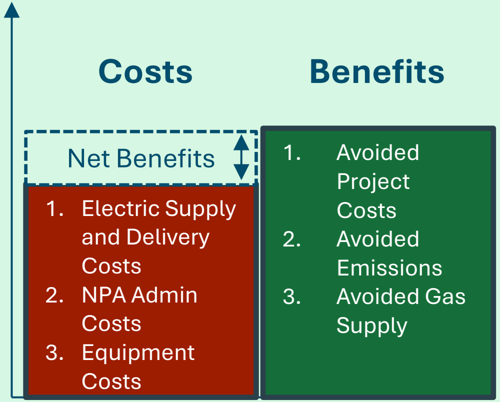
Joint Utility Cost-Effectiveness

"Would NPA implementation increase total revenue requirement?"



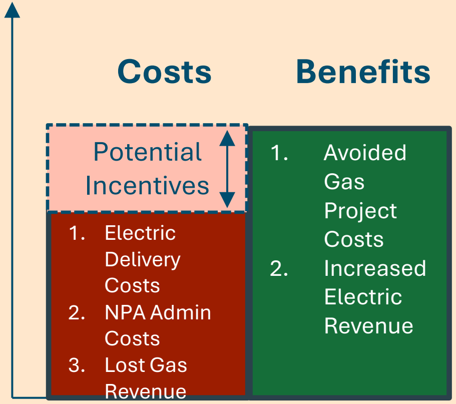
Total Resource Costs (incl. emissions)

"Do the total benefits, including avoided emissions, exceed NPA project costs?"



Ratepayer Cost-Effectiveness

"How would electric and gas ratepayers be affected by implementing this NPA?"



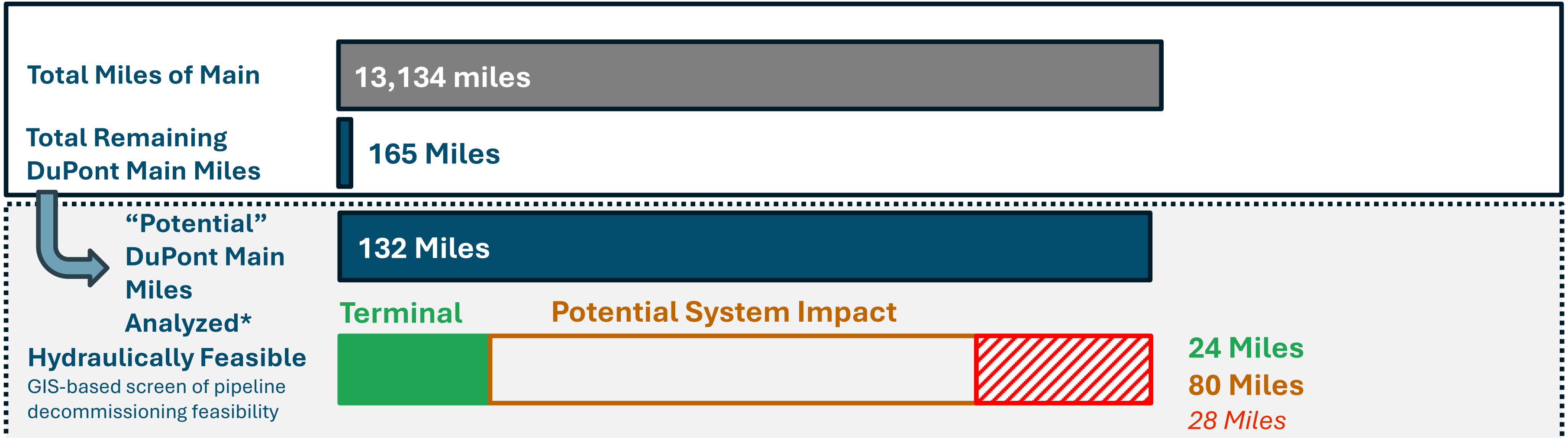
DuPont Pipeline Replacement – Targeted Electrification

Energy+Environmental Economics

DuPont replacement segments identified as targeted electrification candidates

- **Since 2013, PSE’s Older Vintage PE Pipe Mitigation Plan addresses a specific type of Dupont pipe installed prior to 1986 that is at risk for brittle-like cracking and fusion failure, which can result in hazardous leaks.**
  - To mitigate this risk, PSE conducts field inspections to confirm pipe material and prioritizes pipeline remediation based on risk data obtained.
  - All known high-risk pipelines have already been remediated by PSE.
- **At the end of 2025, 165 miles of DuPont pipeline remained, with a targeted remediation completion date of 2032.**
- **These planned remediation projects present opportunities for targeted electrification**

Hydraulic feasibility screening identifies potentially viable candidates for pipeline decommissioning



Terminal: no downstream customers *(18%)*

Potential System Impact: PSE gas hydraulic model analysis needed *(61%)*

Infeasible: based on GIS screen, decommissioning would strand downstream customers *(21%)*

PSE gas hydraulic model analysis needed to determine share of projects that could be avoided in this category

**E3's analysis was limited to a subset of segments for which data was available; PSE will extend this analysis to DuPont segments as project data is finalized.*

High-Level cost-effectiveness screening compares avoided pipeline replacement costs to incurred electric system and NPA program costs

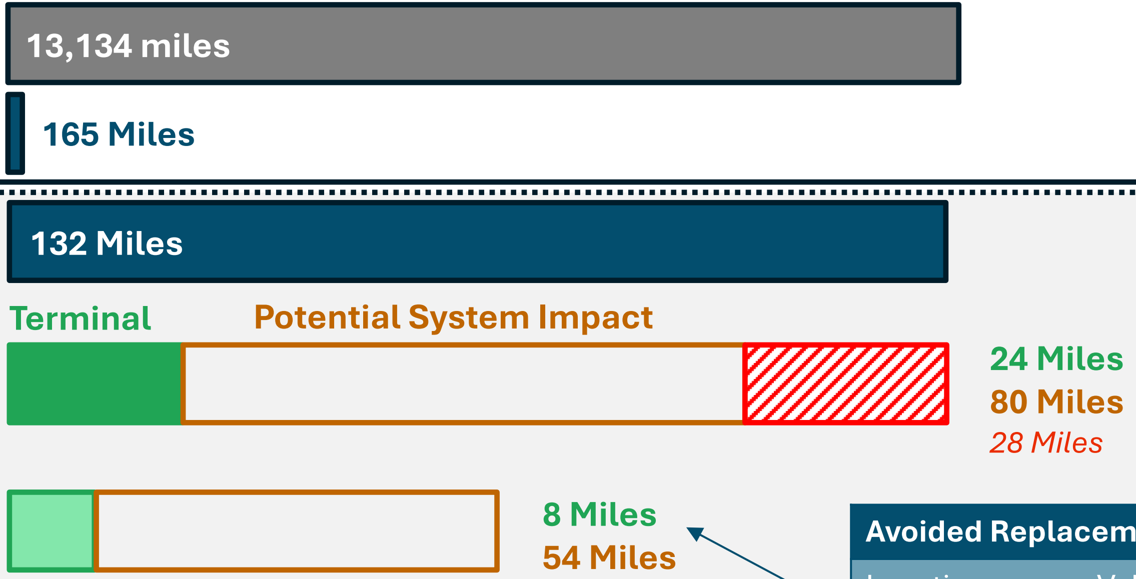
Total Miles of Main

Total Remaining DuPont Main Miles

"Potential" DuPont Main Miles Analyzed

Hydraulically Feasible
GIS-based screen of pipeline decommissioning feasibility

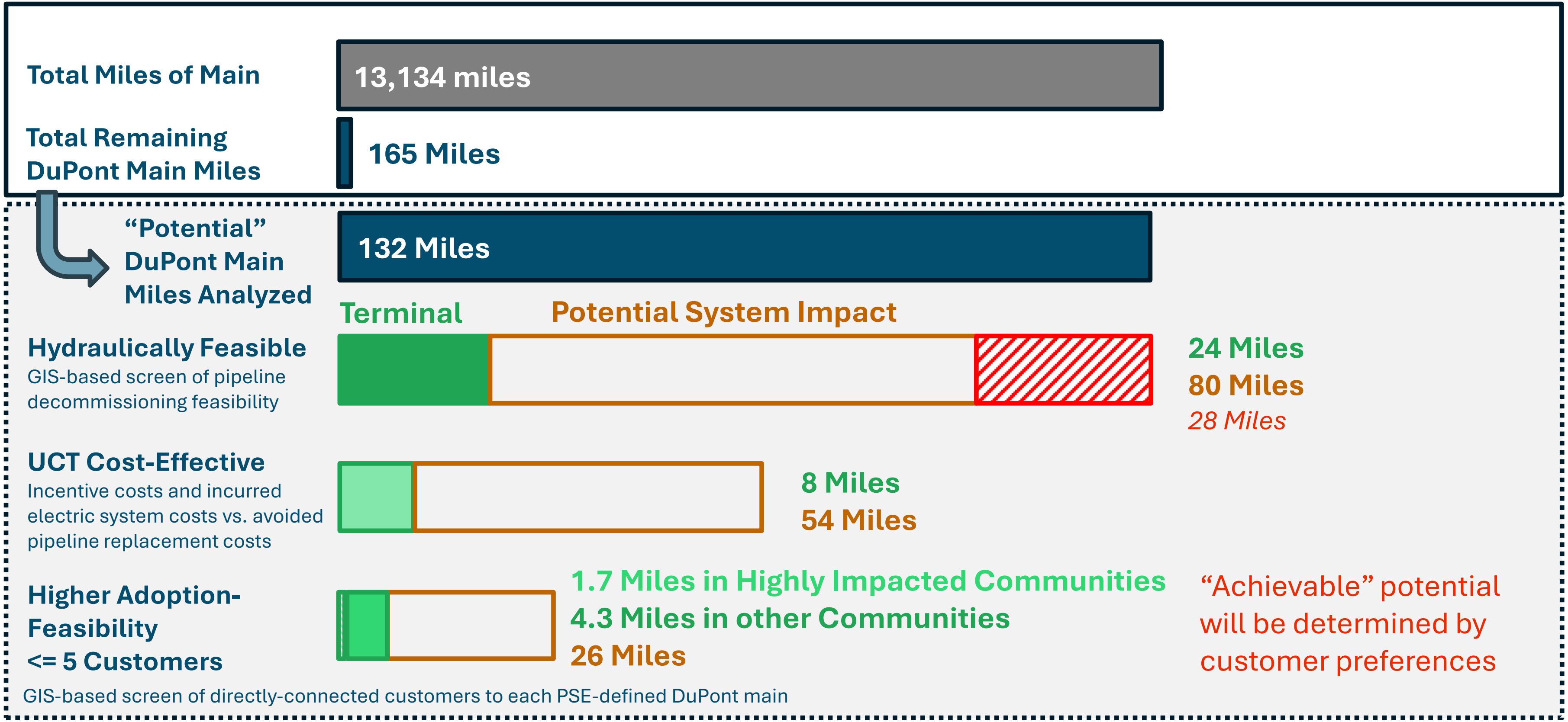
UCT Cost-Effective
Incentive costs and incurred electric system costs vs. avoided pipeline replacement costs



Avoided Replacement Costs	
Location	Value
Seattle	$5.98M/mile
Non-Seattle	$2.31M/mile

Note: Electric Dx upgrade cost impacts ignored as adoption threshold modeled would yield limited peak impacts

5 customer adoption threshold* used to further bound the feasible potential of targeted electrification



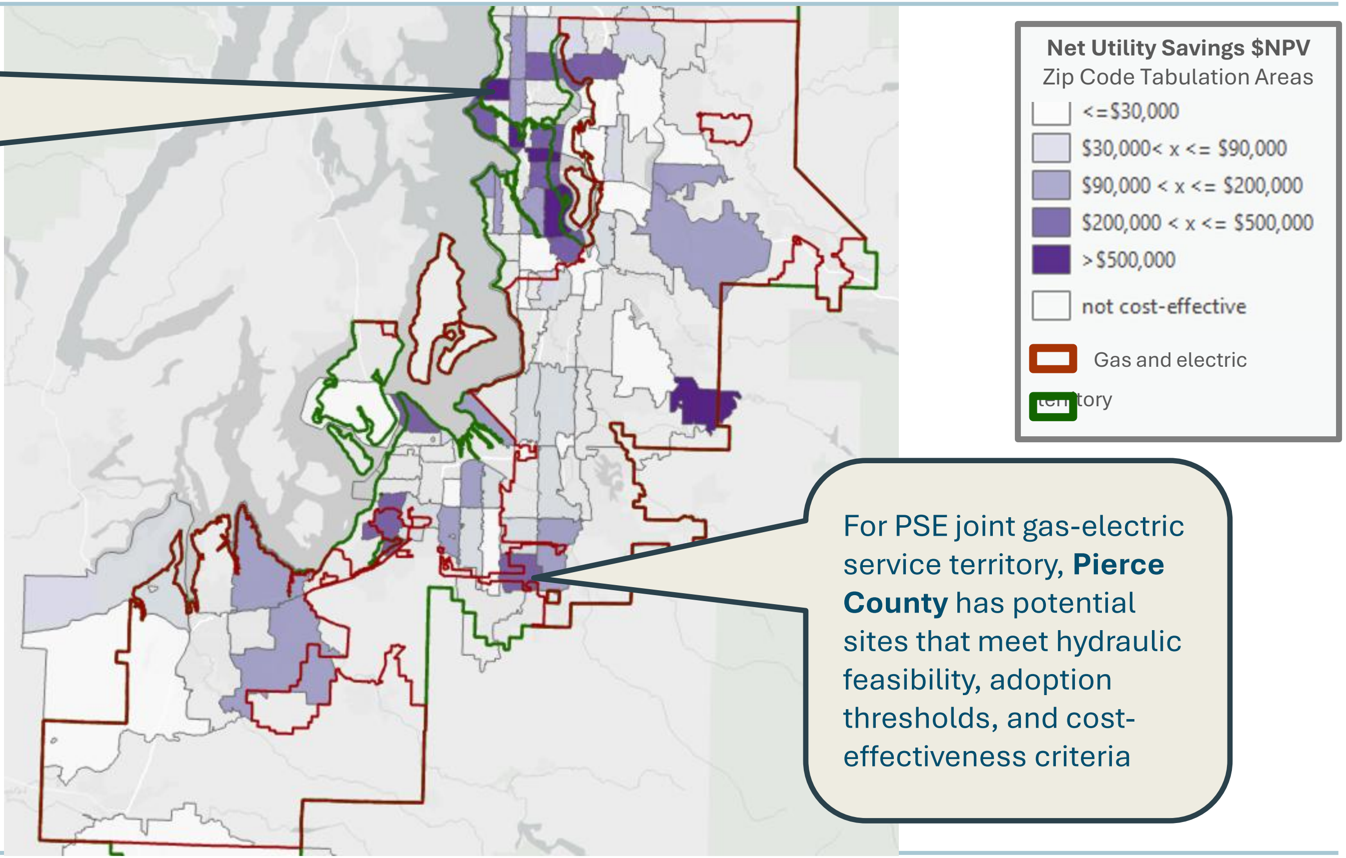
*Informed by analysis of 88 successful PG&E targeted electrification projects, in *Non-Pipeline Alternatives: Emerging Opportunities in Planning for U.S. Gas System Decarbonization*, RMI and National Grid, May 2024

GIS analysis provides the starting point for identifying targeted electrification potential

High cost-effectiveness in Seattle area driven by >$5M/mile pipeline replacement costs; *PSE gas-only territory; coordination with SCL required*

Electric Dx impacts are likely limited for <=5 customer projects

Multiple projects in the same area would yield more significant electric Dx upgrades



For PSE joint gas-electric service territory, **Pierce County** has potential sites that meet hydraulic feasibility, adoption thresholds, and cost-effectiveness criteria

Targeted Electrification Conclusions

- **Terminal DuPont mains with <=5 connected customers present potential benefits from targeted electrification of up to ~4.5% of analyzed DuPont mileage. Approximately 30% of these sites are in Highly Impacted Communities.**
  - Each project will be further assessed including potential service line/system upgrades, electric panel upgrades, customer willingness to convert
  - The “achievable” potential is a smaller, uncertain share of this, given the challenge of universal customer conversion for any zero-gas project size
- **“Potential system impacts” segments requiring further hydraulic modeling by PSE could yield cost savings for segments with <=5 customers for up to ~20% of analyzed DuPont mileage**
- **PSE will use and refine this analysis and approach to identify potential targeted electrification opportunities as system and customer data is refined and as other known projects/populations are identified.**
  - E.g., initial analysis of low-pressure mains, farm taps, and inside regulators identified potential cost-effective NPA opportunities

Specific Projects

Energy+Environmental Economics

Specific Project Overview

Project	Type
1	Peak
2	Peak
3	Zero Gas
4	Peak
5	Peak
6	Zero Gas
7	Peak

Definitions
Zero-Gas NPA: *Total customer departure required,* *Full building electrification*
Peak NPA: *<100% customer departure required,* *Heating electrification only*

Specific Project Overview

Project	Type	Shortfall (scfh)	Est. Project Need-By Date	Project Cost ($M)
1	**Peak**	205,000	2030	$34M
2	**Peak**	46,000	2028	$12M
3	**Zero Gas**	400,000	2032	$150M
4	**Peak**	390,000	2034	$25M
5	**Peak**	2,348,000	2030	$17M
6	**Zero Gas**	110,000	2034	$24M
7	**Peak**	1,869,000	2032	$30M

Specific Project Overview

Impacted by ISP Scenario; Reference Shown

Project	Type	Shortfall (scfh)	Est. Project Need-By Date	Project Cost ($M)	Residential Customers Served	Commercial Customers Served	Industrial Customers Served
1	**Peak**	205,000	2030	$34M	20,467	392	4
2	**Peak**	46,000	2028	$12M	2,850	103	3
3	**Zero Gas**	400,000	2032	$150M	13,064	793	15
4	**Peak**	390,000	2034	$25M	13,064	793	15
5	**Peak**	2,348,000	2030	$17M	121,083	16,256	1,015
6	**Zero Gas**	110,000	2034	$24M	1,761	208	0
7	**Peak**	1,869,000	2032	$30M	46,646	4,292	249

Specific Project Cost-Effectiveness and Adoption Assessment

Project	Type	Shortfall (scfh)	Est. Project Need-By Date	Project Cost ($M)	Total Customer Adoption Needed	Annual Customer Adoption Needed
1	**Peak**	205,000	2030	$34M	4,585	6%
2	**Peak**	46,000	2028	$12M	1,026	17%
3	**Zero Gas**	400,000	2032	$150M	13,872	14%
4	**Peak**	390,000	2034	$25M	8,645	10%
5	**Peak**	2,348,000	2030	$17M	51,949	12%
6	**Zero Gas**	110,000	2034	$24M	1,969	11%
7	**Peak**	1,869,000	2032	$30M	34,938	14%

Zero gas NPAs at this scale are likely infeasible given customer conversion challenge

5-customer adoption threshold assumed for pipeline replacement NPAs

Specific Project Cost-Effectiveness and Adoption Assessment

Project	Type	Shortfall (scfh)	Est. Project Need-By Date	Project Cost ($M)	Total Customer Adoption Needed	Annual Customer Adoption Needed	Societal Net Cost (levelized $k/yr)	Utility Net Cost (levelized $k/yr)
1	**Peak**	205,000	2030	$34M	4,585	6%	$1,235k	$12,331k
2	**Peak**	46,000	2028	$12M	1,026	17%	**-$59k**	$2,422k
3	**Zero Gas**	400,000	2032	$150M	13,872	14%	$4,629k	$46,101k
4	**Peak**	390,000	2034	$25M	8,645	10%	$5,317k	$26,239k
5	**Peak**	2,348,000	2030	$17M	51,949	12%	$42,131k	$167,848k
6	**Zero Gas**	110,000	2034	$24M	1,969	11%	$1,214k	$8,371k
7	**Peak**	1,869,000	2032	$30M	34,938	14%	$40,622k	$143,837k

In Focus: ***Project 2***

High customer equipment costs drive net costs of NPAs; avoided emissions improve cost-effectiveness

Marginal $/kW-yr electric distribution costs used; detailed electric Dx cost assessment presented later on

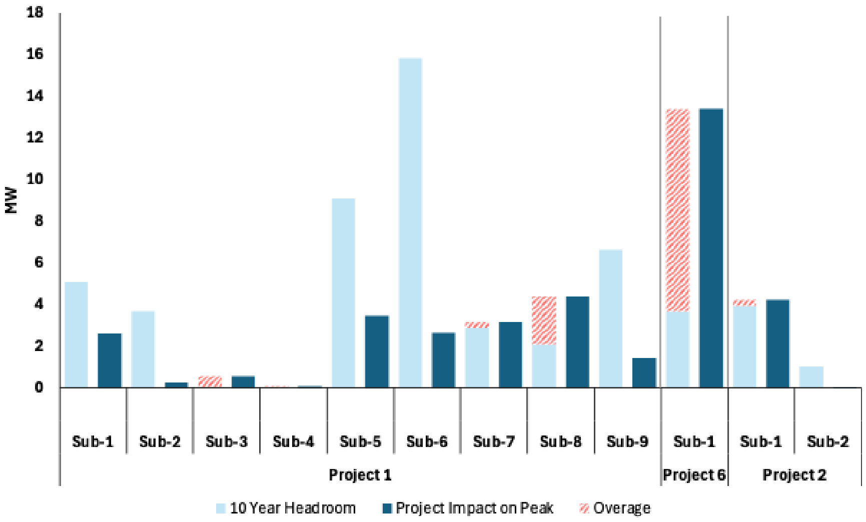
Commercial electrification not selected due to less favorable cost-effectiveness relative to residential electrification; increasing commercial customer electrification would trade off higher NPA costs for more achievable # customer conversions

Detailed electric distribution system cost analysis for subset of projects highlights costs of feeder and substation upgrades

+ **Peak impacts modeled per measure at 23F:**
  - Residential Building Electrification: 4-5 kW/customer
  - Commercial Building Electrification: 16-23 kW/Customer
+ **For subset of projects examined, NPA portfolios would see average peak demand exceed available headroom on at least some electric feeders**
+ **PSE electric team provided primary and secondary distribution overnight capital cost estimates for a selection of projects:**

Project	Low	Mid	High
Project 1	$35M	$41M	$48M
Project 2	$7M	$8M	$10M
Project 6	$25M	$31M	$37M

Average Project Peak Impact vs. Winter Substation Headroom (MW)

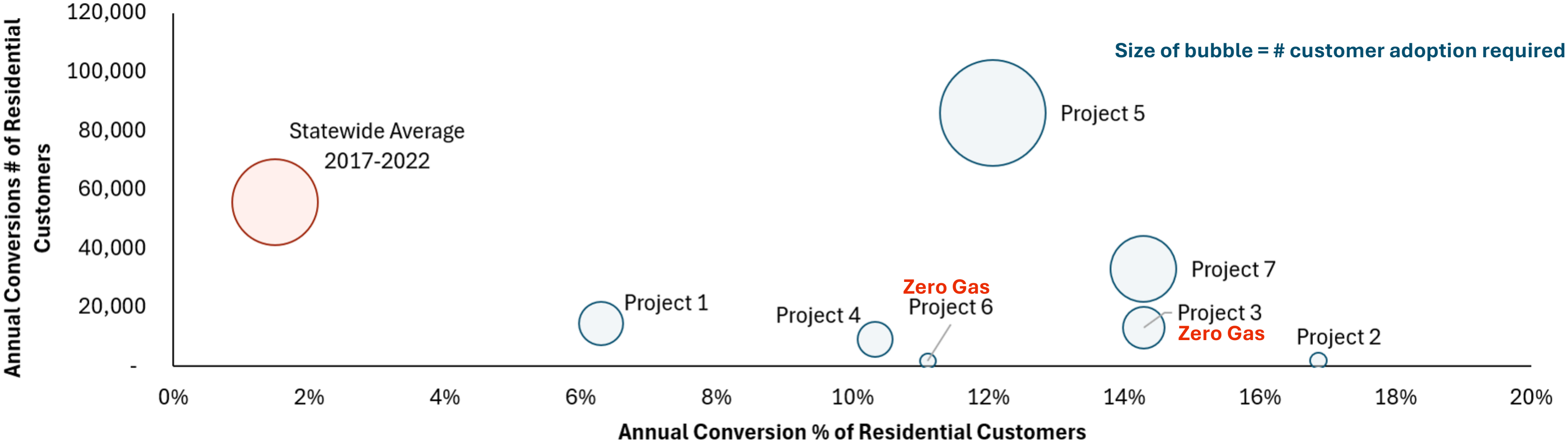


- *Figures represent **substation-level averages**; transformer-level constraints within a substation may not be visible at this aggregation.*
- *Headroom shown reflects **2024 baseline***

In addition to seeing net costs from electrification, specific project NPAs require unprecedented customer adoption

Statewide heat pump adoption benchmark:

- RBSA 2017: 20% of WA households with heat pumps
- RBSA 2022: 28% of WA households with heat pumps
  - *Equivalent to ~**2% of households per year**, or **~56k households per year***
  - *Similar rate observed for PSE-gas customer population in RBSA data*



Specific Project Conclusions

+ **For all projects evaluated, the annual adoption levels required to avoid gas investments far exceed recent statewide heat pump adoption rates**

+ **All projects would increase ratepayer costs relative to planned gas investments**
  - Large per-customer incentives are likely required to achieve adoption required
  - Electrification measures incur further costs via incremental generation and transmission related impacts
  - Local electric distribution system impacts result in additional utility cost impacts in some cases

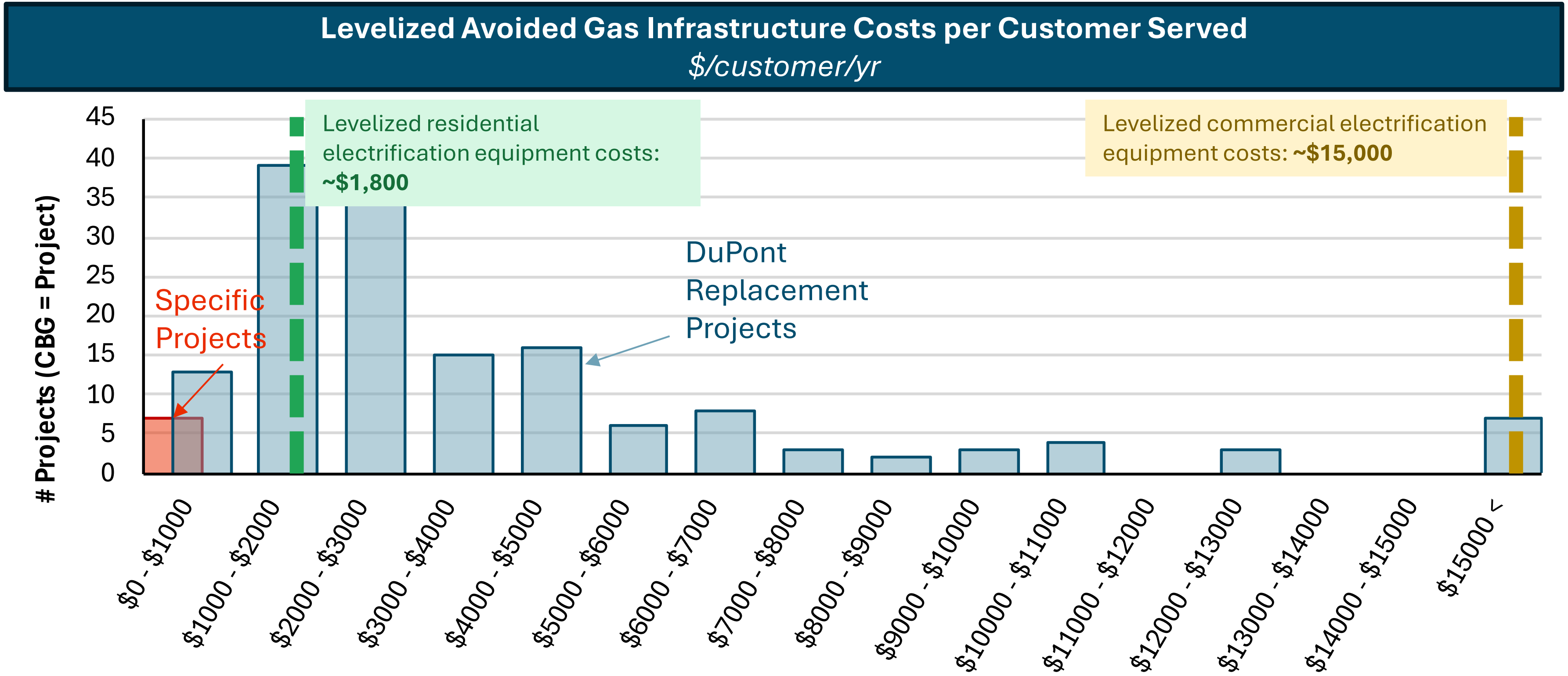
+ **Including avoided emissions leads to societal benefits for a subset of projects**

+ **Pilot projects, such as the ongoing Duvall NPA pilot, can help PSE identify on-the-ground implementation considerations alongside this economic and feasibility assessment.**

Conclusion

Energy+Environmental Economics

Pipeline replacement projects are more cost effective than specific projects because they have higher avoided costs per customer electrified.



Many open questions will need to be addressed to scale NPAs, consistent with the analysis shown here

Adoption challenges	Unprecedented rate of adoption and 100% opt-in required
NPA funding	Large-scale NPA deployment will need clearly-defined funding sources
Allocation of avoided gas replacement costs	How should avoided infrastructure costs be shared across ratepayers?
Electric distribution upgrades	How should NPA-driven electric Dx upgrade costs be shared?
Customer prioritization	Balance of cost-effectiveness, equity, and other priorities required

Project Conclusions

For planned DuPont pipeline replacement projects, terminal DuPont mains with few connected customers present a potential starting point for targeted electrification projects, especially the ~4.5% of potentially cost-effective and hydraulically feasible DuPont mileage with fewer than five customer conversions required

For specific projects, NPAs increase ratepayer costs and require unprecedented customer adoption

- Customer incentives drive NPA costs. Incentives need to be large enough to achieve sufficient customer adoption but given the unprecedented rate of customer adoption required for successful NPAs, the level of incentive that would be sufficient is uncertain.

Pipeline replacement project NPAs in the near-term present a relatively stronger opportunity to PSE in the near-term to successfully scale targeted electrification

- PSE can use and refine this workflow to identify potential targeted electrification opportunities as future system needs are identified, and system and customer data are refined

How PSE will use this analysis

Improved tools and methodology

- Advances PSE's current project cost effectiveness calculation
- Provides process and framework to continue and update analysis as additional information is available

Insights on opportunities

- Understand where geographically targeted electrification may be feasible
- Evaluate potential impacts on gas demand and system utilization
- Incorporate into larger assessment of nonpipeline alternatives.

This assessment does not identify projects for implementation. It provides information that may be used to evaluate geographically targeted electrification as a potential nonpipeline alternative when future gas system needs are identified.

What happens next?

- Identify areas with high potential and flag for bottoms up analysis
- Update assessment with newly scoped projects
- Incorporate insights into the ISP Delivery System Assessment Nonpipeline alternatives section (WAC 480 96 40 2b)
- Incorporate into scenario/sensitivity analysis
- Inform preferred portfolio including the action and implementation plans
- Establish process for adding other known asset populations
- Establish process for updating and maintaining for future use

Draft scenario demand forecasts (load scenarios)

Lorin Molander, PSE

July 28, 2026

PUGET SOUND ENERGY

Objectives

Scenario demand forecasts

- **Purpose of this session**
  - *Inform* RPAG on the updated draft scenario and demand forecasts
  - *Consult* on potential changes or adjustments for future Integrated System Plan (ISP) cycles
- **What PSE needs from you**
  - Initial reactions and reflections on the results
  - Feedback on methodology
- **How your feedback will be used**
  - Informs how we incorporate the results into the ISP
  - Methodology feedback will be tracked for use in future planning cycles

Today's feedback questions

1 Initial reactions

What are your initial reactions to the results of PSE's scenario demand forecasts? Are you surprised by anything?

2 Methodology ideas

What ideas do you have for improving the methodology in the next planning cycle?

Previous engagement and IAP2 levels

June 18, 2025	RPAG special session: Electric vehicle forecast	Inform
July 29, 2025	RPAG meeting: Demand forecast after conservation	Consult / involve
October 1, 2025	PSE published a memo with feedback from the RPAG and members of the public and PSE responses on scenarios, sensitivities, and assumptions for the 2027 ISP.	Inform / consult
February 26, 2026	Electrification modeling approach	Inform / consult

Reference Case Demand Forecast Update

The reference case demand forecast has been updated to account for an adjustment to PSE’s electric system average line loss factor

The “total load” forecast reflects the amount of energy that must be generated or otherwise acquired to serve PSE’s retail customers at the meter (“delivered load”)

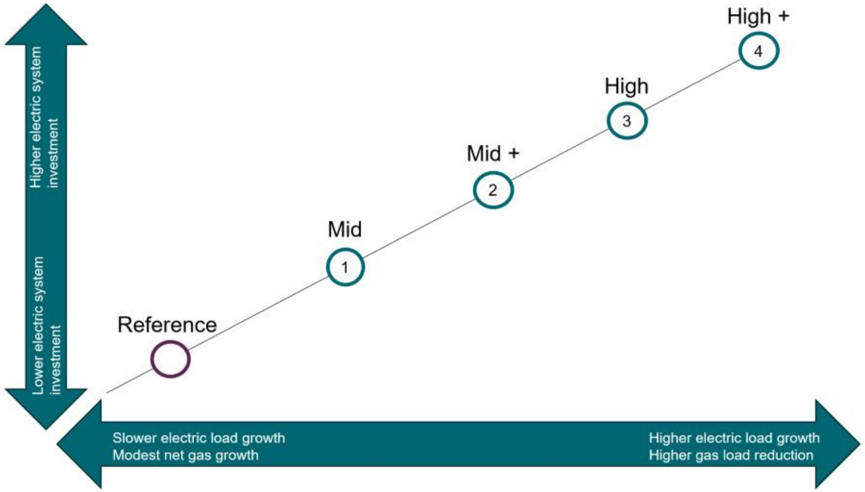
Delivered load + Losses = Total load with losses

- PSE’s electric system average line loss factor has been reduced from 7.58% to 5%, which reduces total electric system load and peaks by 2.7% in all years of the forecast period
- The electric line loss factor applies only to the electric total system load and peak forecasts (i.e., this does not apply to gas forecasts, nor does it impact forecasted electric customer growth)

Scenario Demand Forecasts (Load Scenarios)

What is the purpose of the load scenarios?

Proposed draft scenarios → magnitude of clean electrification



- **Reference Case**: *Leverage current laws and requirements, if current or expected future conditions continued*
- **Scenario:** *Economic/environmental impacts (outside of PSE's control) + other extremes*
  - *Scenarios are NOT alternative or preferred outcomes; they establish the range of energy need (gas and electric) that candidate resource portfolios must be able to deliver*

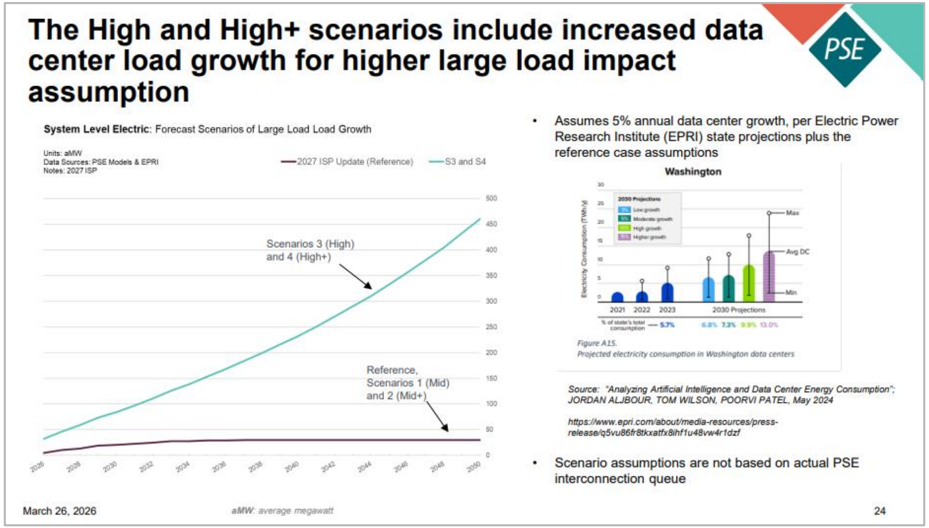
In addition to the reference case, there are four load scenarios (S1-S4) that have varying assumptions for large loads and building and transportation electrification

	Scenarios	Building Electrification	Large Load Requests	Customer Programs	EV Adoption
"Reference"	**Reference (HB 1589): Current Trends**	Current building electrification pilots, funding low-income through CCA	Data Centers (+ other new large load requests): based on high probability of interconnection *(lower demand impact)*	**Reference CPA for customer programs:** no gas appliance conservation, building codes restricting gas, 2% conservation & 10% DR or commercially feasible beginning in 2030 (electric only)	Reference
"S1"	**Scenario 1 (Mid): Incentivized electrification**	Starting in 2030, building electrification based on equipment failure and market adoption rate with an incentive	Data Centers (+ other new large load requests): based on high probability of interconnection *(lower demand impact)*	Customer Programs (DR, DER, DSR, etc.) sized to load (adjusted CPA to demand levels)	Reference
"S2"	***NEW* Scenario 2 (Mid +): Building Electrification Only**	Starting in 2030, electrify buildings at a pace that brings the emissions of both utilities **below** the utility's proportional share of the state GHG emission goals	Data Centers (+ other new large load requests): based on high probability of interconnection *(lower demand impact)*	Customer Programs (DR, DER, DSR, etc.) sized to load (adjusted CPA to demand levels)	Reference
"S3"	**Scenario 3 (High): Enhanced electrification**	Starting in 2030, electrify buildings at a pace that brings the emissions of both utilities **below** the utility's proportional share of the state GHG emission goals **Constrained by equipment failure**	Data Centers (+ other new large load requests): based on **mid probability** of interconnection *(higher demand impact)*	Customer Programs (DR, DER, DSR, etc.) sized to load (adjusted CPA to demand levels)	High
"S4"	**Scenario 4 (High+): Unconstrained electrification**	Starting in 2030, electrify buildings at a pace that brings the emissions of both utilities **below** the utility's proportional share of the state GHG emission goals	Data Centers (+ other new large load requests): based on **mid probability** of interconnection *(higher demand impact)*	Customer Programs (DR, DER, DSR, etc.) sized to load (adjusted CPA to demand levels)	High

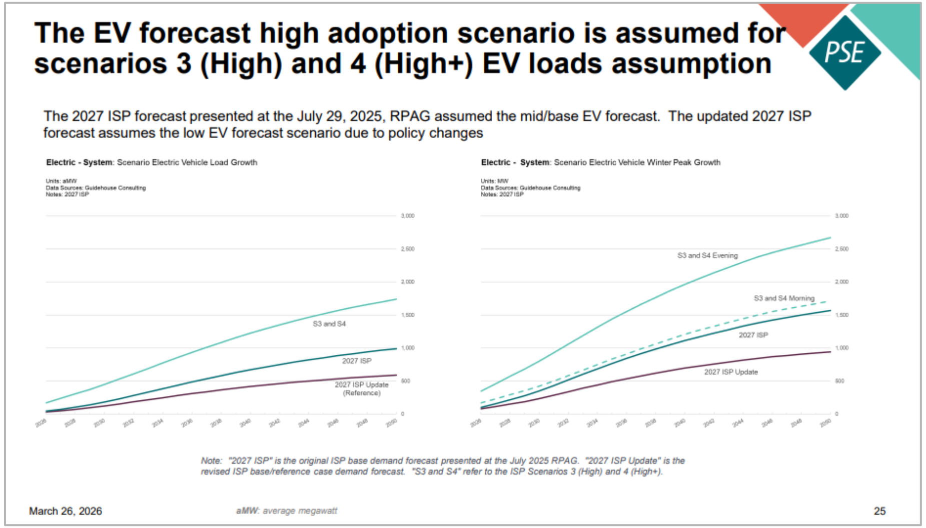
CCA: Climate Commitment Act DR: Demand response DER: Distributed energy resources DSR: Demand-side resources CPA: Conservation Potential Assessment GHG: Greenhouse gas

Large load and electric vehicle (EV) scenario assumptions were presented at the March 26, 2026 RPAG

There are two assumptions for large loads: reference case and an alternative higher large load assumption



There are two assumptions for electric vehicle adoption: the reference case and a high adoption assumption



Please refer to [June 18, 2025, RPAG meeting]for Guidehouse's presentation on the electric vehicle forecast

For load scenarios S1 through S4, there are three different assumptions for building electrification represented

Scenarios	Building Electrification
Reference (HB 1589): Current Trends	Current building electrification pilots, funding low-income through CCA
Scenario 1 (Mid): Incentivized electrification	Starting in 2030, building electrification based on equipment failure and market adoption rate with an incentive
***NEW* Scenario 2 (Mid +): Building Electrification Only**	Starting in 2030, electrify buildings at a pace that brings the emissions of both utilities **below** the utility's proportional share of the state GHG emission goals
Scenario 3 (High): Enhanced electrification	Starting in 2030, electrify buildings at a pace that brings the emissions of both utilities **below** the utility's proportional share of the state GHG emission goals **Constrained by equipment failure**
Scenario 4 (High+): Unconstrained electrification	Starting in 2030, electrify buildings at a pace that brings the emissions of both utilities **below** the utility's proportional share of the state GHG emission goals

Cadmus presented the methodology for developing building electrification impacts at the February 26, 2026, RPAG meeting

- Scenario 2 (Mid+) and Scenario 4 (High+) have the same assumptions for building electrification
- Scenario 3 (High) building electrification assumptions are similar to Scenarios 2 and 4, but electrification is constrained by equipment failure
- Scenario 2 analyzes increased building electrification only whereas Scenario 4 analyzes impacts of increased building electrification, increased large loads, and increased transportation electrification

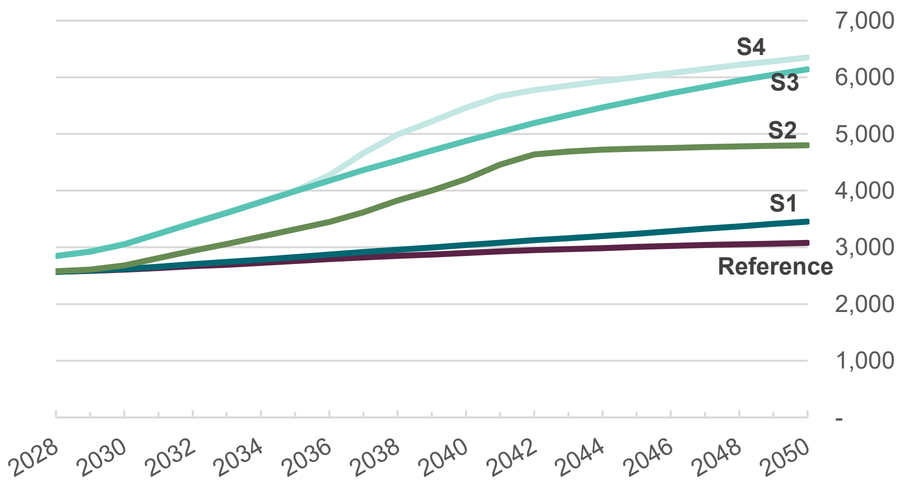
GHG: greenhouse gas

Scenario system load

	Building Electrification	Large Loads	EV
S1	Market adoption with incentive	Same as ref	Same as ref
S2	At a pace to reach GHG emission goal	Same as ref	Same as ref
S3	At a pace to reach GHG emission goal, constrained by equipment failure	High	High
S4	At a pace to reach GHG emission goal	High	High

Electric System Load: 2027 ISP Scenarios

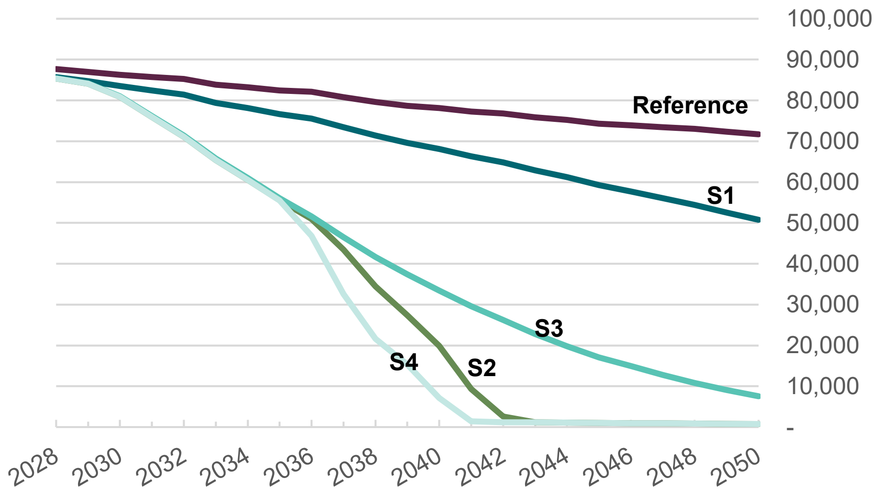
Units: aMW



Annual aMW	2030	2035	2040	2045	2050
Reference	2,607	2,760	2,902	3,006	3,079
S1	2,619	2,829	3,040	3,242	3,454
S2	2,680	3,317	4,204	4,739	4,800
S3	3,054	3,988	4,873	5,592	6,140
S4	3,059	3,999	5,464	5,999	6,349

Natural Gas System Load: 2027 ISP Scenarios

Units: MDth (Therms/10,000)



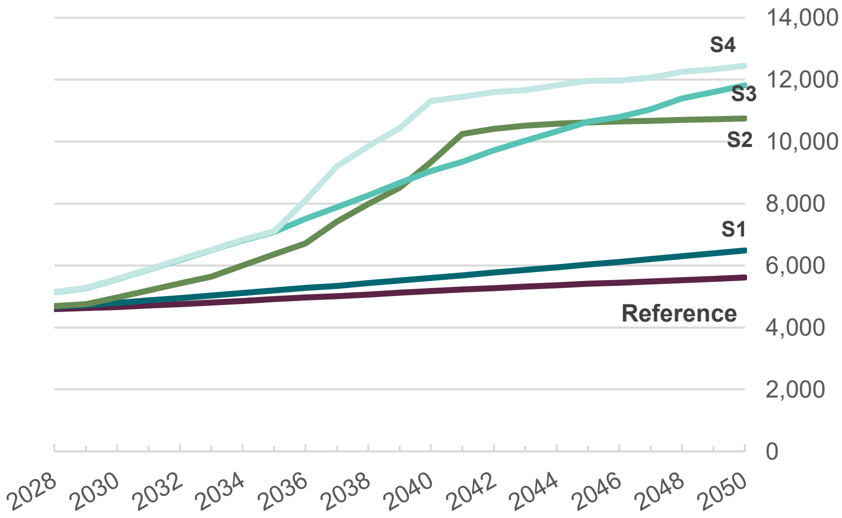
Annual Load (MDth)	2030	2035	2040	2045	2050
Reference	86,274	82,419	78,129	74,272	71,708
S1	83,548	76,643	68,112	59,226	50,763
S2	80,886	55,557	19,872	1,016	739
S3	81,052	56,091	33,433	17,102	7,550
S4	80,879	55,508	7,089	1,018	741

Scenario system peak

	Building Electrification	Large Loads	EV
S1	Market adoption with incentive	Same as ref	Same as ref
S2	At a pace to reach GHG emission goal	Same as ref	Same as ref
S3	At a pace to reach GHG emission goal, constrained by equipment failure	High	High
S4	At a pace to reach GHG emission goal	High	High

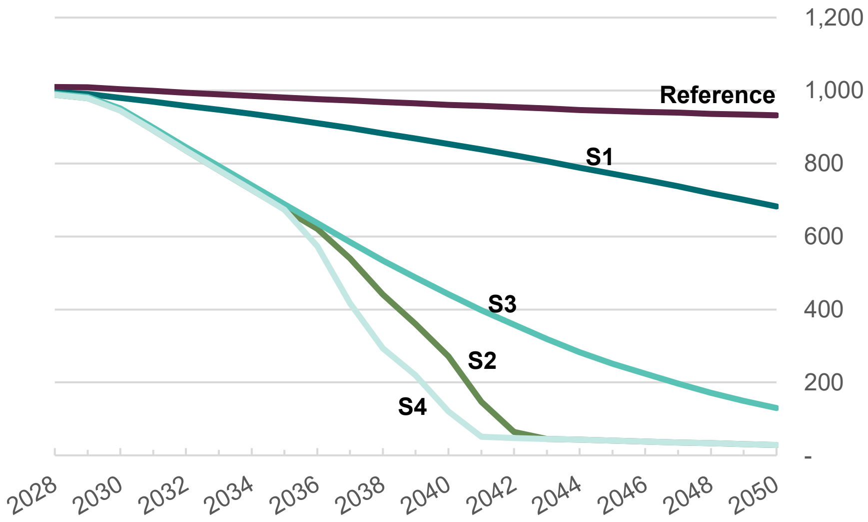
Electric System Winter Peak: 2027 ISP Scenarios

Units: MW



Natural Gas System Peak: 2027 ISP Scenarios

Units: MDth (Therms /10,000)



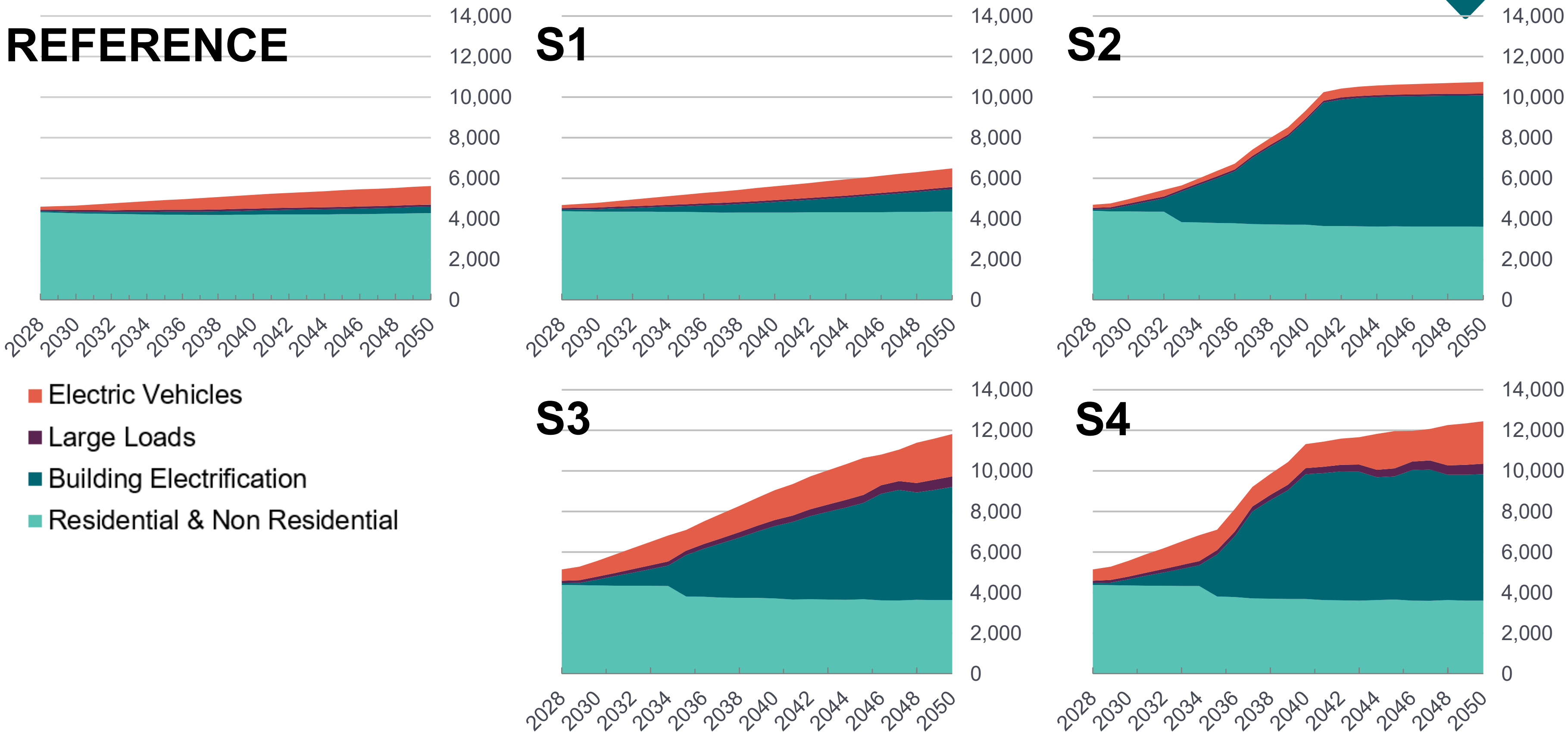
Annual Winter Peak (MW)

	2030	2035	2040	2045	2050
Reference	4,656	4,916	5,179	5,409	5,615
S1	4,790	5,197	5,602	6,030	6,487
S2	4,968	6,361	9,337	10,617	10,748
S3	5,558	7,089	9,048	10,644	11,817
S4	5,567	7,105	11,316	11,958	12,449

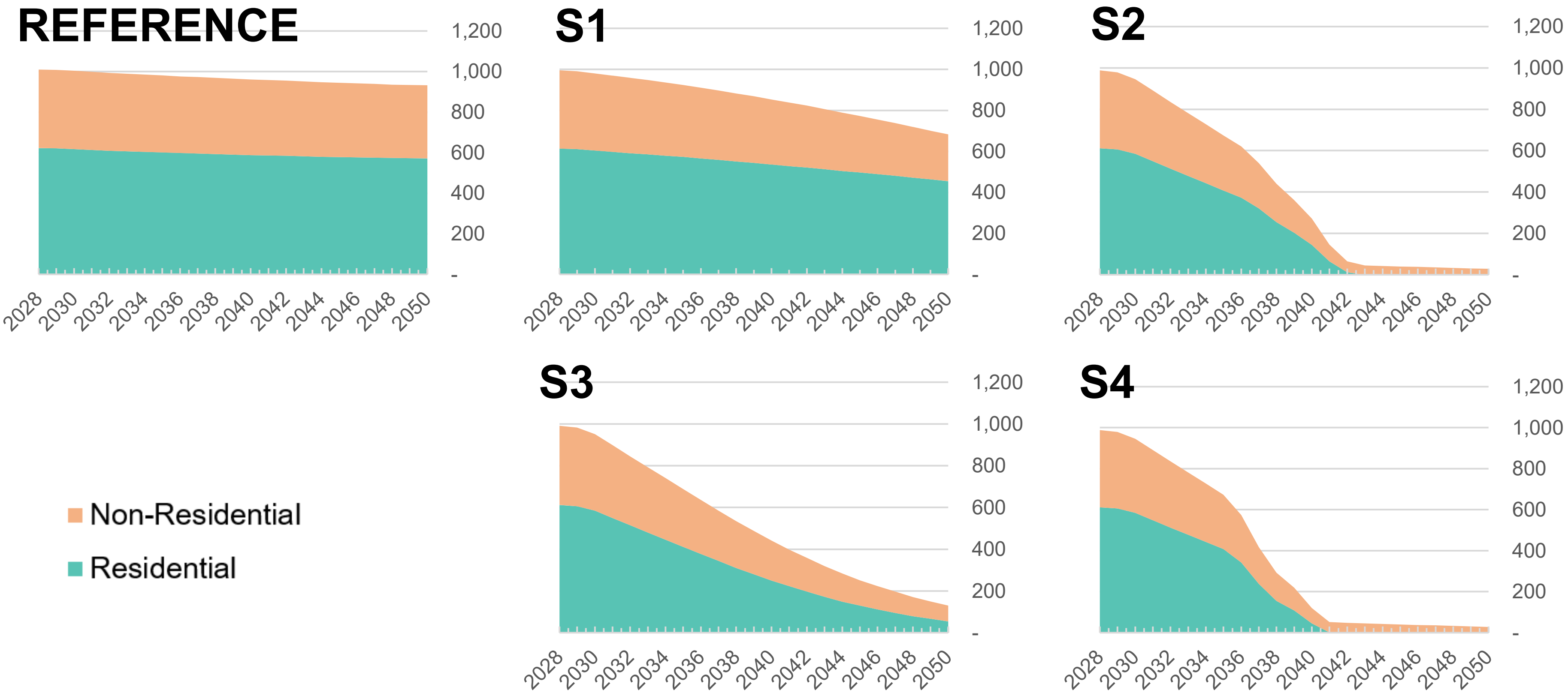
Annual Peak (MDth)

	2030	2035	2040	2045	2050
Reference	1,004	981	961	944	932
S1	980	924	853	772	682
S2	945	674	271	40	28
S3	951	688	442	251	130
S4	945	673	121	40	29

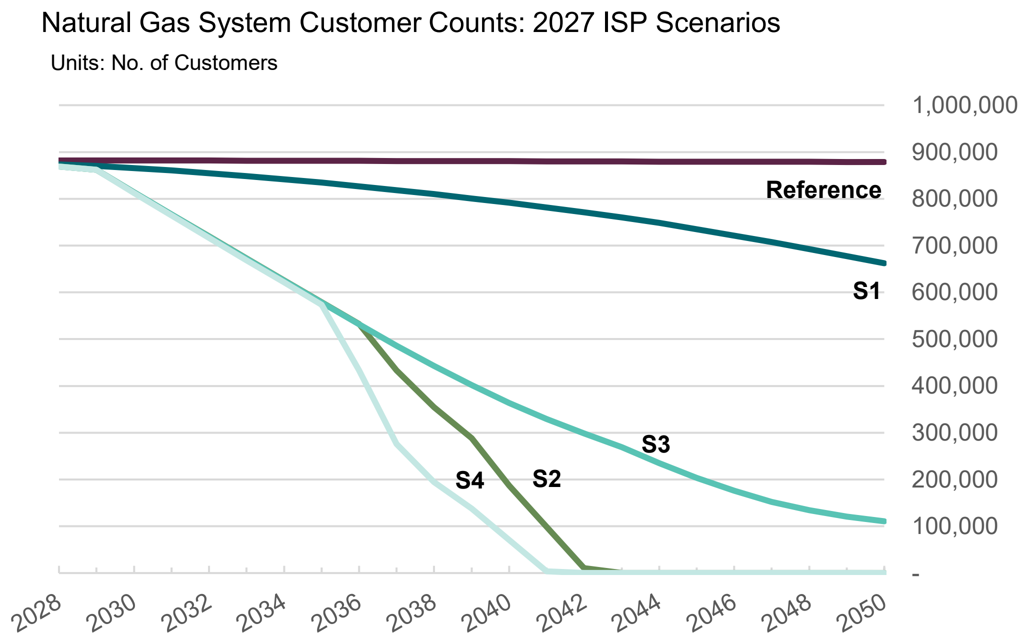
Total electric system winter peaks (MW) by scenario



Total gas system peaks (MDth) by scenario



Number of gas customers: For S2 and S4, residential and commercial customers approach zero by 2041/2042



	Building Electrification	Large Loads	EV
S1	Market adoption with incentive	Same as ref	Same as ref
S2	At a pace to reach GHG emission goal	Same as ref	Same as ref
S3	At a pace to reach GHG emission goal, constrained by equipment failure	High	High
S4	At a pace to reach GHG emission goal	High	High

Customer Counts

	2030	2035	2040	2045	2050
Reference	881,831	881,043	880,220	879,299	878,583
S1	865,644	834,413	791,566	735,116	662,196
S2	813,452	578,862	187,039	437	220
S3	813,278	578,002	363,710	203,448	110,661
S4	812,267	573,609	70,476	345	136

Questions?

PUGET SOUND ENERGY

Next steps

PSE PUGET SOUND ENERGY

Feedback process

01

One week prior to meeting

The feedback window for the upcoming meeting opens.

02

3-5 business days prior to meeting

PSE posts the meeting agenda and slide deck on the Clean Energy website.

03

Day of meeting

PSE engages RPAG for feedback and facilitates a public comment opportunity.

04

One week post meeting

Feedback window for the latest RPAG meeting closes. Feedback received outside this window will go into the subsequent feedback report.

05

Four weeks post meeting

PSE posts the meeting summary and feedback report from the latest RPAG meeting on the Clean Energy website.

Upcoming activities

Date	Activity
August 4, 2026	Feedback form for this meeting closes
August 25, 2026	RPAG meeting

Contact us

- Via email at isp@pse.com
- Via feedback form at: https://www.cleanenergyplan.pse.com/contact
- Leave us a voicemail at 425-818-2051
- Subscribe to our email list
- Visit our website: cleanenergyplan.pse.com

Public comment opportunity

July 28, 2026

How to participate in public comment opportunity

- Please use the “raise hand” feature if you would like to provide comment
- Each speaker will have up to 3 minutes to give comments
- Comments should relate to today’s meeting topics
- Please keep remarks respectful – no personal attacks
- Comments and questions will be included in the feedback report with PSE’s response
- You are welcome and encouraged to send written feedback and questions to isp@pse.com

Thank you for joining us!

Appendix

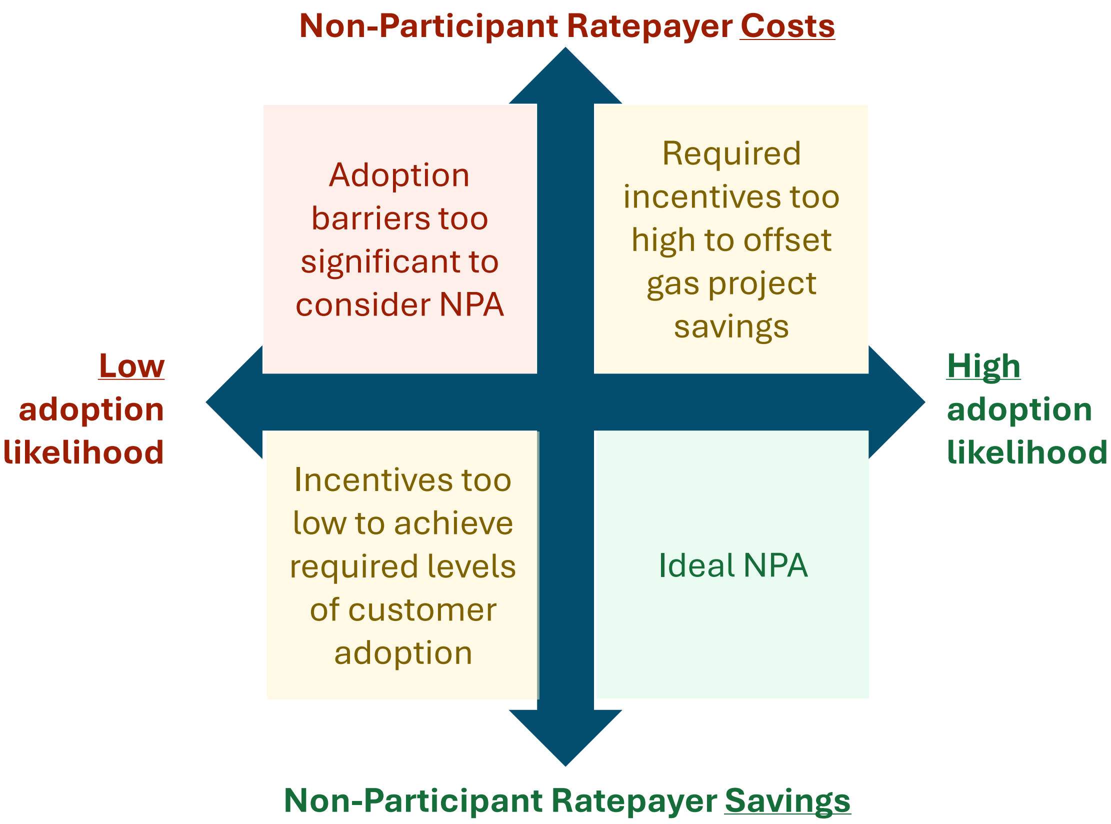
Definitions and acronyms

Acronym	Definition
BESS	Battery energy storage system
CCA	Climate Commitment Act
CEAP	Clean Energy Action Plan
CEIP	Clean Energy Implementation Plan
CETA	Clean Energy Transformation Act
CPA	Conservation potential assessment
DER	Distributed energy resources
DR	Demand response
EV	Electric vehicle
GHG	Greenhouse gas

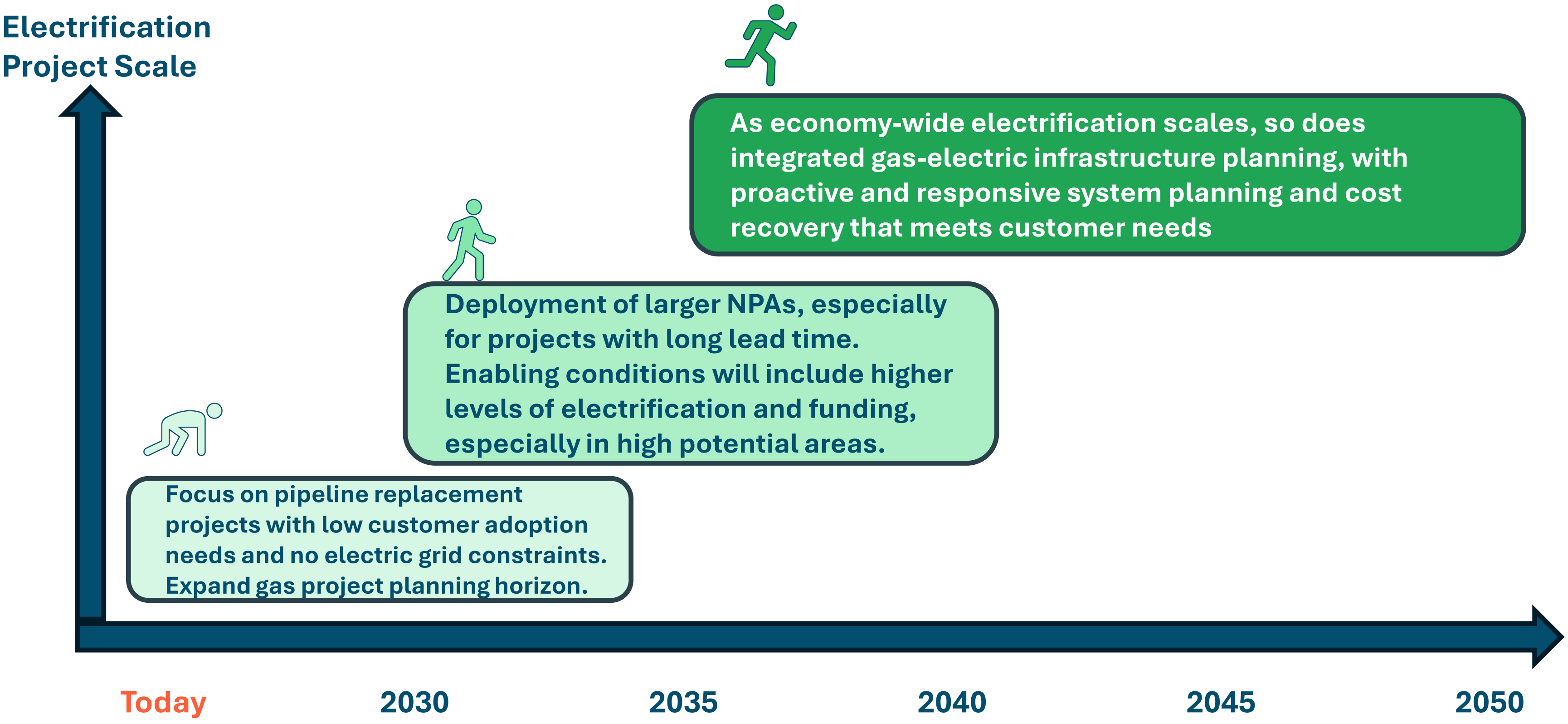
Acronym	Definition
HVDC	High voltage direct current
IRP	Integrated Resource Plan
ISP	Integrated System Plan
MW	Megawatt
NPA	Non-pipeline alternative
NWA	Non-wires alternative
RFP	Request for proposal
RPAG	Resource Planning Advisory Group
SCL	Seattle City Light
WAC	Washington Administrative Code

Customer incentives seek to balance NPA achievability with ratepayer cost-effectiveness

+ **Achieving rapid and high levels of targeted conversion in one area is challenging**
  - This especially true when customers are shifting from functioning gas appliances
+ **Customer incentives need to be high enough to secure rapid customer adoption required for NPAs, but absent non-ratepayer funding, decrease the utility cost savings from deploying NPAs**
  - For this study, the utility incentive assumed covers the total upfront cost of each customer



Crawl, walk, run progression to targeted electrification



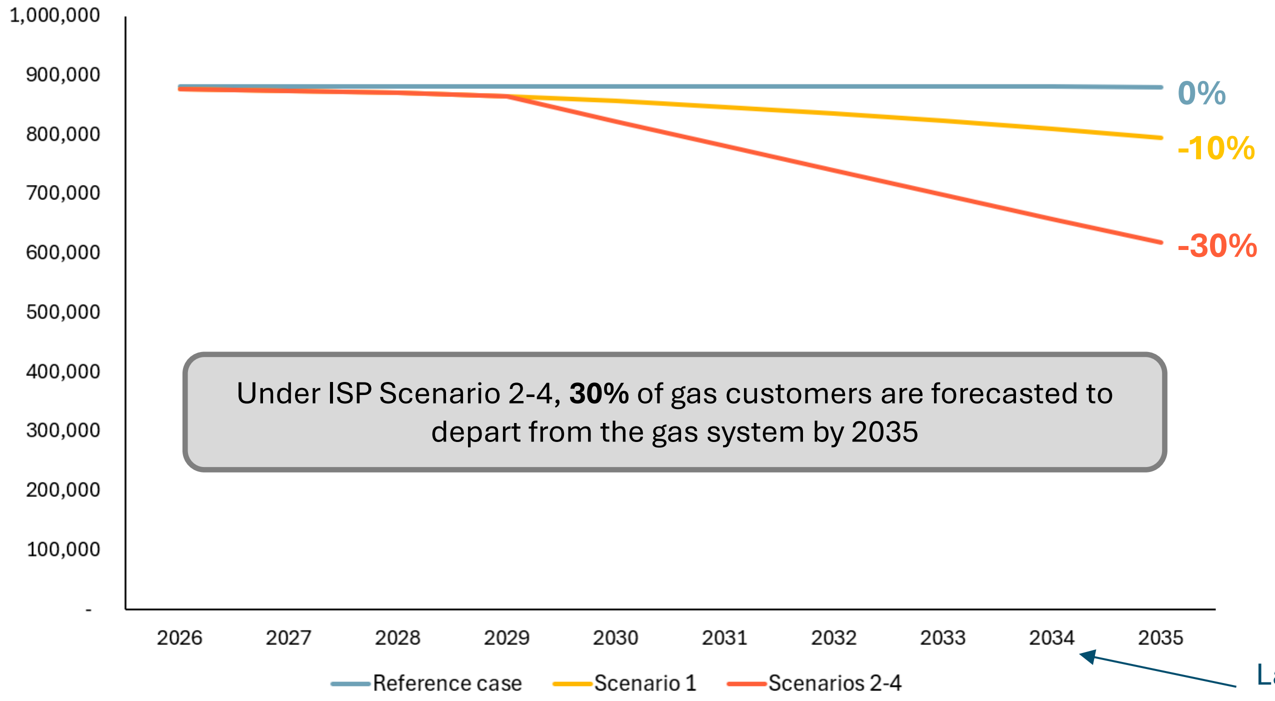
DuPont pipeline replacement NPAs present stronger targeted electrification opportunity in the near-term relative to reliability projects

Factor	Pipeline Replacement NPAs	Reliability Project NPAs
Number of customer conversions required	Fewer per project	More per project
Timeline	Longer lead time per customer conversion needed	Need-by date usually tied to system reliability needs
Avoided gas infrastructure costs per customer served	Higher gas infrastructure costs per customer	Lower gas infrastructure costs per customer*
Electric Dx impacts	Low for small projects	Higher for large-scale targeted electrification
Potential Role in PSE ISP	**Promising near-term option to develop targeted electrification experience, identifying customer conversion obstacles and refining strategy**	• **Challenging economics and feasibility in the near-term.** • **Higher feasibility in high electrification futures with long project lead times and non-ratepayer funding**

**especially for peak reliability projects*

Under High Electrification ISP scenario, cost-effectiveness of NPA projects improve due to background gas customer conversions

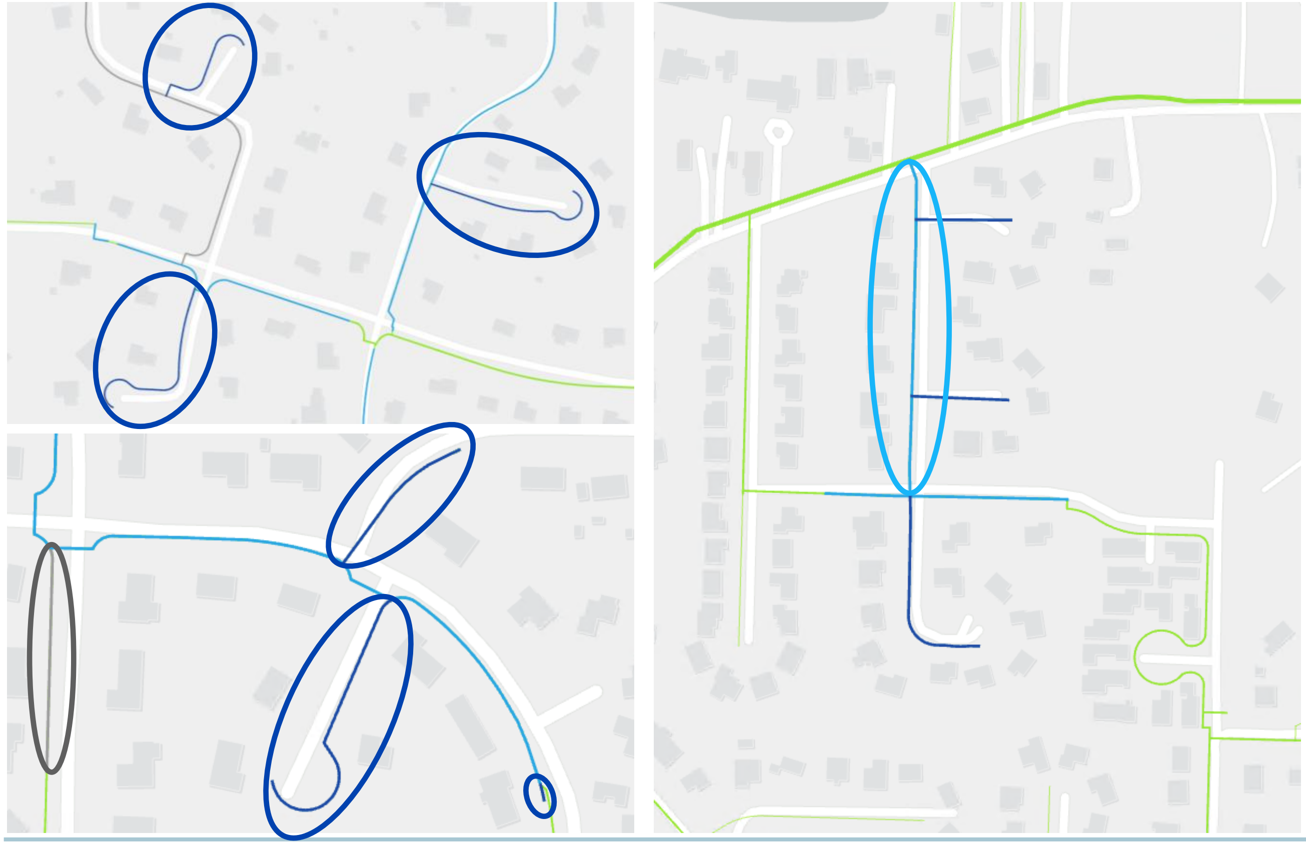
Forecasted PSE Gas Customers by 2027 ISP Scenario



Latest gas project in-service date considered

Under ISP scenarios 2-4, required level of customer conversion required to meet project gas shortfalls decreases, *potentially** improving project cost-effectiveness

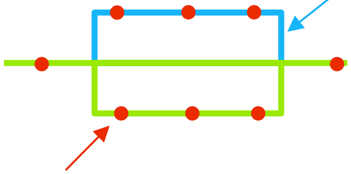
Hydraulic Feasibility Identification Approach



Higher NPA suitability

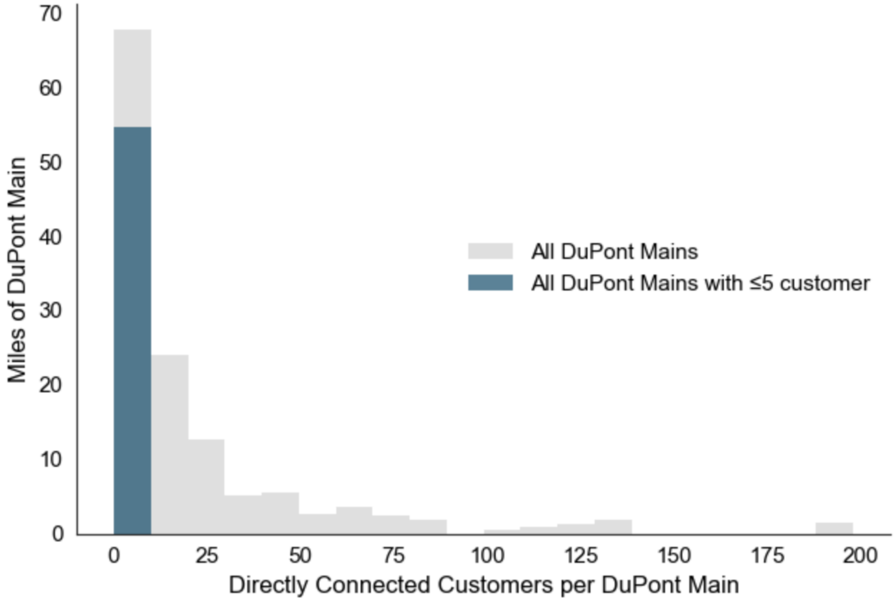
Terminal: no downstream customers of DuPont segment

Potential System Impact: customers may be indirectly affected downstream; additional review needed to assess pressure sufficiency and decommissioning feasibility



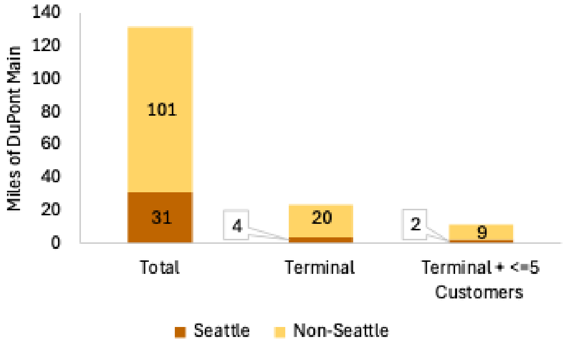
Customer Adoption Adoption Feasibility Approach

Directly Connected Customers per DuPont Segment



5-customer planning heuristic informed by analysis of 88 successful PG&E targeted electrification projects*

DuPont Segment Miles (Seattle vs Non-Seattle)

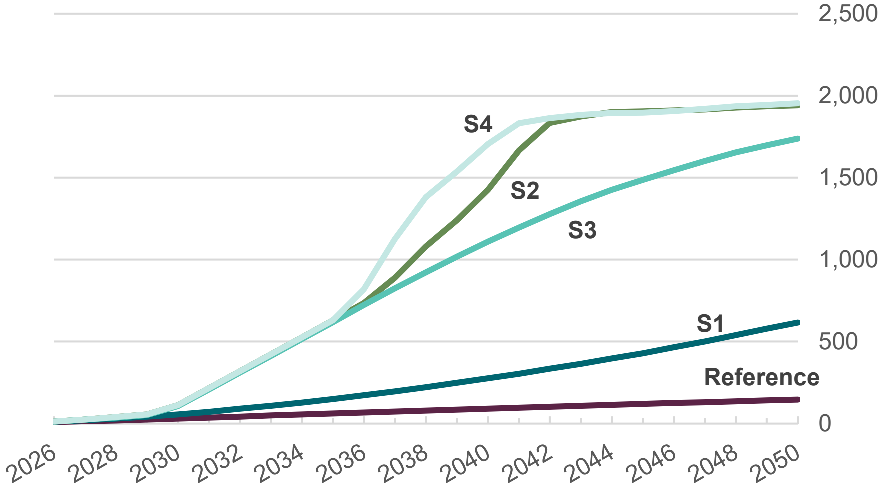


**Non-Pipeline Alternatives: Emerging Opportunities in Planning for U.S. Gas System Decarbonization*, RMI and National Grid, May 2024

Building electrification impacts: Electric load and peak

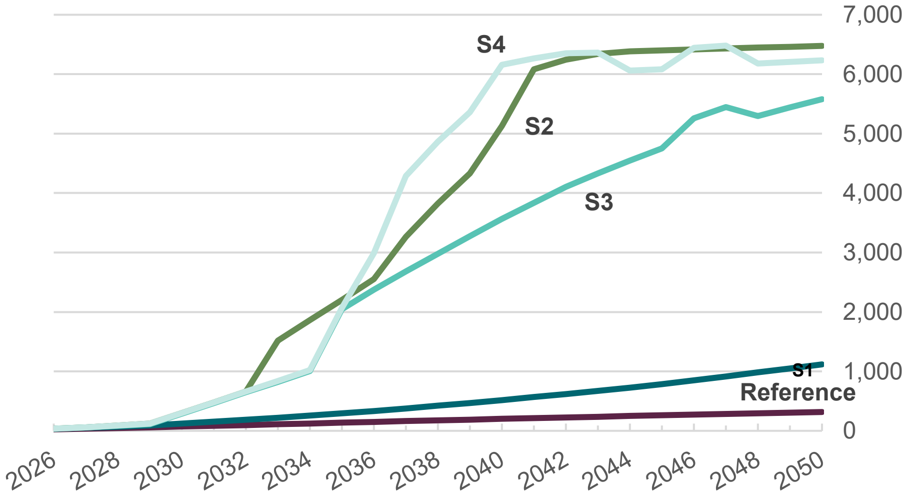
Electric System Increase in Load Due to Building Electrification

Units: aMW



Electric System Increase to Winter Peak Due to Building Electrification

Units: MW



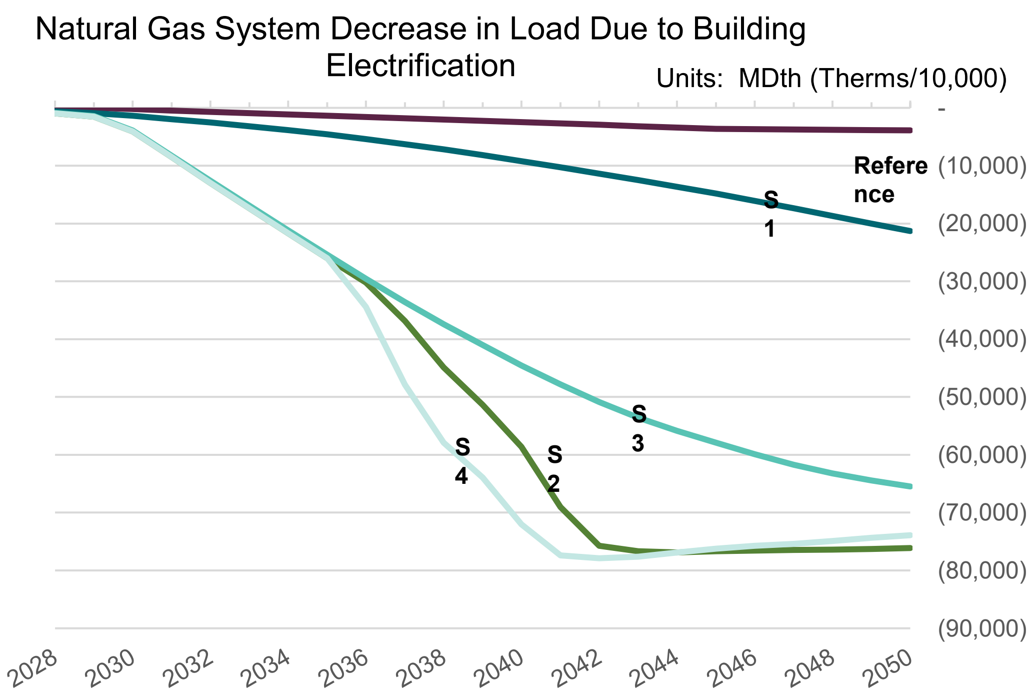
Scenario Annual aMW: Building Electrification

	2030	2035	2040	2045	2050
Reference	31	62	91	120	146
S1	55	150	276	429	616
S2	112	630	1,425	1,905	1,941
S3	107	618	1,110	1,486	1,738
S4	112	630	1,704	1,897	1,953

Scenario Winter Peak MW: Building Electrification

	2030	2035	2040	2045	2050
Reference	71	137	201	261	316
S1	122	293	518	787	1,118
S2	298	2,204	5,130	6,402	6,477
S3	288	2,049	3,568	4,752	5,579
S4	298	2,068	6,159	6,085	6,233

Building electrification impacts: Gas load



The maximum potential gas load impacts happens around 2041/2042 under S2 and S4

Decrease in Load Due to Building Electrification (MDth)

	2030	2035	2040	2045	2050
Reference	(226)	(1,356)	(2,485)	(3,615)	(3,892)
S1	(1,372)	(4,580)	(9,208)	(14,816)	(21,302)
S2	(4,068)	(25,994)	(58,596)	(76,697)	(76,123)
S3	(3,891)	(25,395)	(44,552)	(57,914)	(65,473)
S4	(4,068)	(25,992)	(72,027)	(76,222)	(73,888)