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2027 Electric and Natural Gas Integrated Resource Plans

Technical Advisory Committee Meeting No. 10 Agenda

Wednesday, May 27, 2026

Virtual Meeting – 9:00 am to 12:00 pm Pacific Time

Topic	State	Audience
• Introduction and Questions from TAC 9 ○ Proposed Idaho Natural Gas Energy Efficiency		
• CEIP Update	WA	Electric
• CETA Interim Energy Compliance Report	WA	Electric
• Building Electrification Impact on T&D system	WA/ID	T&D
• Load Forecast Update (Energy & Peak)	All	E&G
• New Resource QCC Forecast	WA/ID	Electric

Microsoft Teams meeting
Join: https://teams.microsoft.com/meet/288057820782057?p=m4ndWSeit7DYdQ80GF
Meeting ID: 288 057 820 782 057
Passcode: yy3DM6ty

Need help? | System reference
Dial in by phone
+1 509-931-1514,,516361780# United States, Spokane
Find a local number
Phone conference ID: 516 361 780#

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Introductions 2027 Electric & Gas Integrated Resource Planning

TAC 10 – May 22, 2026

John Lyons, Ph.D. – Senior Resource Policy Analyst

TAC 10 Agenda

- Introduction and Questions from TAC 9
  - Proposed Idaho Natural Gas Energy Efficiency
- CEIP Update
- CETA Interim Energy Compliance Report
- Building Electrification Impact on T&D System
- Load Forecast Update (Energy & Peak)
- New Resource QCC Forecast

Meeting Guidelines

- IRP team is in office Monday – Wednesday; also available by email, phone and Teams for questions and comments
- Stakeholder feedback responses shared with TAC at meetings, in Teams and in Appendix
- Working IRP data posted to Teams
- All TAC meetings will be virtual on Teams
- Draft TAC presentations emailed three days before each meeting
- Final TAC presentations, meeting notes and recordings posted on IRP page

Virtual TAC Meeting Reminders

- Please mute mics unless speaking or asking a question
- Raise hand or use the chat box for questions or comments
- Respect the pause
- Please try not to speak over the presenter or a speaker
- Please state your name before commenting for the note taker
- This is a public advisory meeting – presentations and comments will be documented and recorded

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Idaho Natural Gas Energy Efficiency

TAC 10 – May 27, 2026

James Gall, Manager of Resource Analysis

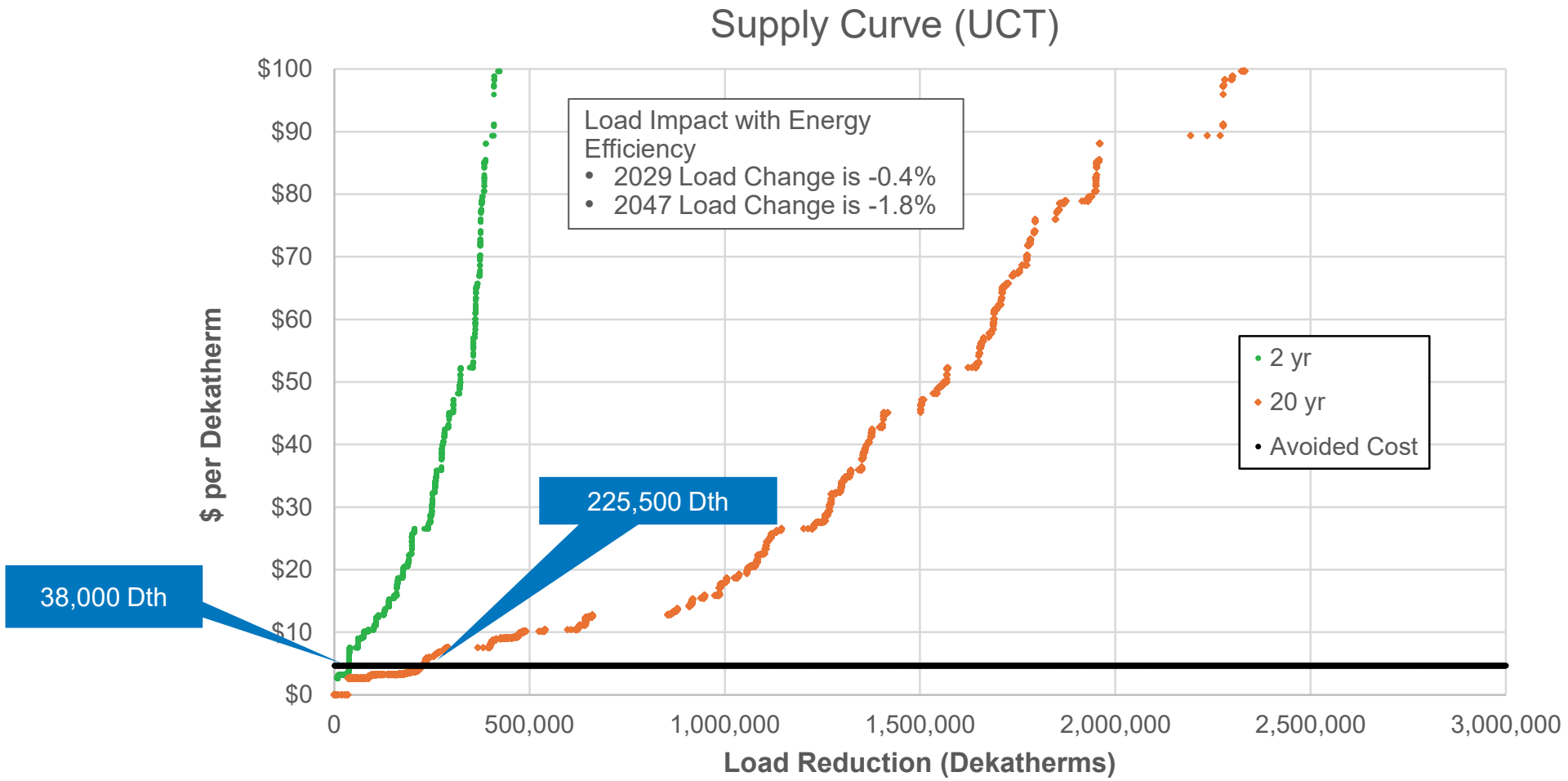
Background and Proposal

- On June 1, 2026, Avista plans to file a request to discontinue natural gas energy efficiency (EE) programs in Idaho due to lack of cost effectiveness, with an effective date of September 1, 2026.

- Due to this, it raises the question of whether the IRP should include natural gas EE programs for Idaho as a resource option?
  - Energy efficiency potential is known- but UCT are not effective measure of cost effectiveness due to total program costs.

- Proposal:
  - Only model known weatherization programs and NEEA programs as a load reduction.
  - Show potential savings using IRP estimate Avoided Cost with UCT cost provided by Cadmus but not modeled as a load reduction.
  - Evaluate EE programs again in 2029 IRP and next business planning process

Idaho Energy Efficiency Supply Curve



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TAC 11 Technical Modeling Workshop – Rescheduling, TBD		
Topic	**State**	**Audience**
PRiSM Model Tour	All	E & G
Aurora Resource Adequacy Model Tour	WA/ID	Electric
New Resource Cost Model	All	E & G

TAC 12 Wednesday, July 15, 2026 (13:00 – 16:00 PDT)		
Topic	**State**	**Audience**
Load & Resource Balance Methodology	WA/ID	Electric
Loss of Load Probability	WA/ID	Electric
Non-Energy Impacts	All	E & G
Draft Preferred Resource Strategy Results	All	E & G

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TAC 13 – Monday, August 17, 2026 (13:00 – 16:00 PDT)		
Topic	**State**	**Audience**
ETO Energy Savings	OR	Gas
Preferred Resource Strategy Results	All	E & G
Oregon Non-Pipe Alternatives	OR	Gas
IRP/Progress Report Outlines	All	E & G
Next Steps	All	E & G

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TAC 14 – Thursday, September 17, 2026 (13:00 – 16:00 PDT)		
Topic	**State**	**Audience**
Portfolio Scenario Analysis	All	E & G
Avoided Cost	All	Electric
Resource Adequacy Results	WA/ID	Electric
CBI Forecast and Results/Energy Burden	WA/OR	E & G
Final Report Overview and Comment Plan	All	E & G
Action Items	All	E & G

Electric Transmission & Distribution 5-Year Plan – October 7, 2026 (10:00 – 12:00 PDT)		
Topic	**State**	**Audience**
Electric Trans Transmission & Distribution 5-Year Plan	WA/OR	Electric

Other Key 2027 IRP Dates

- Oct 15, 2026 – Draft Electric IRP Released to TAC
- Nov TBD 2026 – Virtual Public Meeting
  - Noon-1pm
  - 6-7pm
- Jan 1, 2027 – Final Electric IRP Filed
- Feb 15, 2027 – Draft Gas IRP Released to TAC
- Apr 1, 2027 – Final Gas IRP Filed

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Clean Energy Transformation Act Update

Integrated TAC Meeting #10
May 27, 2026

Kelly Dengel | Clean Energy Policy & Implementation Manager

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2026 Clean Energy Compliance Report (2021 CEIP)

&

2025 Clean Energy Implementation Plan

2026 Clean Energy Compliance Report

2021 CEIP's 2022 – 2025 Implementation Period

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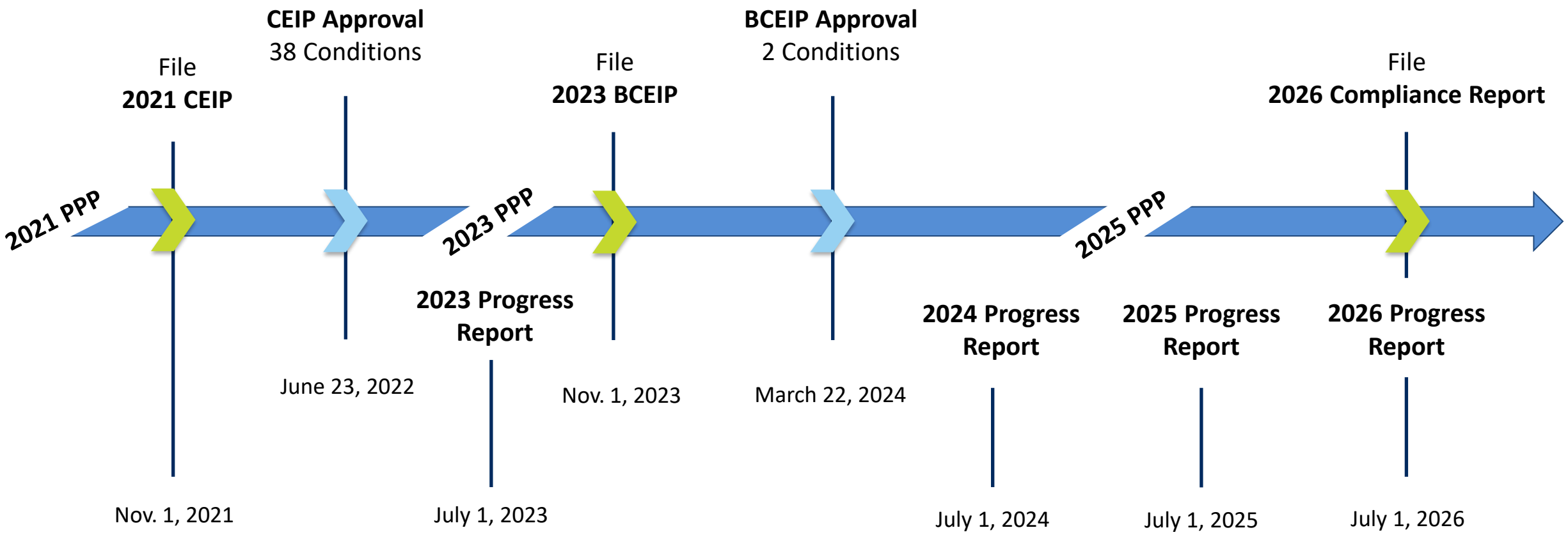
2021 CEIP Timeline



Quarterly Public Participation Meetings + Ongoing EAG, EEAG, EAAG, TAC, DPAG Meetings

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Compliance Report Requirement Summary

- Demonstrate “whether & how” meet **interim in & specific targets**
- Demonstrate **specific actions** contributed the clean energy standards, provided customer benefit & were cost effective
- Demonstrate **equitable transition through Customer Benefit Indicators** (CBI)
- Public Participation Plans to **address participation barriers with the Equity Advisory Group** & other advisory groups
- **Incremental cost of compliance**

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Renewable Energy Targets & Specific Actions

Approved Interim Targets

- 2022 – 40%
- 2023 – 47.5%
- 2024 – 55%
- 2025 – 62.5%

Specific Actions

- Retire sufficient RECs to comply with annual targets

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Renewable Energy Targets & Availability (MWh)

Available (MWh)	2022	2023	2024	2025	Average
Renewable Energy MWh	3,502,810	3,263,436	3,493,661	3,931,342	3,547,812
Renewable Energy %	**59.4%**	**59.1%**	**61.9%**	**67.0%**	62.5%

Target (MWh)	2022	2023	2024	2025	Average
Renewable Energy Target MWh	2,275,197	2,624,321	3,102,988	3,67,616	2,917,533
Renewable Energy Target %	**40.0%**	**47.5%**	**55.0%**	**62.5%**	51.3%
REC Retirement for Target MWh	2,275,197	2,624,321	3,102,988	3,67,616	2,917,533
REC Retirement for Target%	**40.0%**	**47.5%**	**55.0%**	**62.5%**	51.3%

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Renewable Energy Additional Specific Actions

Specific Actions	Status
▪ Secure 48 aMW from the 2020 Renewable RFP **or** 2022 All Source RFP	✓ Chelan PUD PPA's: ▪ 10-year for 51 aMW thru 2033 ▪ 20-year for 51 aMW for 2026-2030, increasing to 102 aMW for 2031-2045
▪ Issue 2022 All Source RFP for 48 aMW	✓ 30-year Clearwater Wind PPA thru 2046 for 41.9 aMW
▪ Upgrade Kettle Falls GS by 11.2 MW	✗ Contractual agreement with third-party abandoned
	✓ 23-year Columbia Basin Hydro PPA thru 2045 for 120 aMW
▪ Modernize Post Falls Hydro Dam	✗ Evaluating options

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Energy Efficiency Targets & Specific Actions

Approved Targets

Year	Biennium Target MWh*	Actual MWh
2022-2023	107,260	60,409
2024-2025	66,543	85,207
Total	**173,188**	**145,616**

Specific Actions

- Existing Programs (9)
- New Programs (8)
  - Equity Advisory Group Identified Projects
  - Wood Stove Replacement Incentive
  - Multifamily Building Split Incentives
  - Health & Safety for Mobile Homes
  - Single Family Weatherization
  - Community/Small Business Efficiency
  - Midstream Incentives
  - Always On Pilot

*Subject to 2021 CPA & 2022-2023 BCP | 2023 CPA & 2024-2025 BCP

Energy Efficiency Targets

Energy Efficiency (MWh)	2022	2023	2024	2025	Total
Energy Efficiency Target*	53,322	53,322	33,272	33,272	173,188
Energy Efficiency Achieved**	23,020	37,389	45,018	40,189	145,616

*"Although Avista failed to meet its conservation targets, we find that there existed sufficient circumstances to allow **Avista to be "considered in compliance" for the purposes of RCW 19.285.040(1)(e)**. Further, the Company has shown that it has exercised adaptive management techniques in an effort to adapt to the challenges the pandemic introduced. Thus, we find that **Avista has sufficiently complied with its biennial acquisition target for cost-effective conservation to be considered in compliance** and therefore conclude that no penalty is warranted at this time." – Docket UE-210826, Order 02*

*2022-2023 target | 2022-2023 BCP
*2024-2025 target | 2024-2025 BCP

**2022-2023 achievement | 2022-2023 BCR
**2024-2025 achievement | 2024-2025 BCR

Demand Response Targets & Specific Actions

Approved Targets

- ✓ 30 MW of DR savings

Specific Actions

- ✓ 30 MW Large Industrial DR Contract 2022-2031
- ✓ Time of Use & Peak Time Rebate Pilot

Demand Response MW	2022	2023	2024	2025	Total
Demand Response Target	30 MW				30 MW
Demand Response Achieved	30 MW				30 MW

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Demand Response Additional Specific Actions

Specific Actions	Status
▪ Commercial EV Time of Use Rate	✓ Implemented Commercial TOU in 2021
▪ Spokane Tribe Microgrid Partnership	✓ Design phase started in 2025. Estimated construction completion in January 2028.
▪ Connected Communities Project	✓ Reduced scope based on federal funding loss
▪ Active Energy Management Pilot	✓ 2022-2024 pilot for commercial customers Not cost effective | TRC ratio of 0.26

Incremental Costs

Cost Cap	2022	2023	2024	2025	Total
Incremental Cost Cap Estimate	$44.4	$36.0	$24.9	$13.0	$118.3

Incremental Cost	2022	2023	2024	2025	Total
Incremental Cost Estimate*	$2.8	$3.2	$10.2	$25.4	$41.6
Incremental Cost Actual	$3.3	$6.9	$16.6	$22.1	$49.0

*Based on proposed renewable targets

Actual Incremental Costs

- Columbia Basin Hydro PPA
- Chelan PUD PPA
- Clearwater Wind PPA
- Associated Transmission
- Market purchase/sales
- Named Communities Investment Fund
- Avoided REC sales

Discussion & Questions

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2025 Clean Energy Implementation Plan

2025's CEIP's 2026 – 2029 Implementation Period

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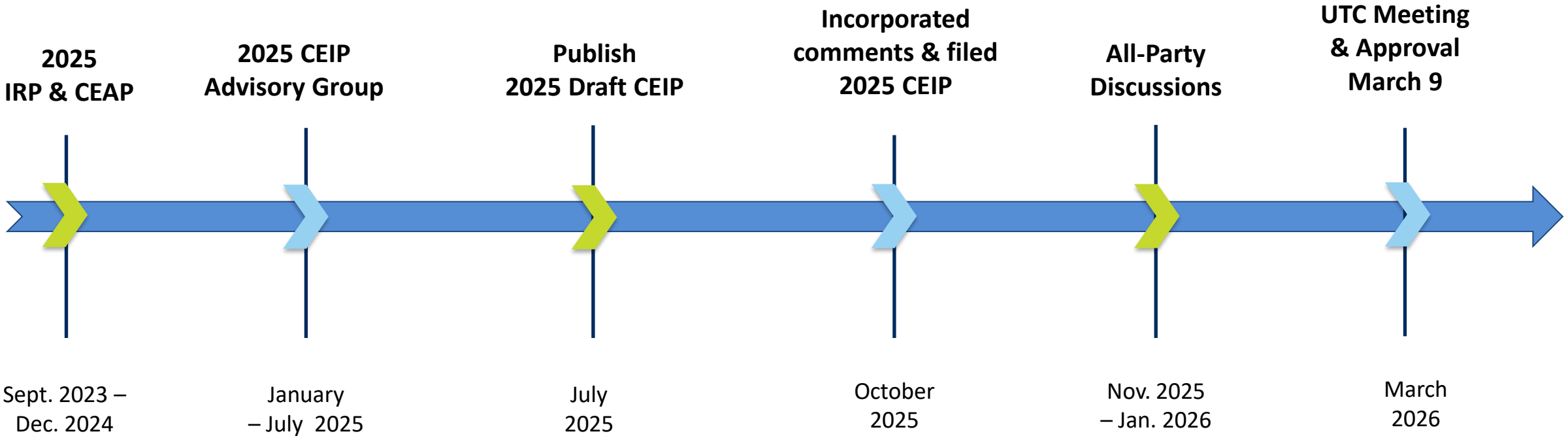
2025 CEIP Planning with Advisory Group Collaboration



Quarterly Public Participation Meetings + Ongoing EAG, EEAG, EAAG, TAC, DPAG Meetings

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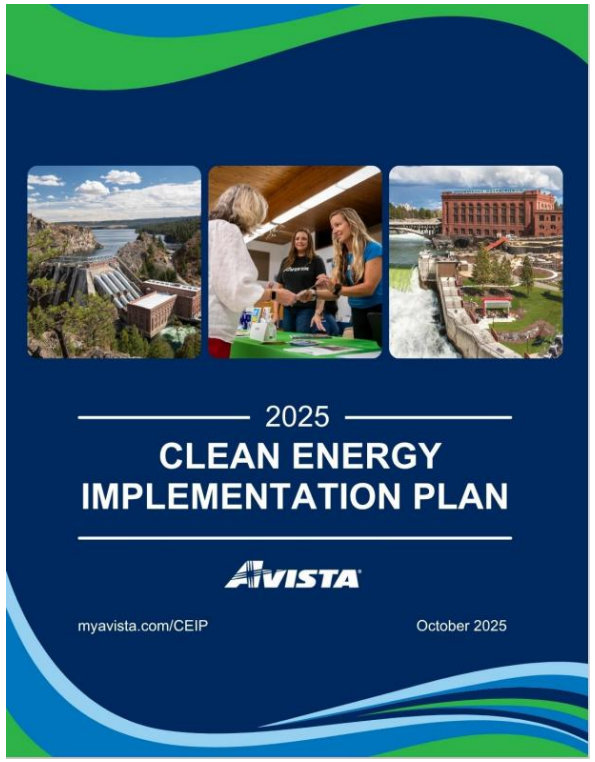
2025 Clean Energy Implementation Plan

Interim & Specific Targets | Specific Actions | Additional Actions & Goals



Public Participation Plan

Named Communities & Customer Benefit Indicators

Renewable Energy

Energy Efficiency

Demand Response

Company Initiatives

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2025 – 2027 Public Participation Plan

Participation Strategies

- Virtual public meetings
- Quarterly email newsletter
- Equity Advisory Group
- Community events
- Biennial CEIP survey
- CEIP webpage improvements
- Increase multi-language access
- Educational, testimonial videos
- Targeted paid social media
- Community partnerships

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Named Communities

Condition: Identify Deepest Need

Avista Electric Residential Households (as of Q4 2024)	**245,564**	
	2021 CEIP	**2025 CEIP**
Washington State Department of Health (DOH)	**V1 2019**	**V2 2022**
Highly Impacted & Vulnerable Populations*	105,867	134,720
Federal Climate & Economic Justice 40 Map		**V2 2024**
All sensitives & scores added to Vulnerable Populations		8,637
Avista's Named Community Population	**105,867 or 43%**	**143,013 or 58%**

*Includes characteristics identified by advisory groups and public meeting processes

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6 Equity Areas | 13 CBIs | **54** Metrics

2025 Customer Benefit Indicators

Condition: Data Normalization

Affordability

- Participation in Company Programs ↑
- Energy Burden ↓

Accessibility

- Outreach & Communication ↑
- Transportation Elec ↑
- NC Investments ↑

Energy Resilience

- Energy Availability ↕

Energy Security

- Generation Location ↑
- Residential Disconnects ↓

Environmental Affects

- Outdoor Air Quality ↓
- Greenhouse Gas Emissions ↓

Public Health

- Employee Diversity ↑
- Supplier Diversity ↑
- Indoor Air Quality ↑

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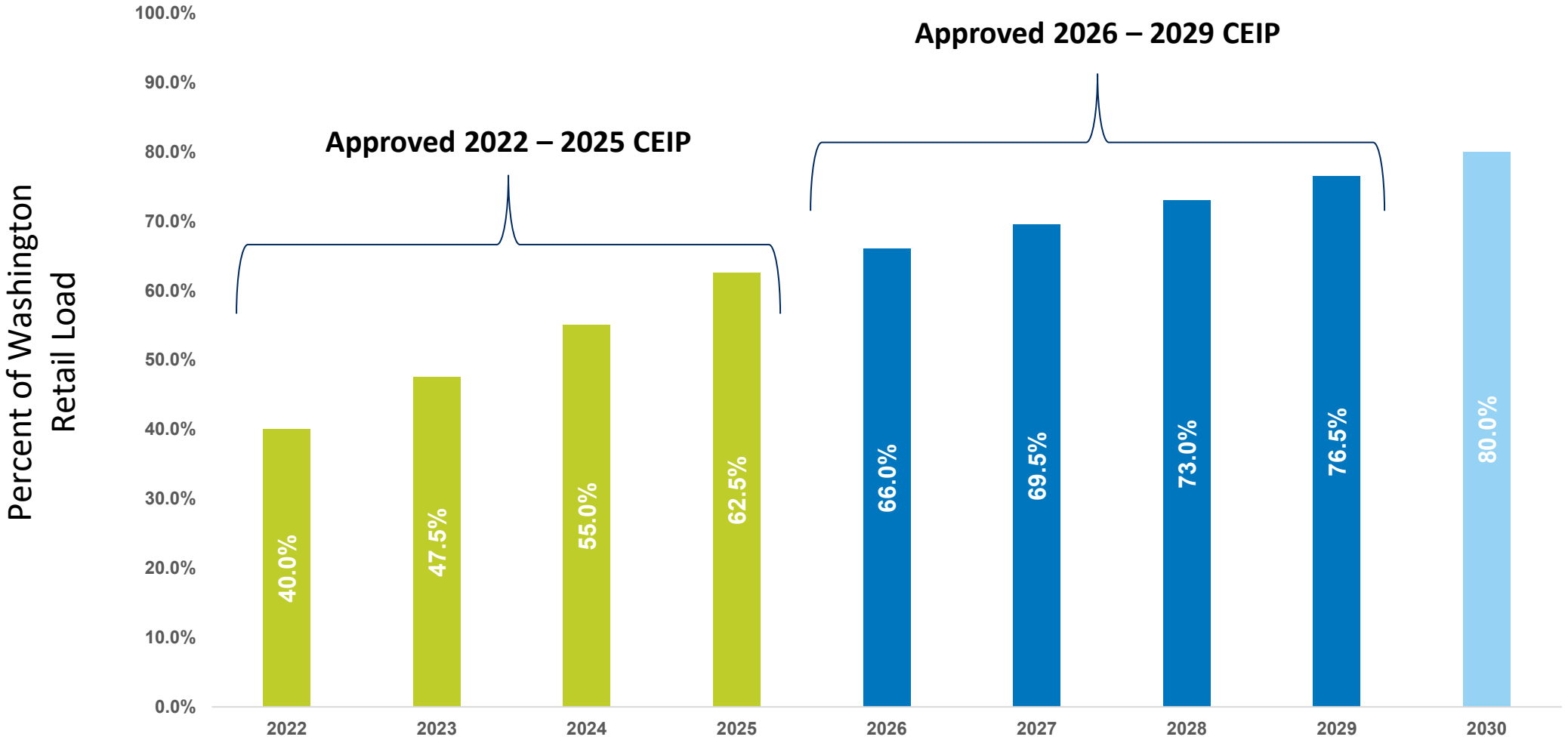
Renewable Energy Targets



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Renewable Energy Interim Targets & Specific Actions

Interim Targets

2026 – 66.0%

2027 – 69.5%

2028 – 73.0%

2029 – 76.5%

Specific Actions

- Retire sufficient RECs to comply with annual targets

Status

- Ongoing

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Renewable Energy Additional Actions

Additional Actions	Status

▪ Issue 2025 All Source RFP
  ▪ 75 – 375 MW of winter qualifying capacity
  ▪ 50 – 350 MW of summer qualifying capacity
  ▪ 0 – 200 aMW of annual clean energy
	▪ RFP contract negotiations
	  ▪ Battery Energy Storage System – 100 MW
	  ▪ Natural Gas CT – Efficiency upgrade & 14 MW summer capacity increase
	  ▪ Montana wind PPA – 82+ aMW

▪ Install 1.5 MW & 1.6 MW BESS low-income solar ▪ WSU Community Solar | SSHB1814 tax credit	▪ Install 1.5 MW solar & 1.7 MW BESS ▪ Secured WSU Community Solar | SSHB1814 tax credit ▪ Seeking federal Investment Tax Credit
Condition: Generation RFP Filing	

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Energy Efficiency Specific Targets & Specific Actions

Specific Target

155,712 MWhs* savings by 2029

Condition: EE Target

Specific Actions

- Continue existing cost-effective measures/programs
- Pursue CPA identified cost-effective measures/programs

Status

- Ongoing

*Subject to 2025 CPA & 2026-2027 BCP | 2027 CPA & 2028-2029 BCP

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Demand Response Specific Targets & Specific Actions

Specific Targets

Cumulative 55 MW of DR savings during a single peak hour by 2029

Condition: DR RFP Filing

Specific Actions

- Continue 30 MW industrial demand response contract
- Pursue cost-effective solutions from All-Source RFP

Status

- RFP contract negotiations for up to non-firm 40 MW (system)
  - C&I third-party aggregator program
  - Residential “bring your own thermostat” program

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Demand Response Additional Actions

Additional Actions	Status
Time of Use Rate & Peak Time Rebate Pilot	▪ Pilots end Q2 2026, with filing due December 1, 2026
EV Time of Use Rate	▪ Will conduct demand response potential assessment
NEEA End-Use Load Flex Project	▪ Phase 2 study approved with regional joint utility funds

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Named Communities Investment Fund

Additional Action

$5M Annually

$2M
Energy Efficiency

$3M
Community

Watch NCIF Stories

https://www.youtube.com/playlist?list=PLhTj-kwTtfCBVRQSDNyVLNfhvui9u8dI

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Conditions & Status

Conditions | 12	Status
Named Communities | 2 Conditions	
▪ Identify "Deepest Need"	▪ In progress, subcommittee created
▪ Identify programs and allocation amount for "Deepest Need"	▪ Contract with Empower Dataworks
Customer Benefit Indicators | 4 Conditions	
▪ Co-develop CBI data normalization methodology with peer utilities & advisory groups	▪ Not started, peer utilities aware
▪ Report annual CBI values from inception in CEIPs & BCEIPs	▪ Ongoing
▪ Disconnect data to be reported in COVID-19 Protection docket	▪ Complete and ongoing
▪ Title revisions of four metrics	▪ Complete

Conditions & Status

Conditions | 12	Status
Specific Targets/Actions & Incremental Cost | 6 Conditions	
▪ Update DR target & specific actions after RFP contracts signed ▪ 2027 IRP accelerated clean energy scenario & issue RFP ▪ Update incremental cost in 2027 BCEIP ▪ Energy Efficiency target to equal 155,712 MWh	▪ Contracts in negotiation ▪ In progress ▪ Not started ▪ Complete
▪ If 2025 All Source RFP fulfills CETA renewable energy targets in 2025-2029 and includes incremental cost for the 2025 CEIP, Avista will file all details relevant to specific actions for renewable energy.	▪ Contracts in negotiation
▪ Compliance filing for projected CBI values or a designation as nonapplicable, as referenced in WAC 480-100-640(5)(c), for existing specific actions	▪ Complete, filed May 11, 2026

Discussion & Questions

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T&D Costs of Building Electrification

TAC 9 – May 27, 2026

Robert Hughes Resource Planning Analyst

What makes up this cost?

Incremental increases in demand due to building electrification will require additional investments in the transmission and distribution system beyond traditional load growth.

Estimated to be $304 per kW-yr (compared to $316 kW-yr in the 2025 IRP). Costs (2025$) include:

- Feeders: 10MW/Feeder, 4 feeders per substation
- Transmission/Distribution lines: ($550k for Distribution, $1.4M - $2M for Transmission
- Switching stations: 115/230 kV $14.5M - $18.5M
- Service Transformers: $20k per Transformer
- Line Extensions: $1M - $1.1M
- Buried/Overhead line costs: 10% adder for buried
- Substation and Support FTE: 3-5 additional employees

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Load Forecast Update

TAC 10 – May 27, 2026

Mike Hermanson – Power Supply Analyst

Transition End Use Model to Load Forecast

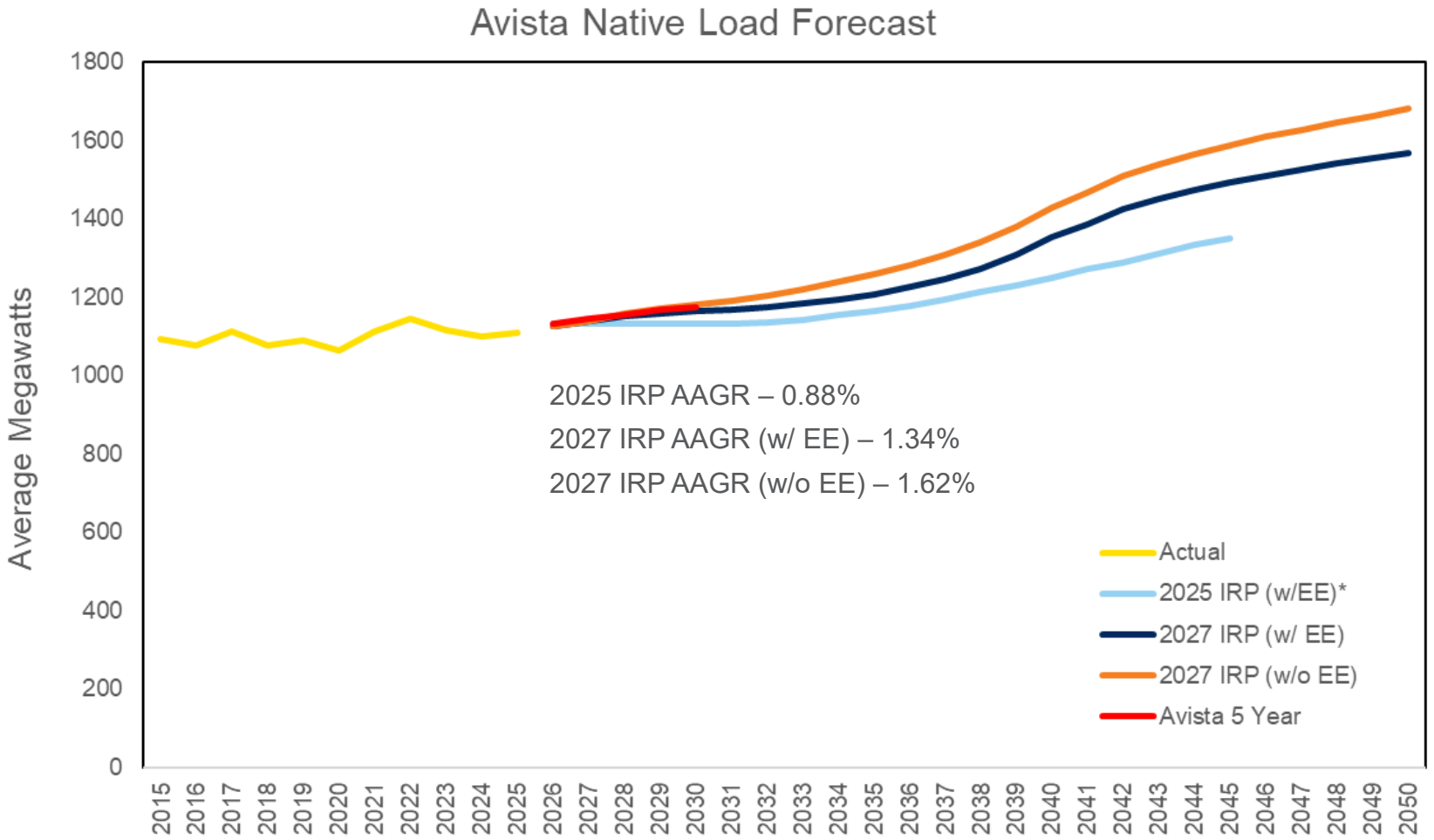
Energy Forecast

- Starts with Avista's medium term (5-year) forecast.
- Continues past five years using growth rate of Cadmus (consultant) forecast.
- Add energy losses (T&D).
- Add large industrial loads.

Peak Forecast

- Estimate 2025 weather adjusted peak load using regression analysis built on historical temperatures and loads.
- Estimate of winter months utilized 79-year rolling average.
- **Estimate of summer months utilized a trend of the last 20 years.**
- Utilized growth rate of Cadmus peak forecast applied to the base value to estimate monthly peak load for the study period.
- Add in EVs, customer solar, and large industrials.

Energy Forecast



*adjusted for industrial customer that is no longer a customer

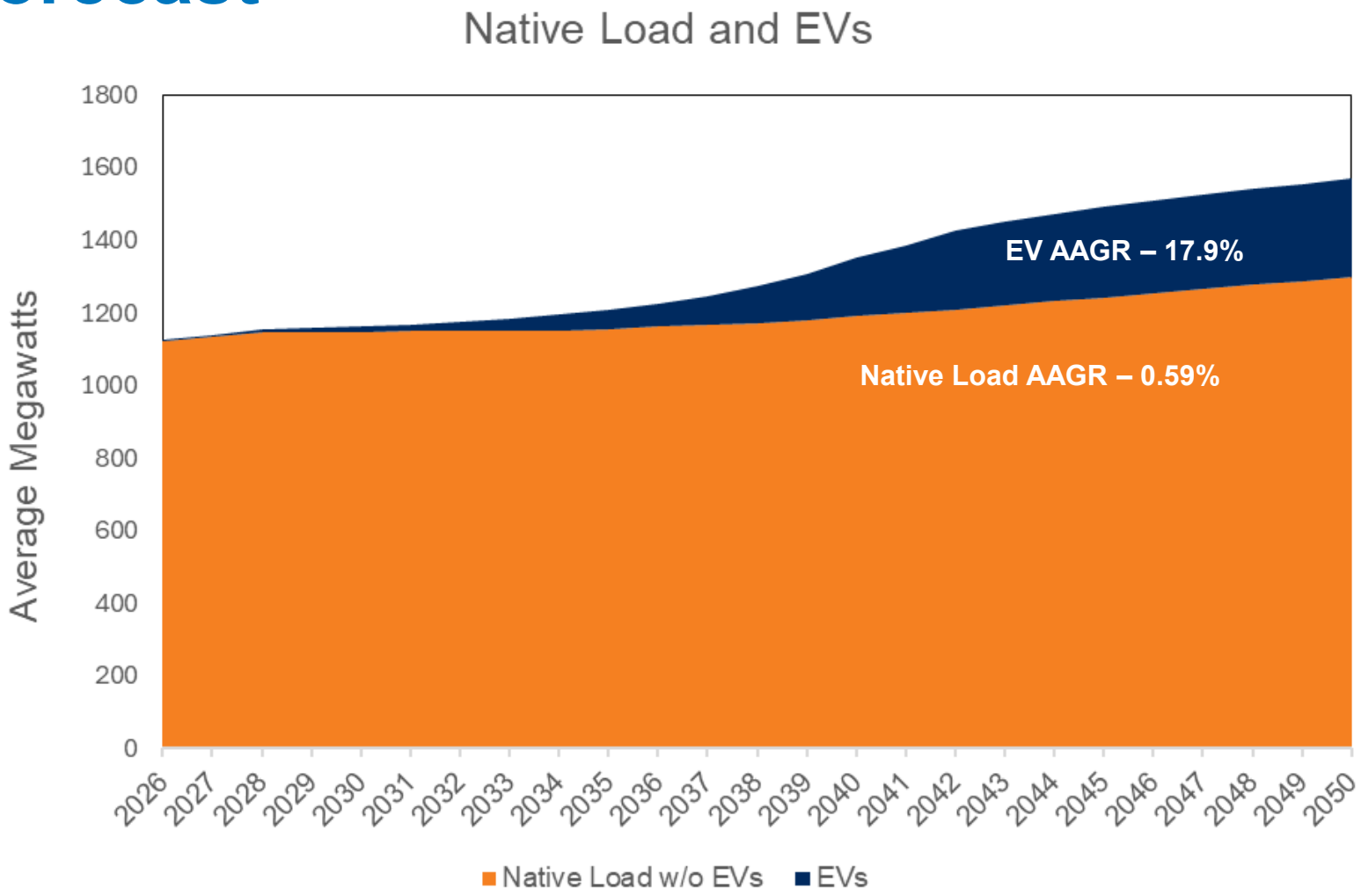
2045

2025 IRP – 1,349 aMW

2027 IRP w/EE – 1,493 aMW

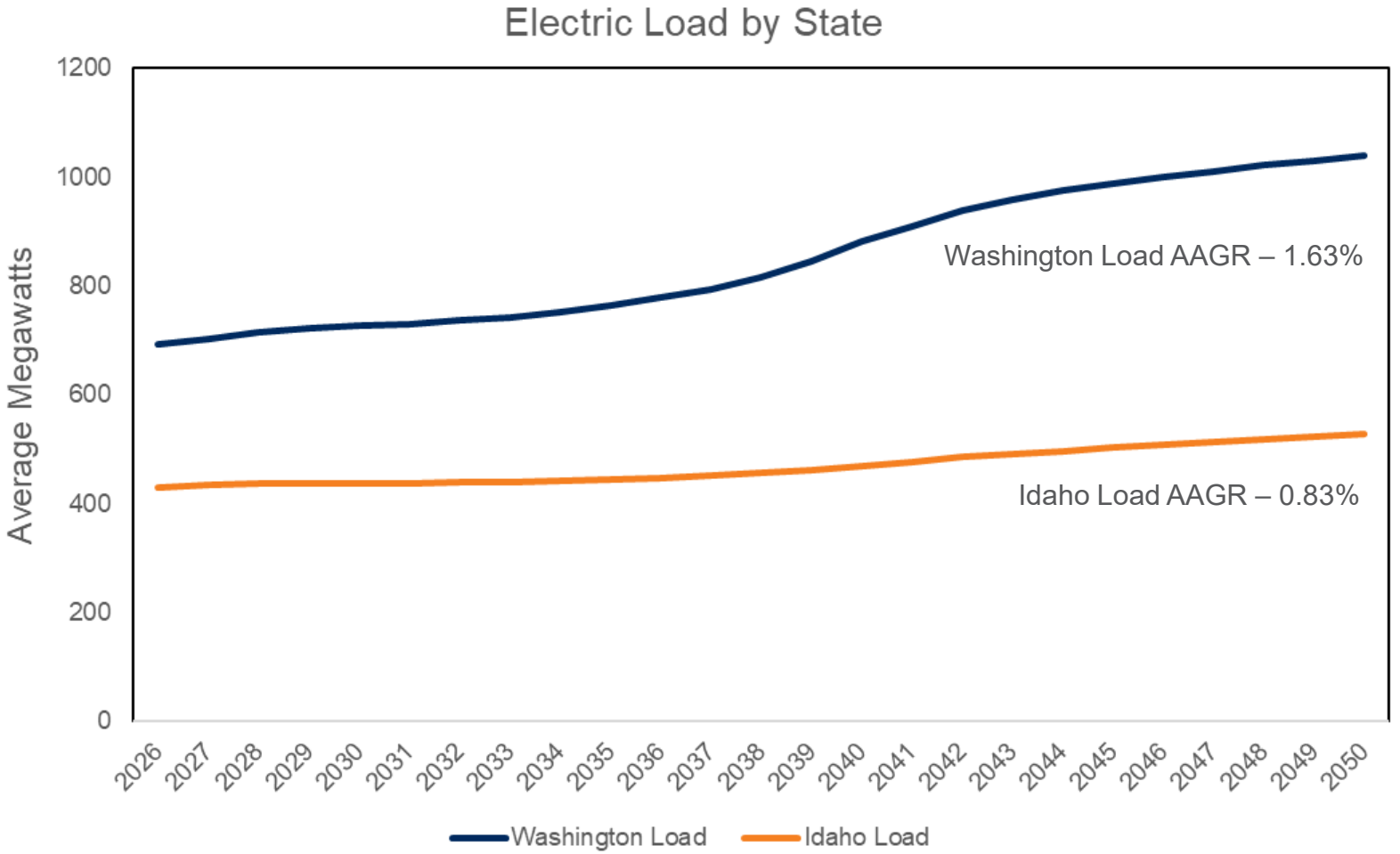
2027 IRP w/o EE – 1,588 aMW

Energy Forecast



- EV load contributes significantly to load growth

Energy Forecast



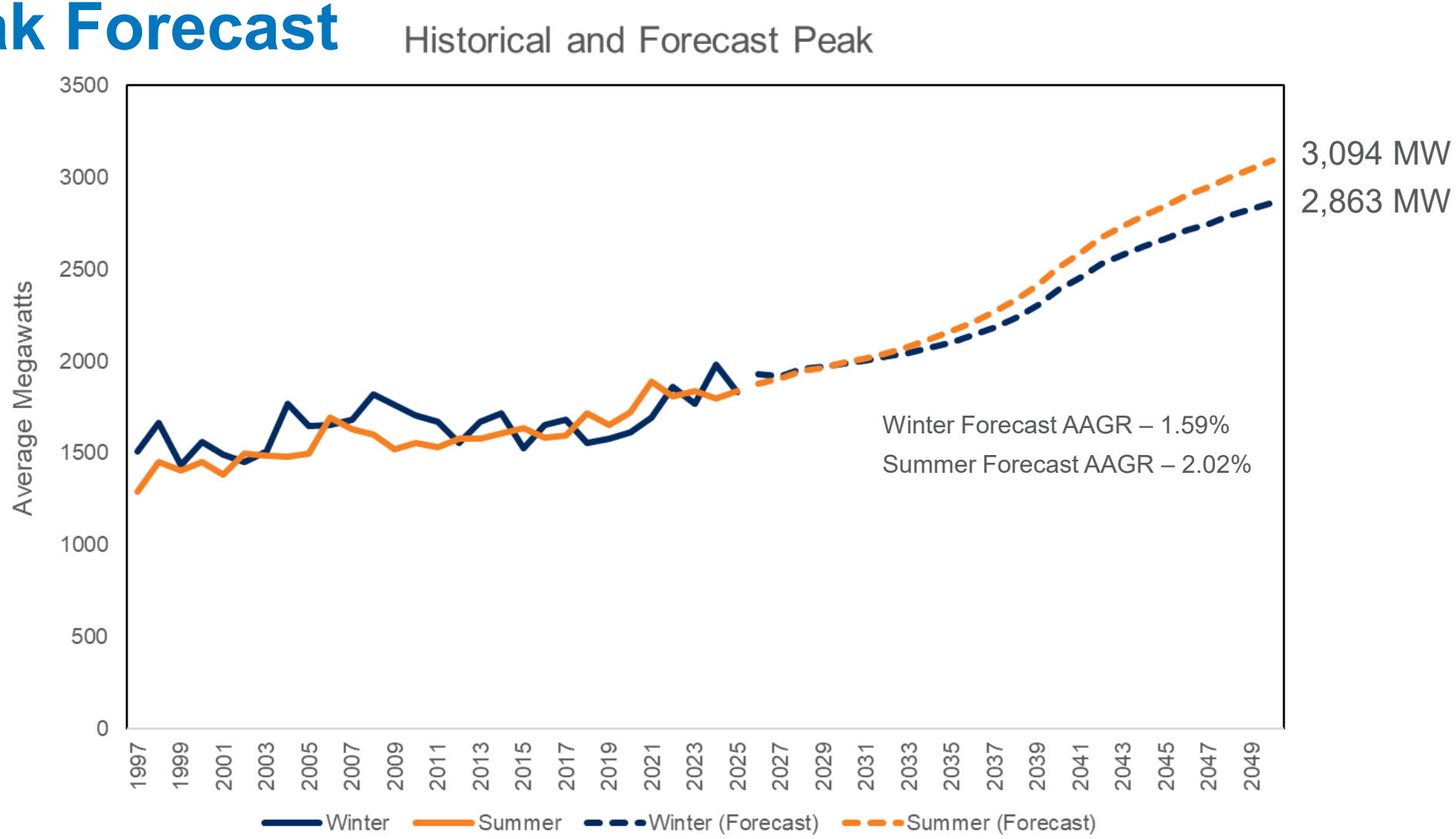
2050 Load Forecast (aMW)

WA – 1,040

ID – 530

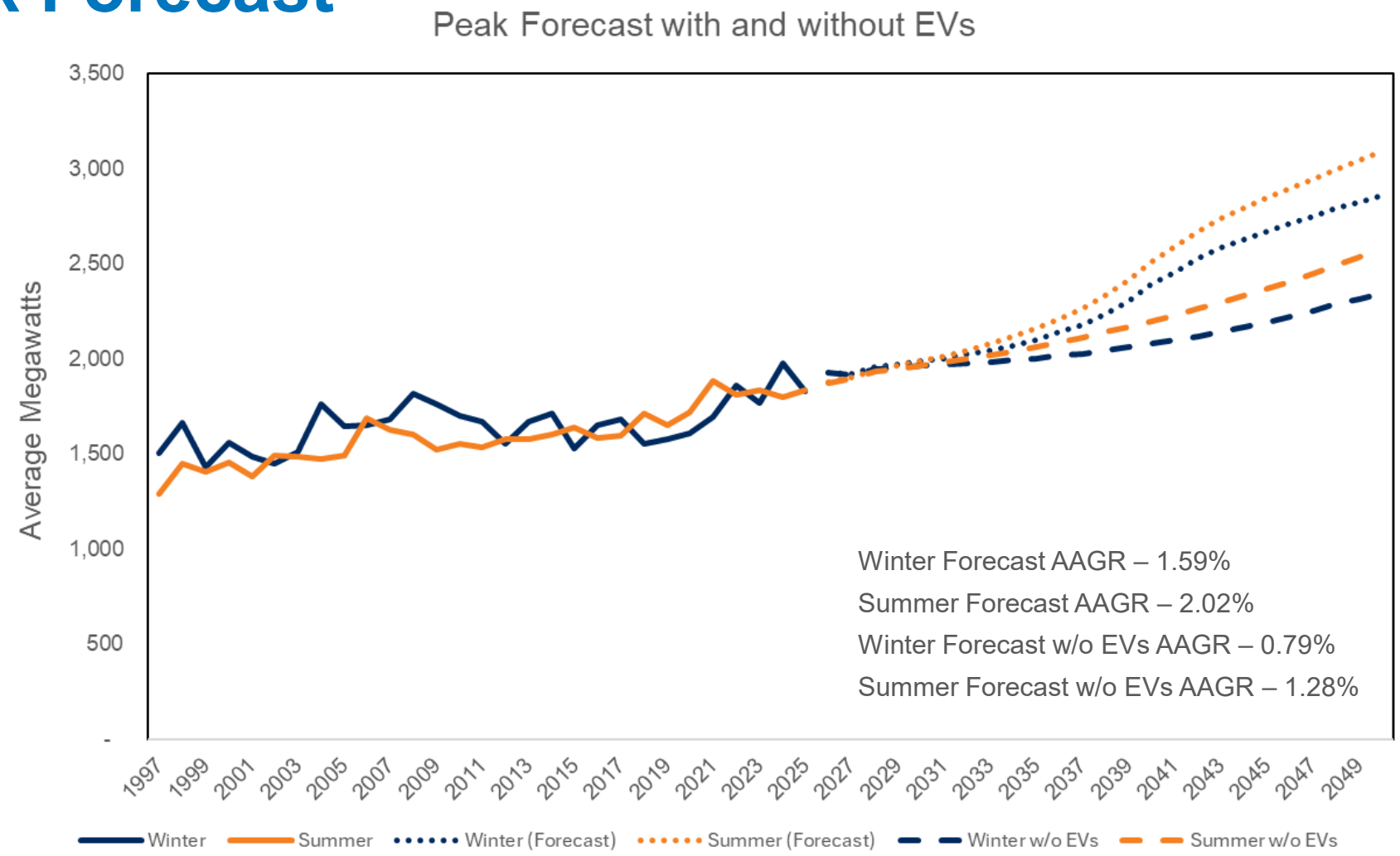
- Higher load growth in Washington is driven by EVs.

Peak Forecast

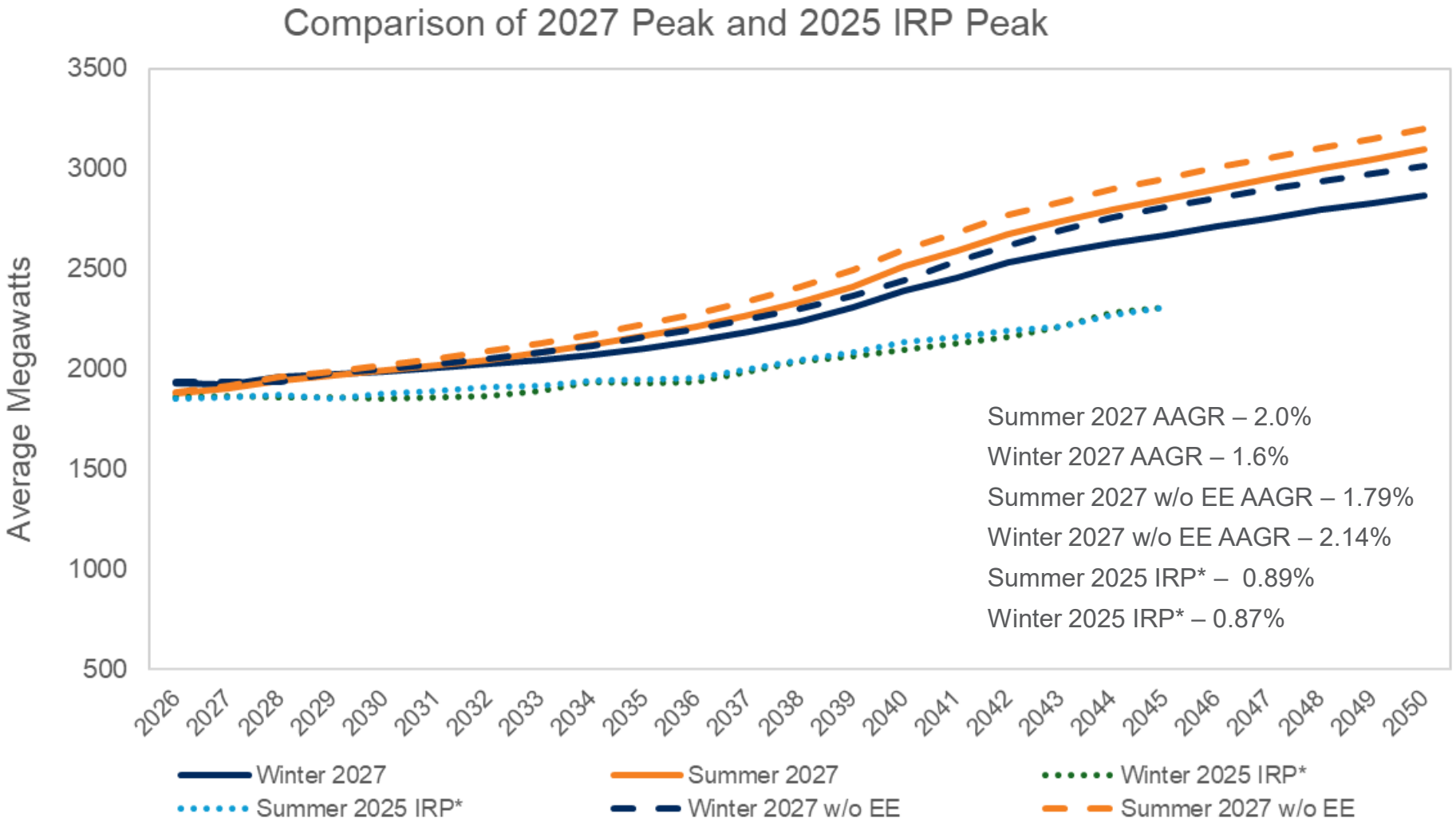


- Forecasted acceleration of peak growth from past trends

Peak Forecast



Peak Forecast



*adjusted for industrial customer that is no longer a customer

2025 IRP to 2027 IRP Load Forecast - Drivers of Growth

- The peak baseline utilized in the forecast was established with a new methodology – a trend of the last 20 years rather than a rolling average of the last 20 years. This increased the summer baseline and was carried through the forecast.
- The RCP 8.5 climate forecast was used.
- Increased EV and space conditioning loads.
- Smaller increases in several other end uses, such as appliance systems and lighting.
- The difference between summer and winter peaks are due to increased space cooling loads, smaller increase in other end uses, and an increased summer baseline.

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Load Forecast Update

TAC 10 – May 27, 2026

Michael Brutocao – Natural Gas Planning Manager

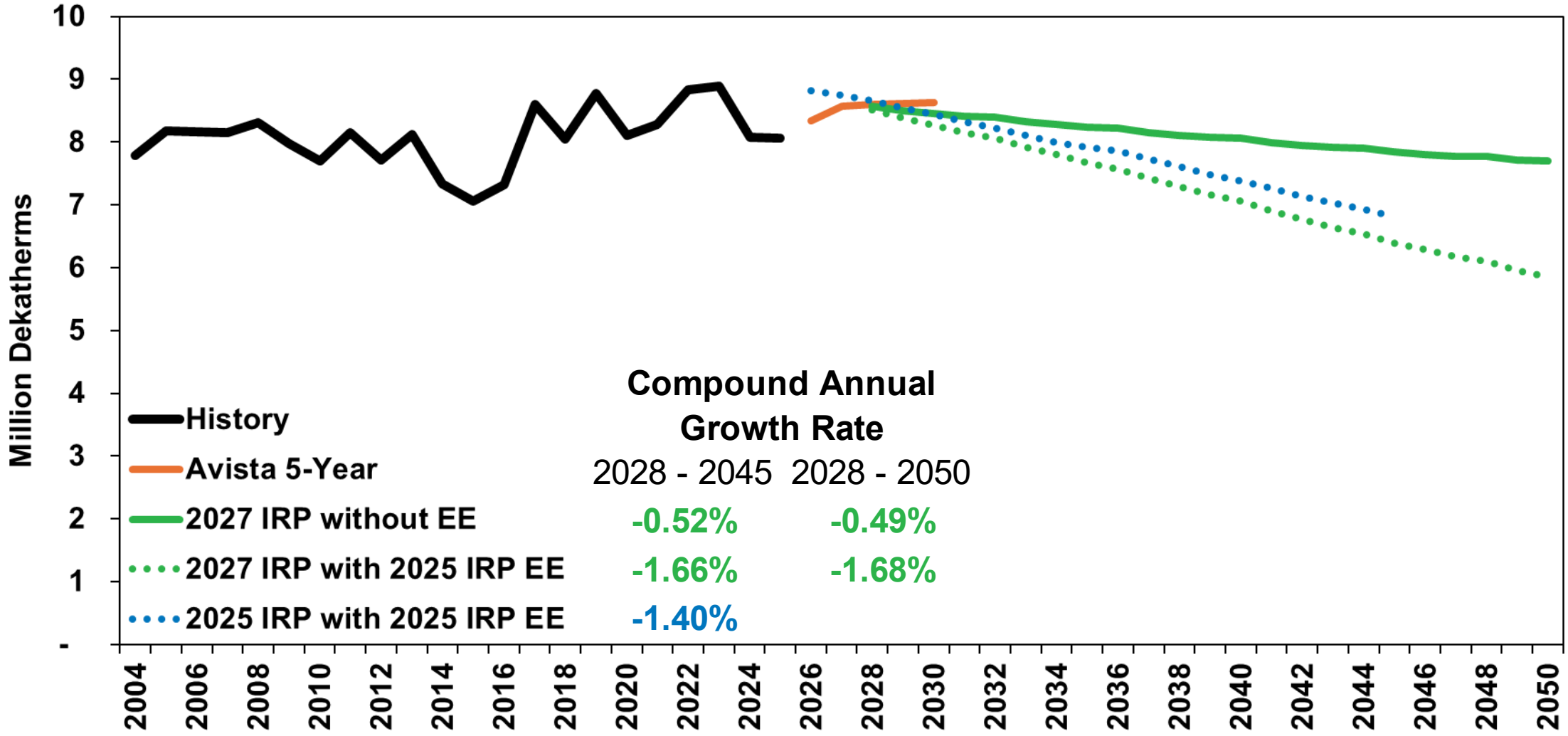
Transition End Use Model to Load Forecast

Year	Load Forecast	Peak Day Forecast
2026	Avista's medium-term, 5-year forecast	Avista's 2026 Peak Day Forecast →
2027		YOY growth rate of Avista's medium-term monthly load forecast applied to respective state and customer segment
2028 – 2050 (IRP Horizon)	YOY growth rate of Cadmus (consultant) monthly load forecast applied to respective state and customer segment	YOY growth rate of Cadmus (consultant) monthly peak day load forecast applied to respective state and customer segment

2026 Peak Day Forecast

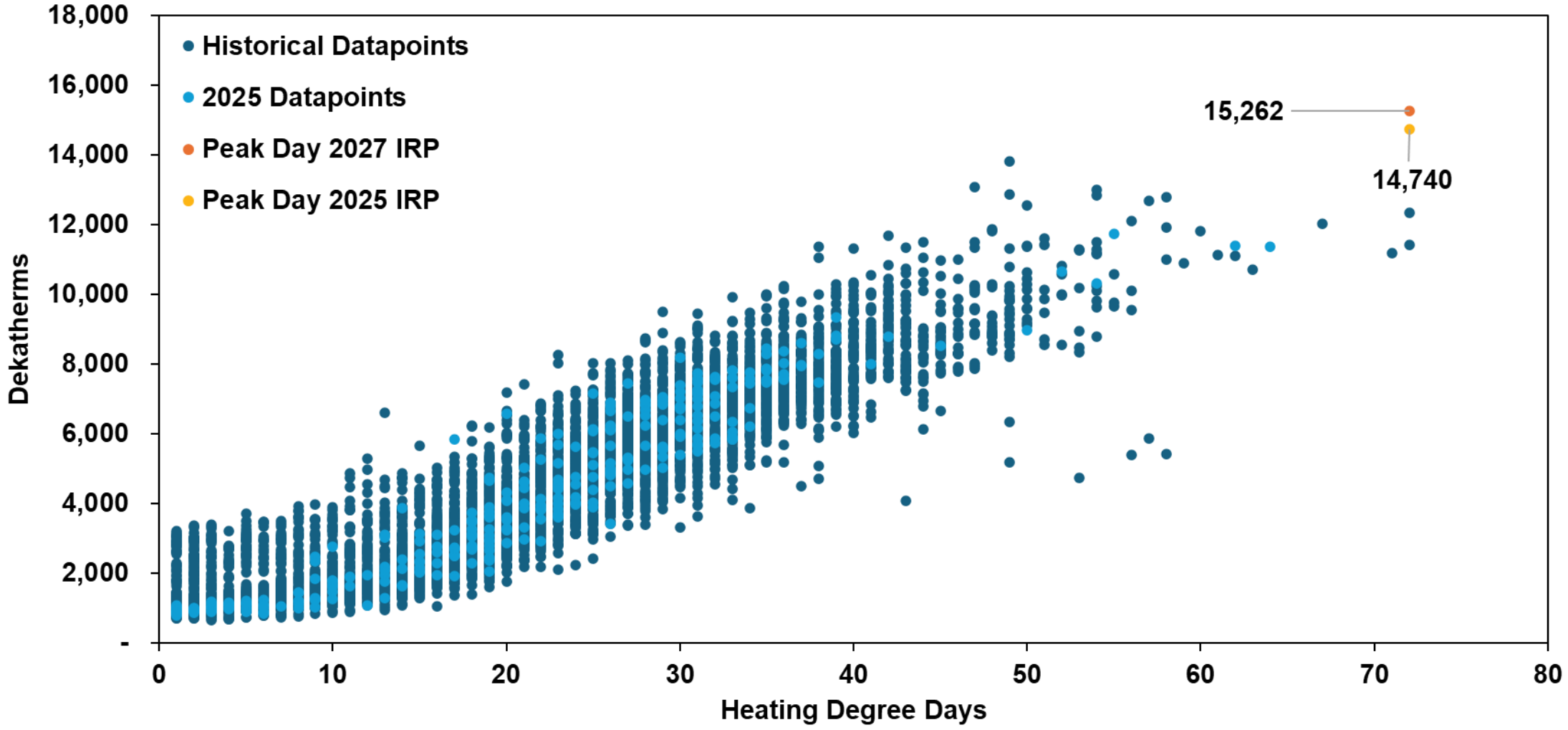
For each of Avista's service territories, daily loads are regressed against heating degree days using data from the most recent year (2025) to best reflect current technologies. The 2026 peak day forecasted load is then determined by applying this load-Heating Degree Day (HDD) relationship to the peak day HDDs for each respective service territory.

Oregon – Load Forecast



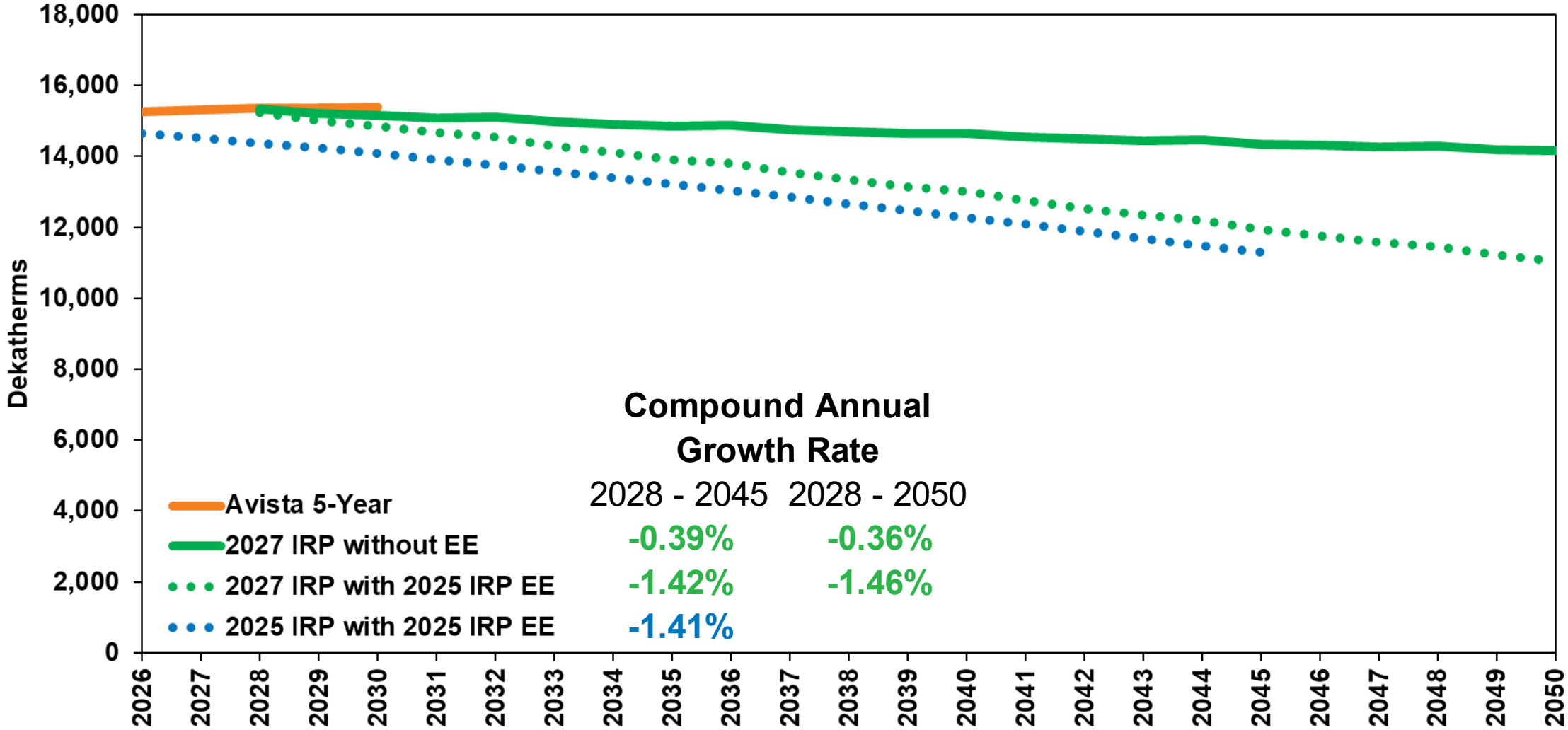
Historical values are reflective of forecasted rate schedules only
2025 IRP EE trended for years beyond 2045

Klamath Falls – 2026 Peak Day Forecast



Historical data since 2005

Klamath Falls – Peak Day Forecast



5 2025 IRP EE trended for years beyond 2045

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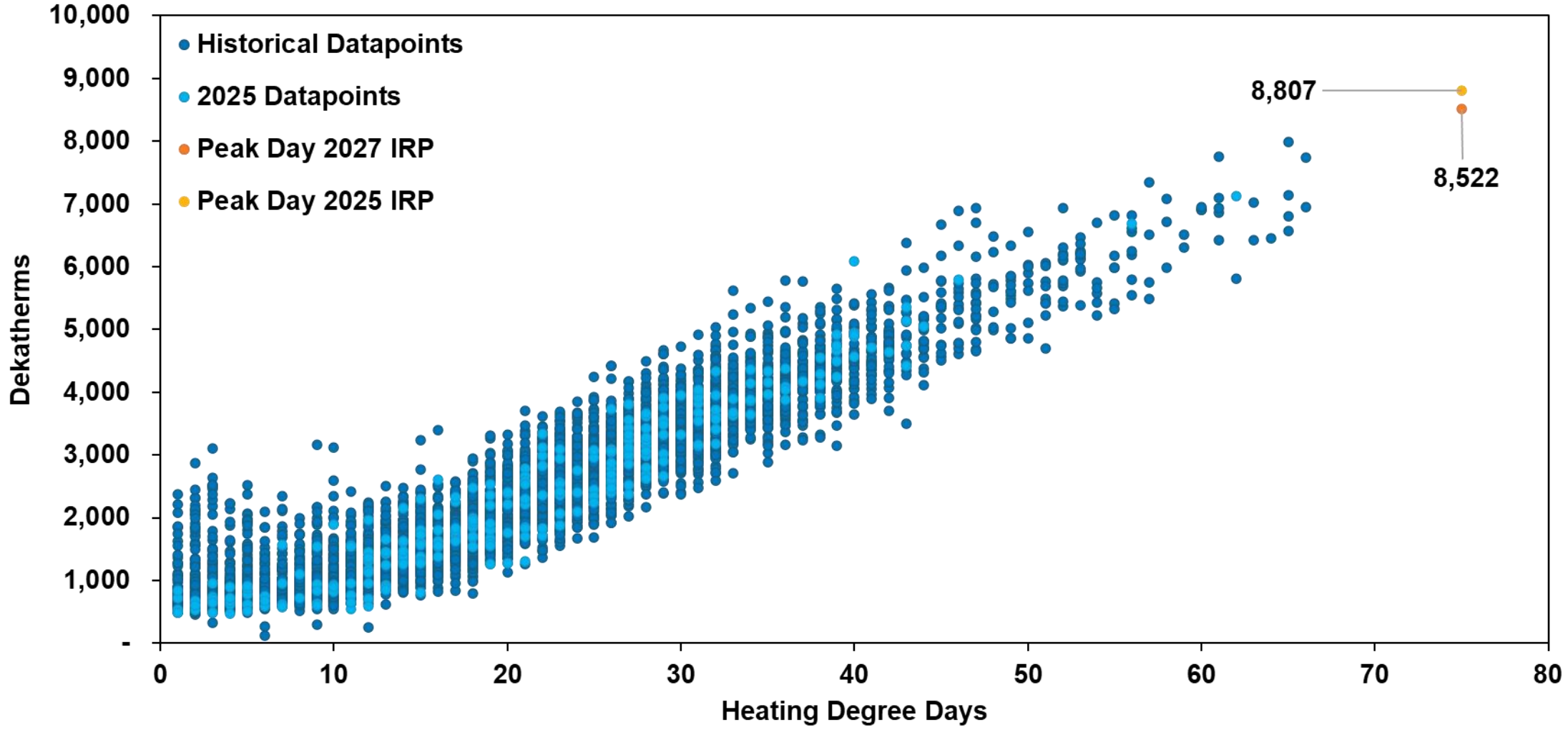
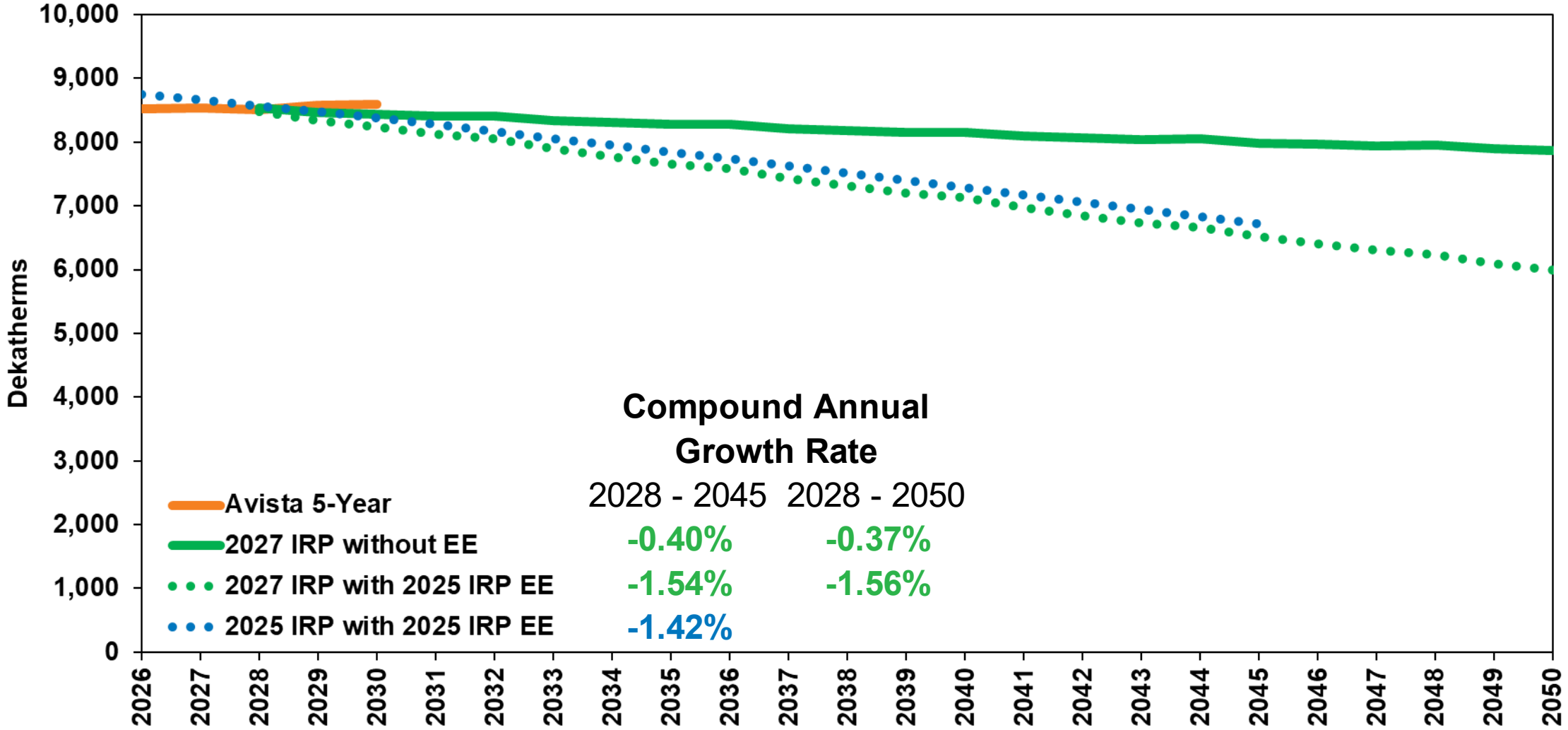
La Grande – 2026 Peak Day Forecast



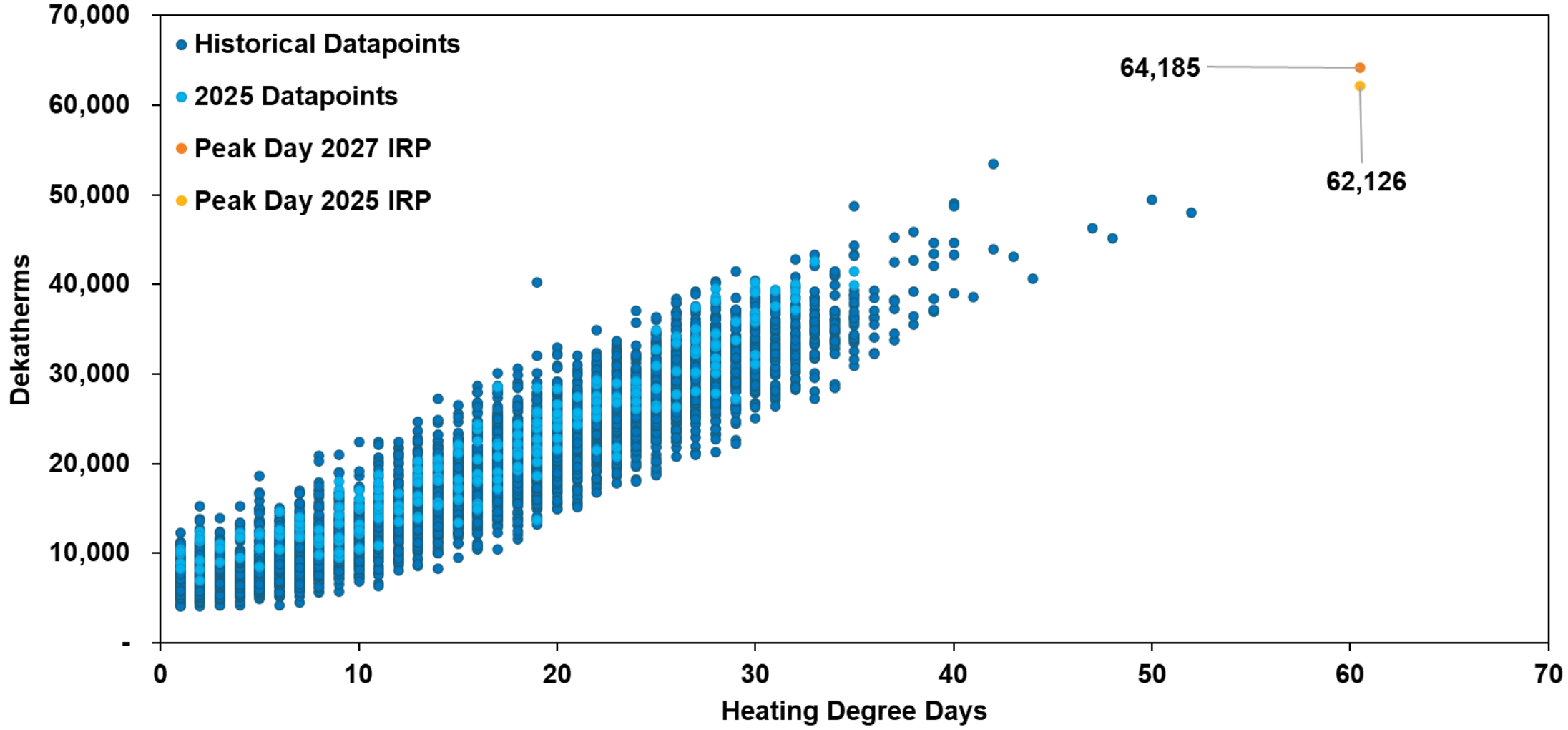
Historical data since 2005

La Grande – Peak Day Forecast



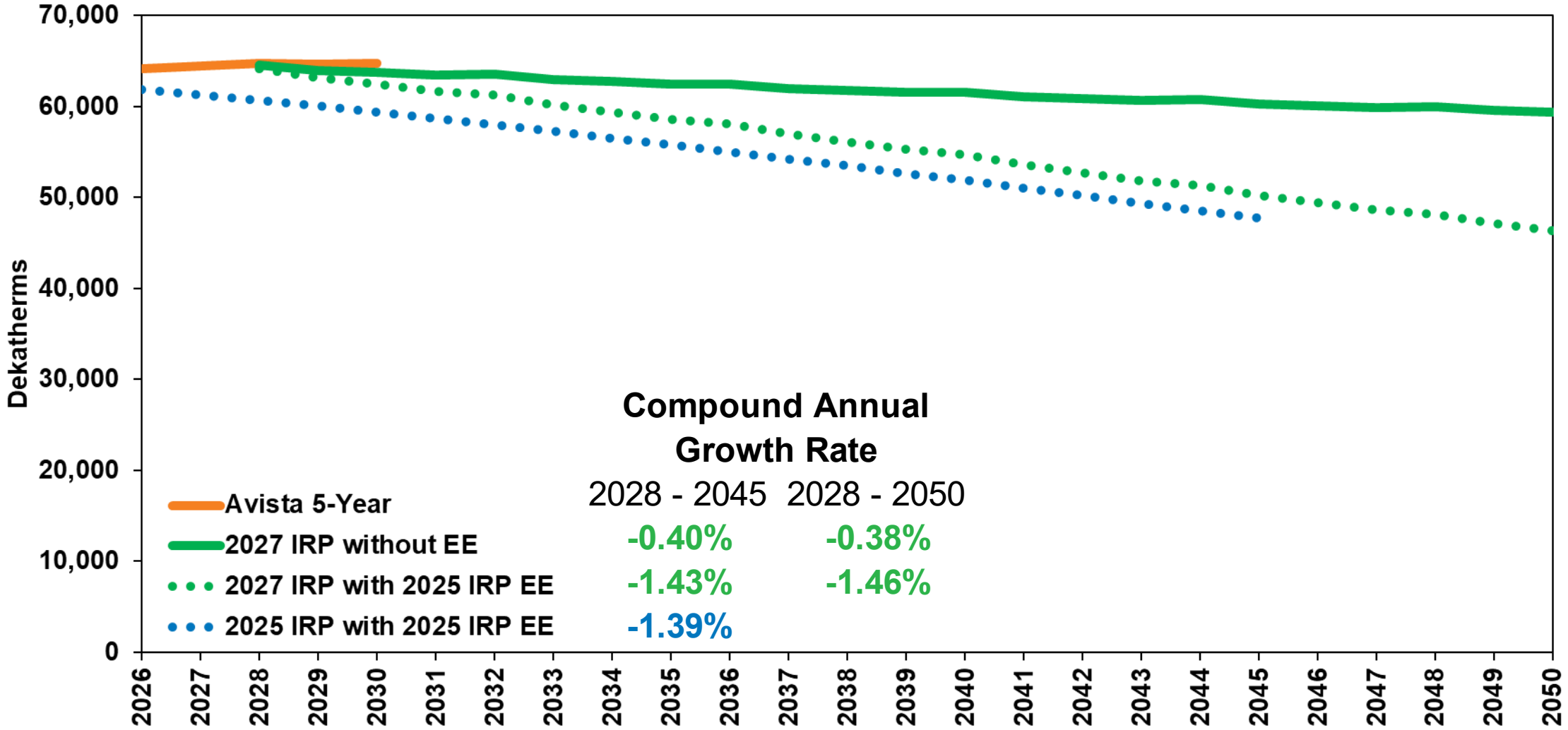
2025 IRP EE trended for years beyond 2045

Medford – 2026 Peak Day Forecast



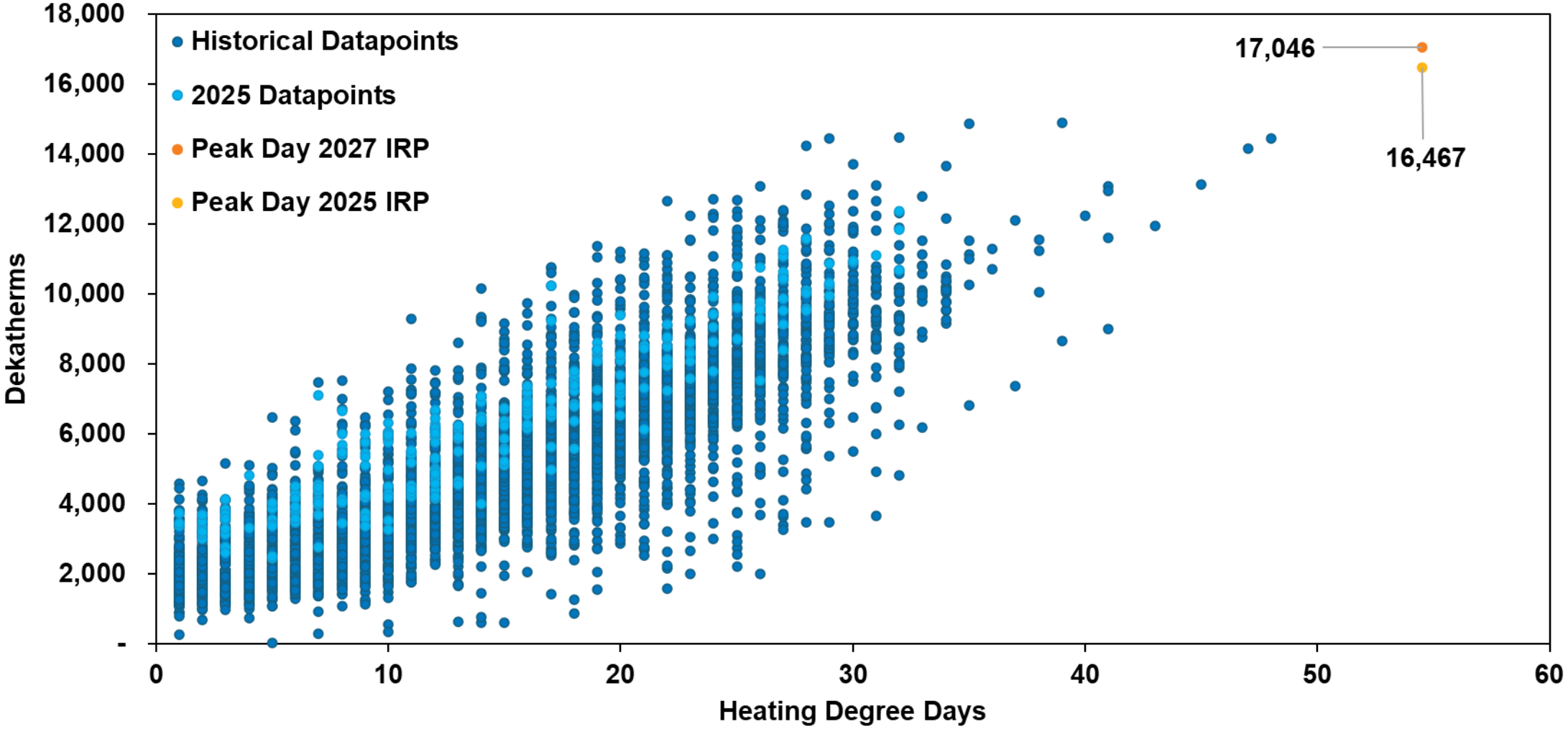
 Historical data since 2005

Medford – Peak Day Forecast



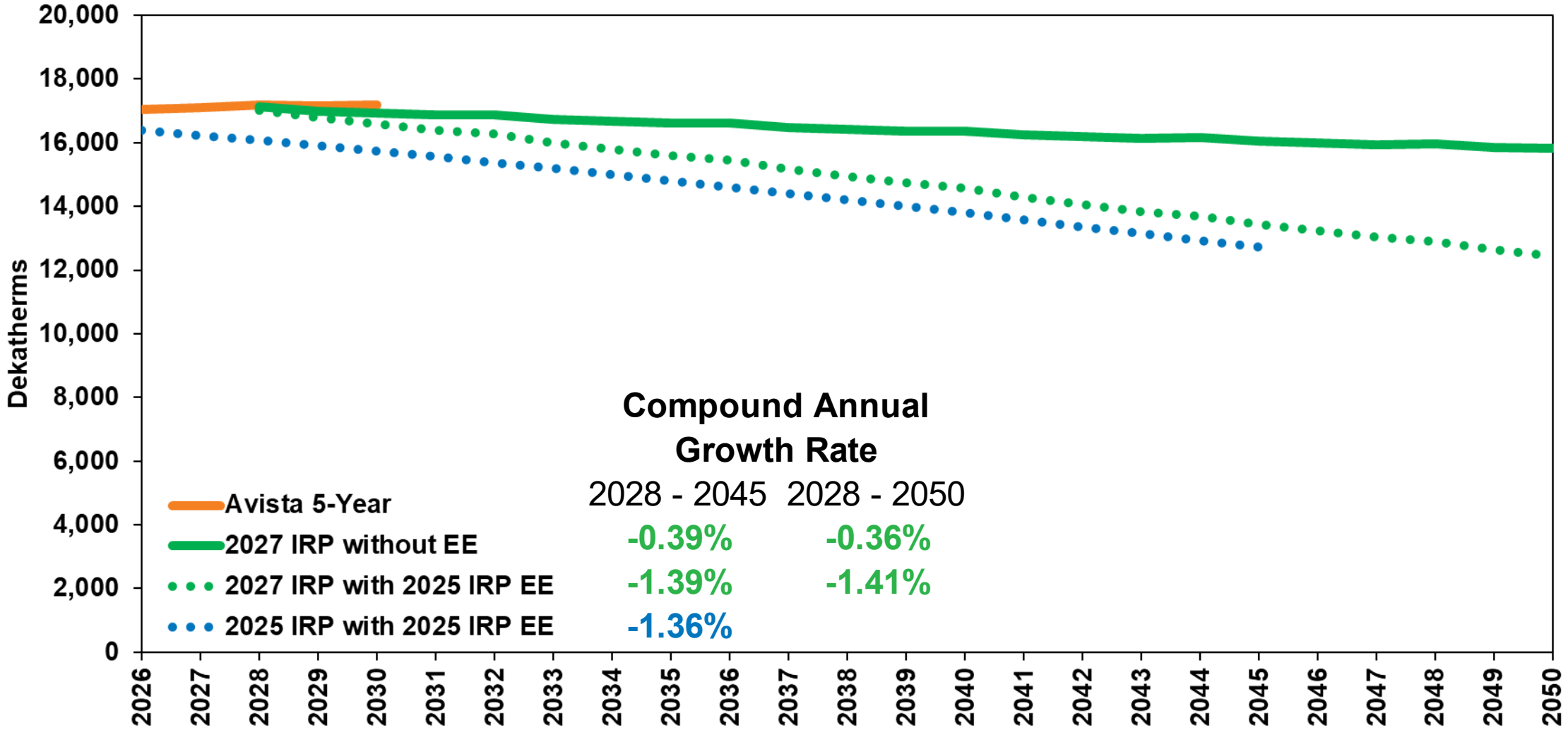
2025 IRP EE trended for years beyond 2045

Roseburg – 2026 Peak Day Forecast



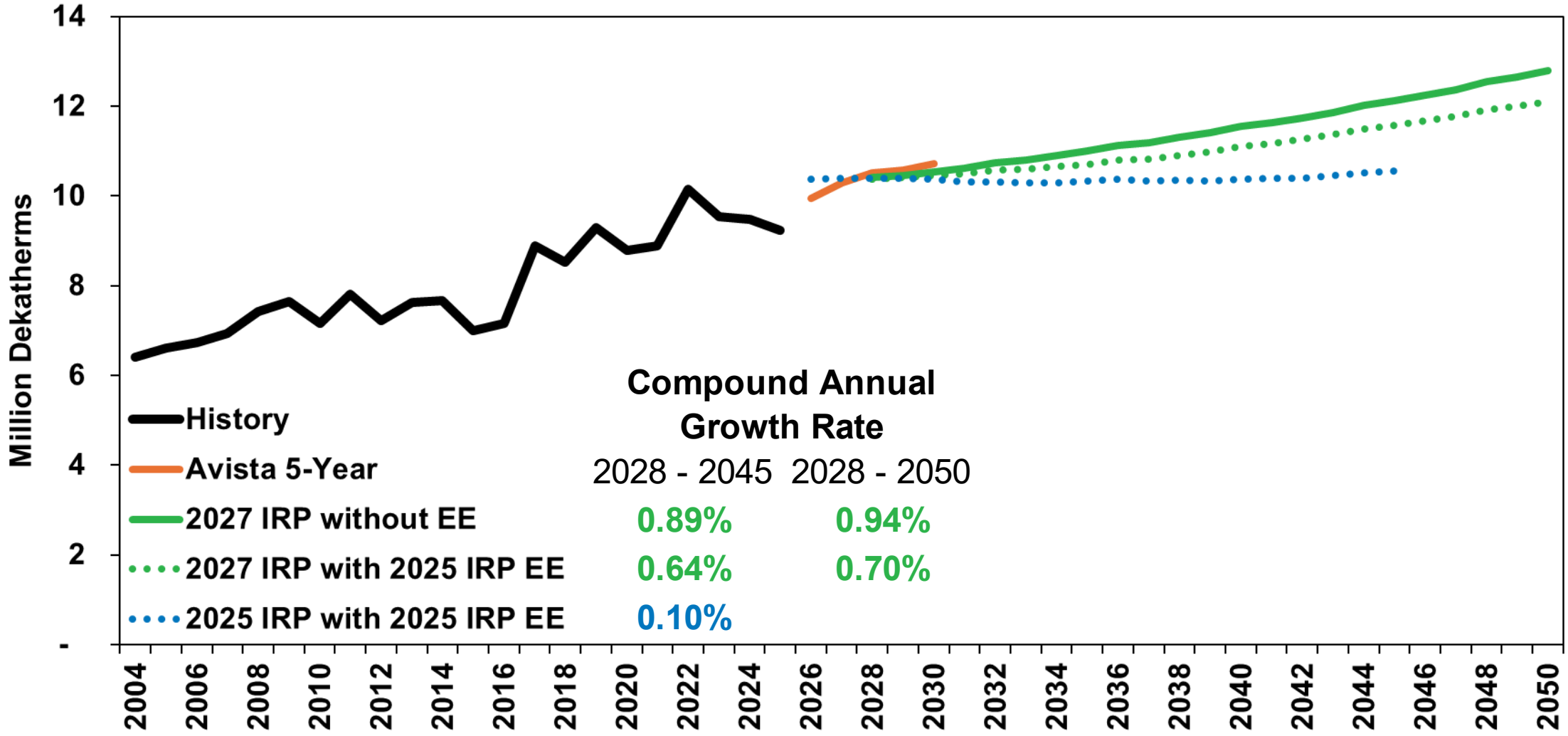
 Historical data since 2005

Roseburg – Peak Day Forecast



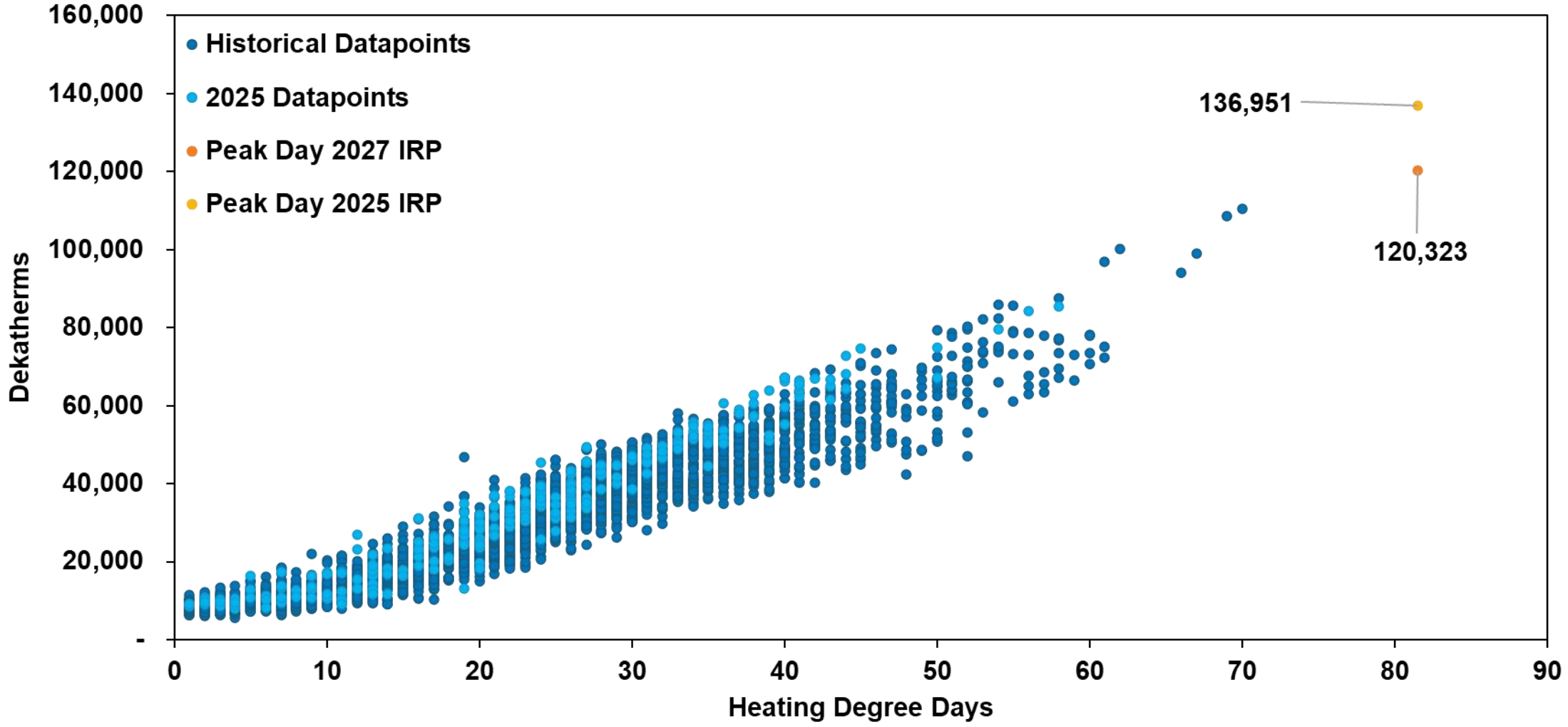
2025 IRP EE trended for years beyond 2045

Idaho – Load Forecast



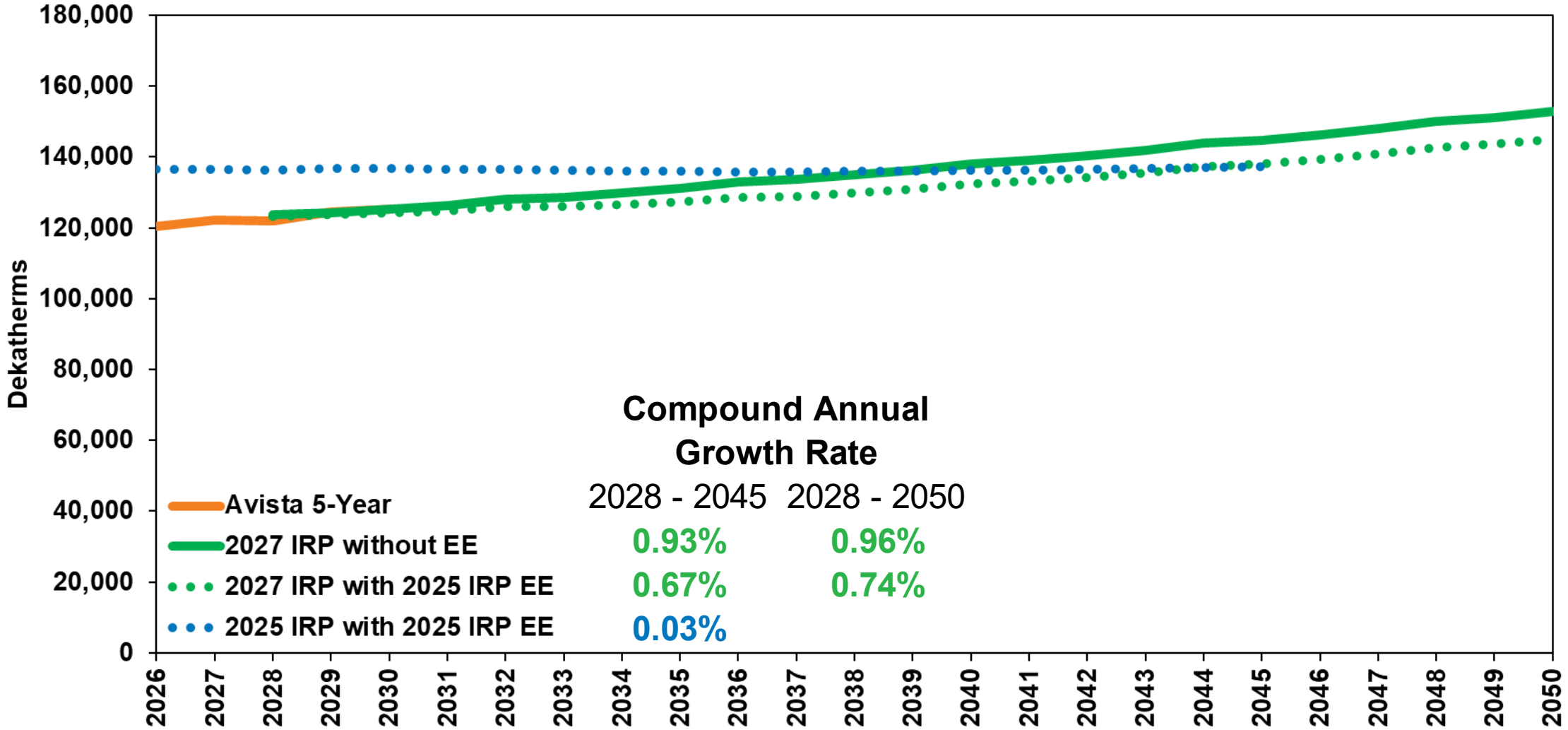
Historical values are reflective of forecasted rate schedules only
2025 IRP EE trended for years beyond 2045

Idaho – 2026 Peak Day Forecast



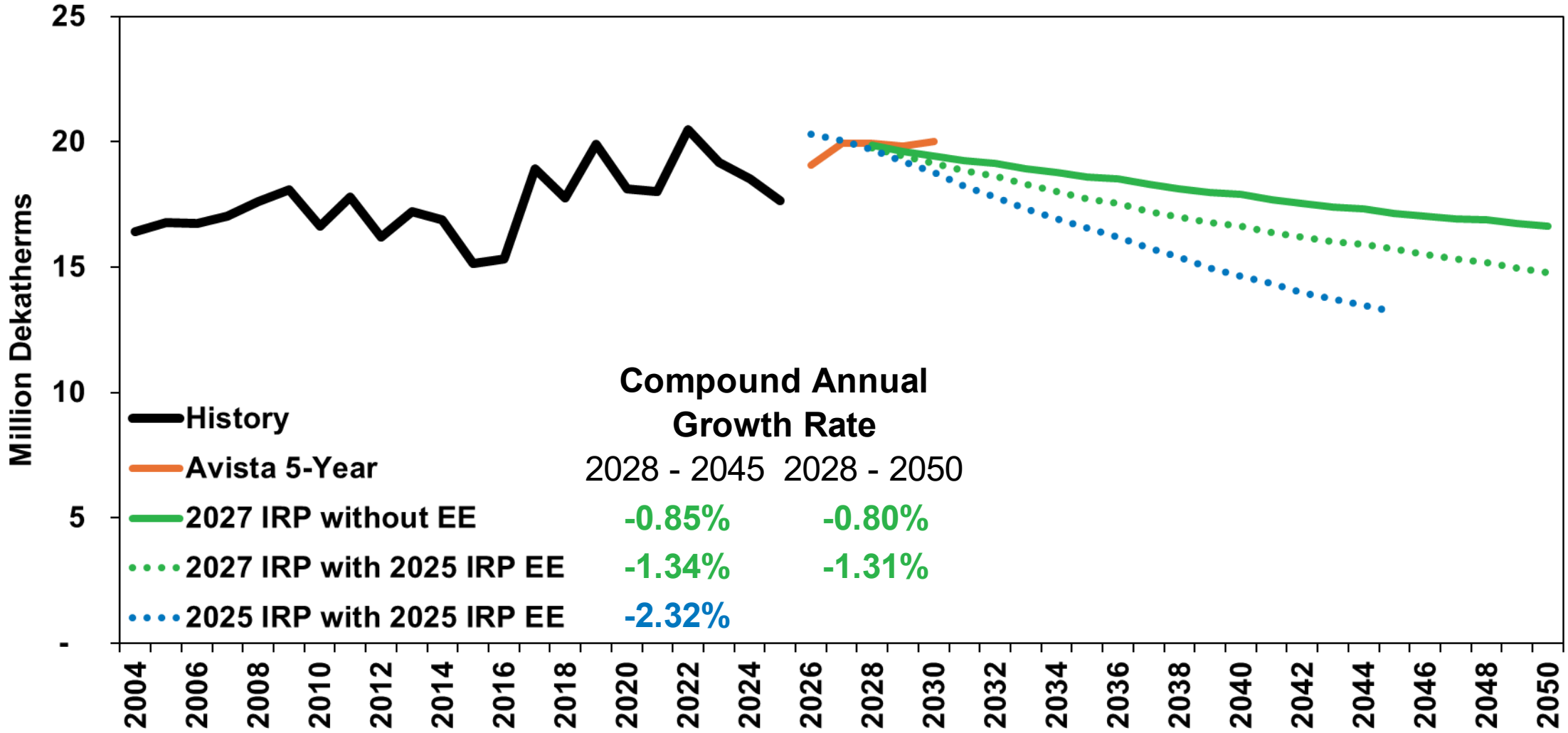
 Historical data since 2012

Idaho – Peak Day Forecast



2025 IRP EE trended for years beyond 2045

Washington – Load Forecast



Historical values are reflective of forecasted rate schedules only
2025 IRP EE trended for years beyond 2045

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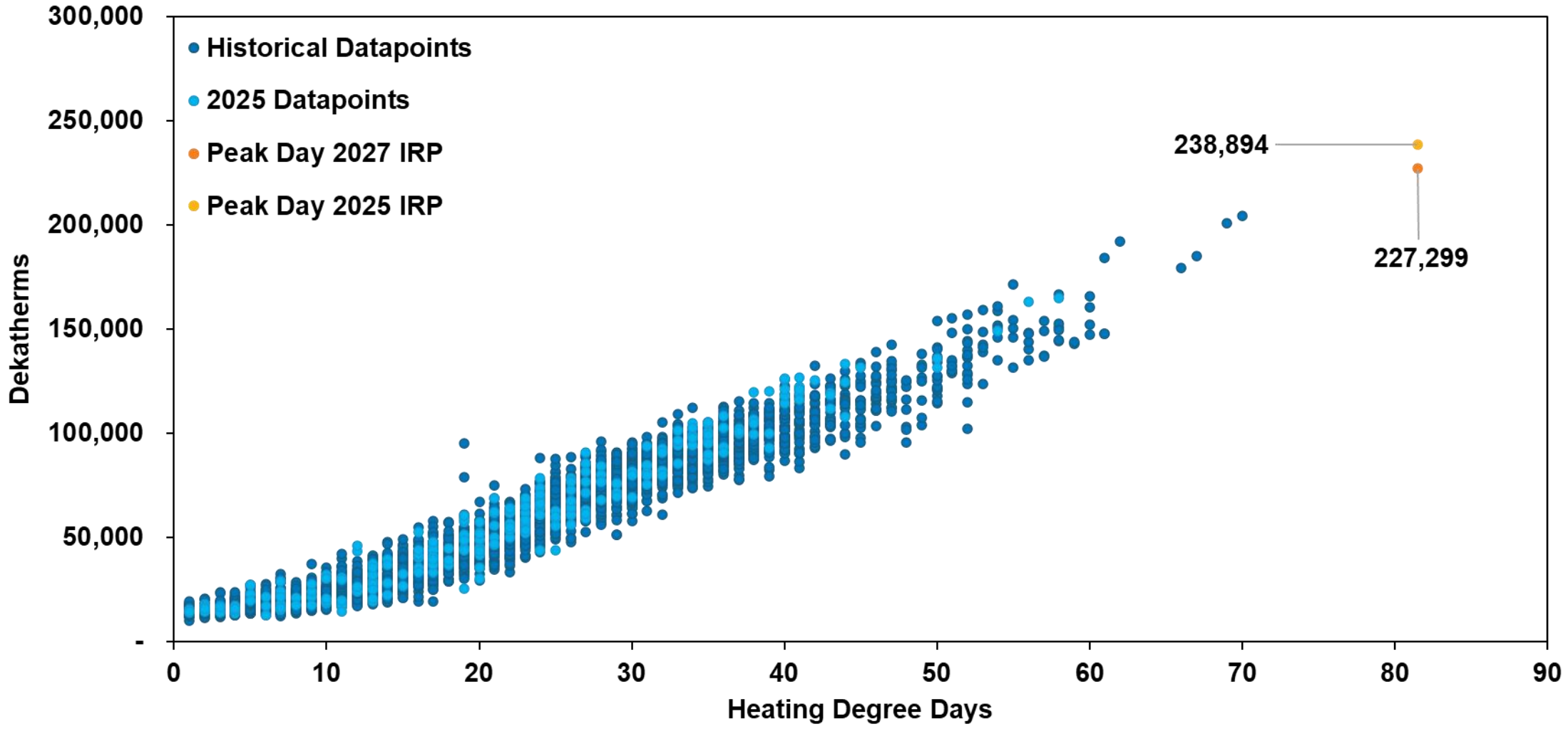
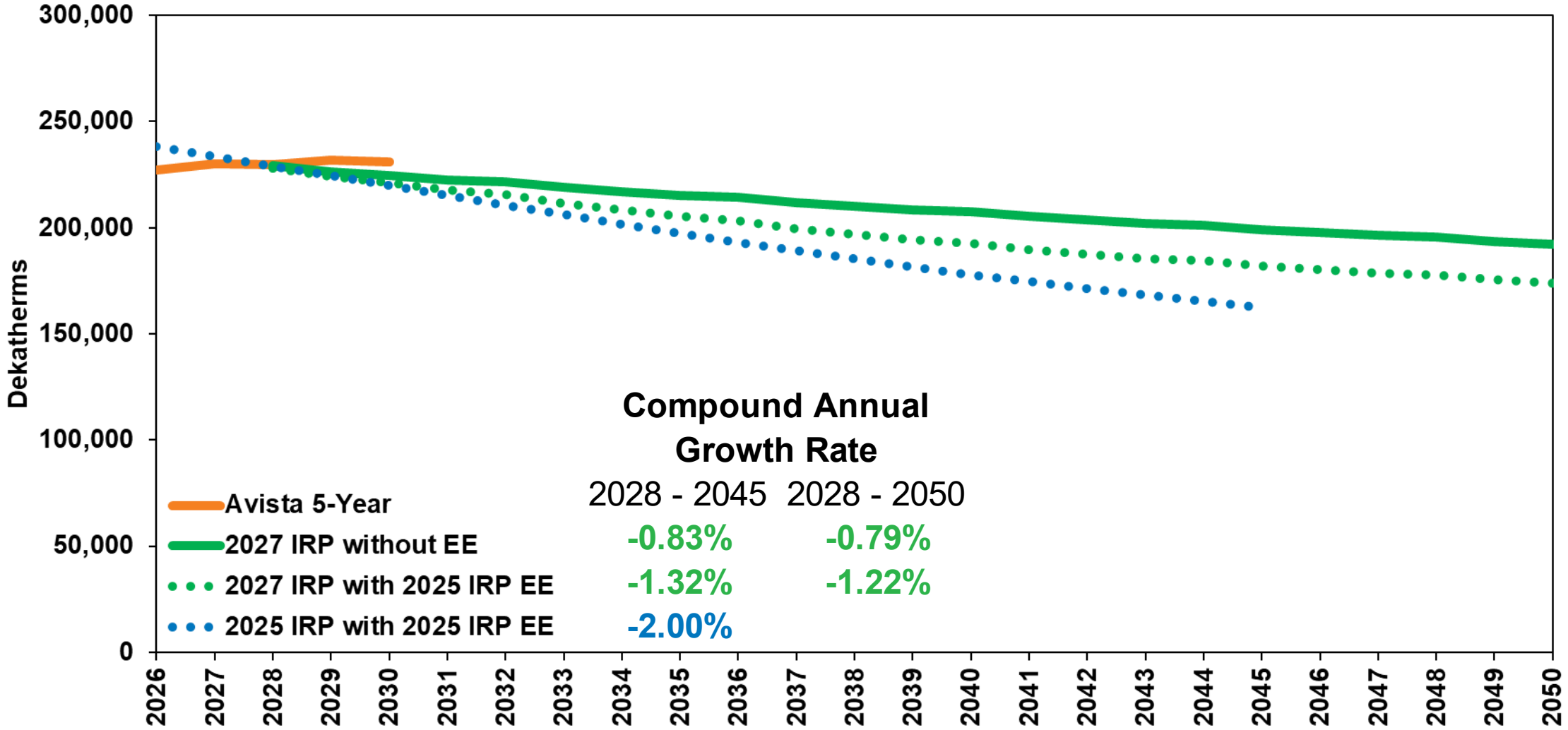
Washington – 2026 Peak Day Forecast



 Historical data since 2012

Washington – Peak Day Forecast



2025 IRP EE trended for years beyond 2045

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New Resource QCC Forecast

TAC 10 – May 27, 2026

Jon Lee, Resource Planning Analyst

Avista's Qualified Capacity Credit Methodology

- Avista utilizes the Western Power Pool's WRAP assigned QCCs in developing our Load and Resources report, but we also conduct a separate validation process to accurately assess those values.
- For new resources, Avista will use generic estimates from WRAP. A scenario will also be conducted from the E3 study on Resource Adequacy and the Energy Transition in the Pacific Northwest.
  - Due to the wide variance in battery storage QCC treatment between WRAP and E3, we will conduct our own QCC analysis for storage and may replace the WRAP value.
- To validate that the Preferred Resource Strategy is Resource Adequate (RA), Avista will conduct a RA analysis to verify the QCC values and Planning Reserve Margin (PRM) percentage.

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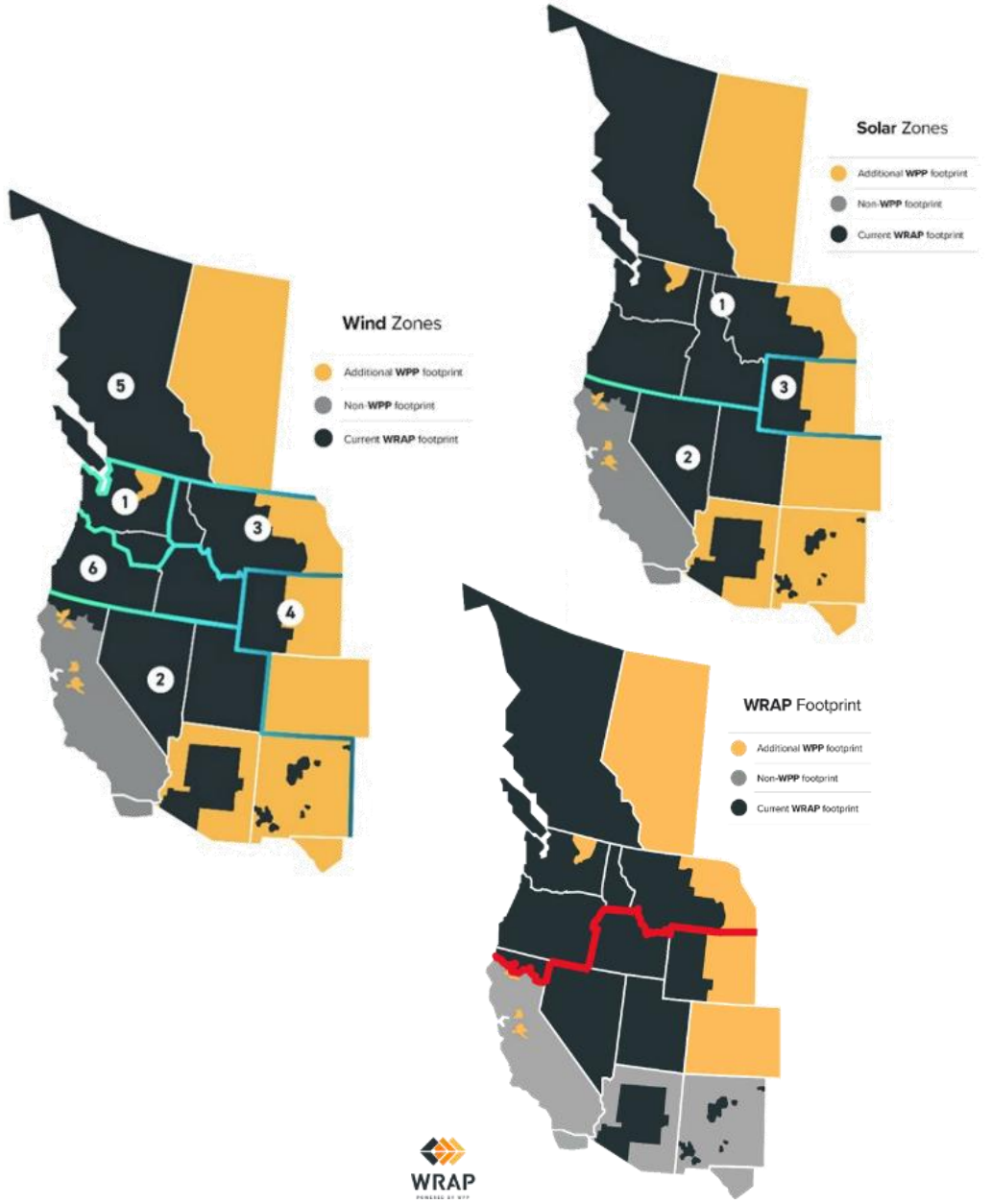
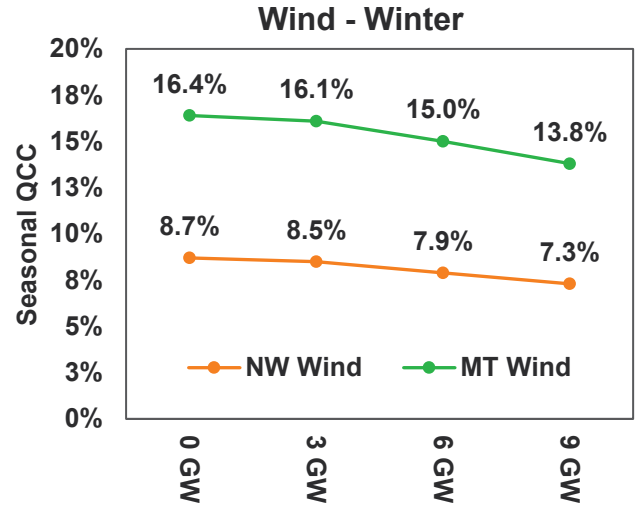
WRAP QCC Determination

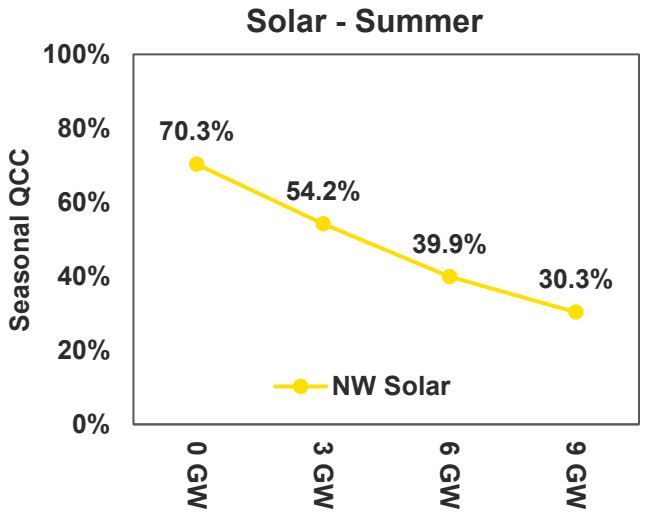
- Includes only binding participants and their associated load and resources
- Loss of load events (LOLE) tabulated during seasonal hours
- Pure capacity (no outages) added in all hours until the program footprint (or subregion) reached 0.1 LOLE
- Monthly adjustments made to ensure all months of the planning season had at least 0.01 LOLE while maintaining 0.1 LOLE across the season
- Capacity contribution of VERs determined by removing those resources from the model and re-running the simulation (ELCC methodology)
- Thermal and Long-duration storage calculated by using the Equivalent Forced Outage Factor (EFOF) methodology during Capacity Critical Hours
- Demand Response (5-Hour Duration) – Modeled maximum monthly capacity of all programs submitted by the Participants.
    - Avista assumes DR is a load reduction and receives additional credit to the QCC value to cover avoided PRM

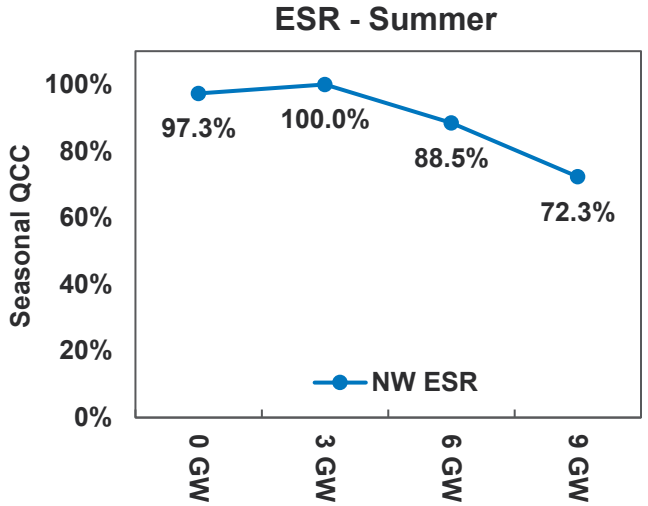


Future Penetration of VERs

- Future penetrations of 3 GW, 6 GW, and 9 GW studied for Wind, Solar and ESR VER Zones/Subregions
- 0.1 LOLE analysis performed again under each incremental capacity addition to determine seasonal QCC value
- Avista utilized the same generation capacity forecast used in our electric market price forecast for each VER and zone through 2050
- Through a linear regression model, we modeled how the QCC would change over time with incremental VER additions







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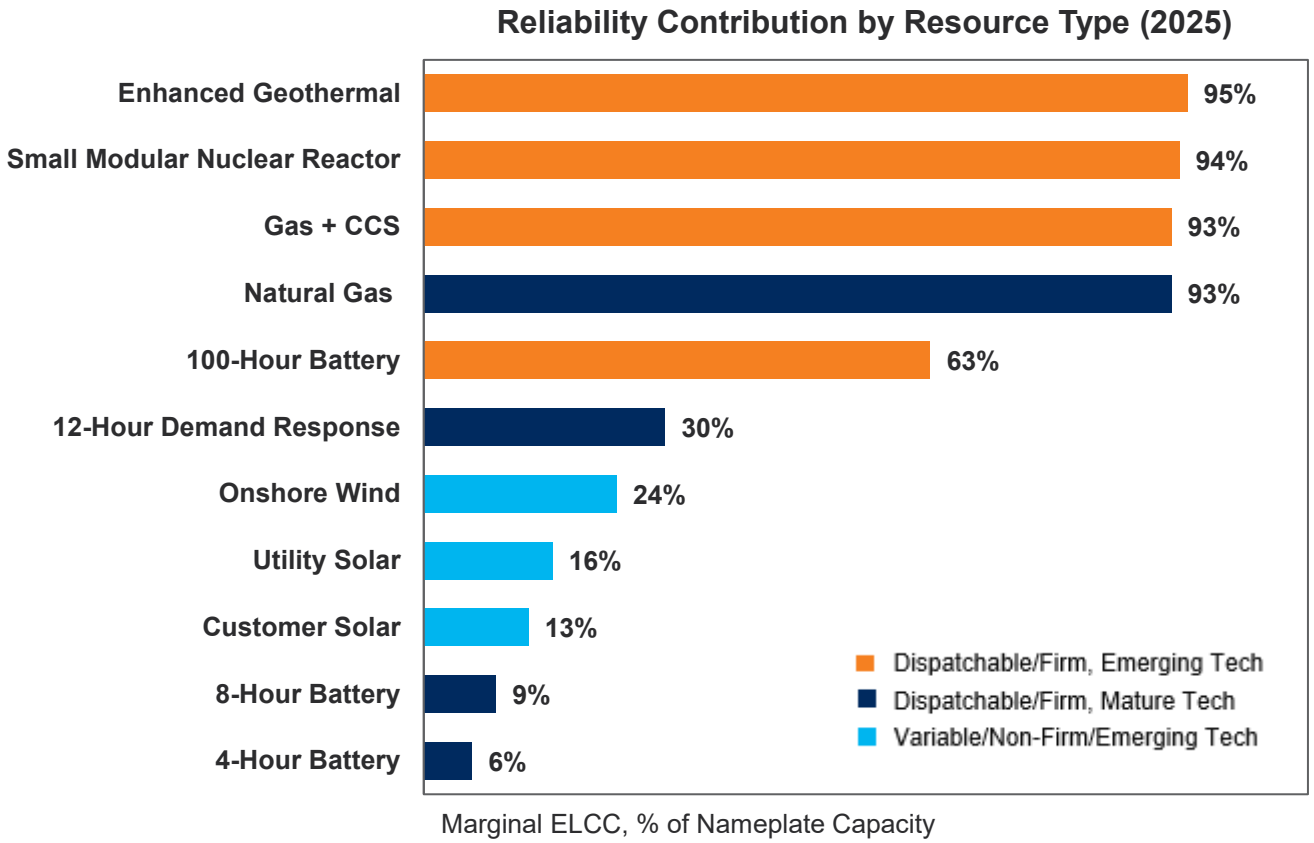
WRAP-Based QCC for Certain New Resources

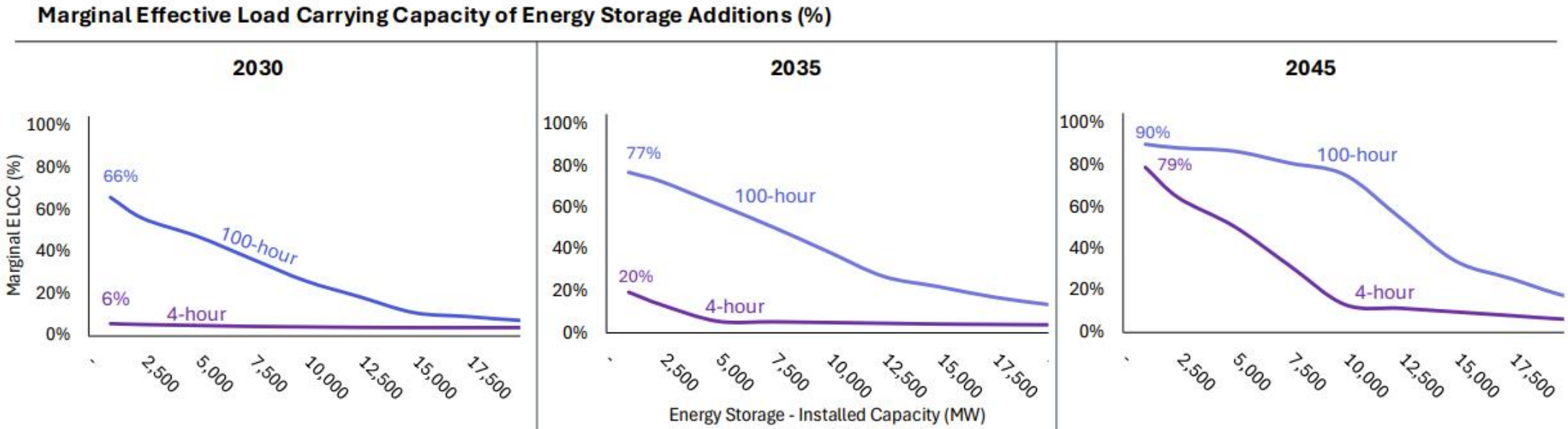
Resource	Winter (Jan)			Summer (Aug)		
	2028	2035	2045	2028	2035	2045
Geothermal/Nuclear	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Biomass	97.3%	97.3%	97.3%	97.3%	97.3%	97.3%
CCCT	101.3%	101.3%	101.3%	88.0%	88.0%	88.0%
Frame Machine	103.4%	103.4%	103.4%	89.8%	89.8%	89.8%
Reciprocating/Linear Generator	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%
Solar	6.5%	1.1%	0.6%	62.0%	39.0%	23.2%
NW Wind	9.9%	9.8%	9.5%	11.1%	10.9%	10.5%
Montana Wind	27.4%	26.6%	25.8%	16.7%	16.3%	15.7%
4 Hour Energy Storage	99.4%	91.2%	78.3%	100%	95.5%	88.3%
8 Hour Energy Storage	98.0%	93.9%	87.6%	99.3%	96.6%	93.0%
100 Hour Energy Storage	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%
Demand Response (3 hour)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%

E3 Reliability Assessment



- Driven by loss of load events occurring primarily during wintertime **multi-day** low hydro conditions
- Each resource was measured based on its ability to produce energy during critical conditions
- The largest variance between this study and WRAP's ELCCs was for 4- and 8-Hour batteries, 12-Hour DR, and Utility Solar
- E3 found that short-duration energy storage and demand response can provide incremental value but cannot respond for the required duration

Impact of Increased VER Penetration



Today, short-duration storage is **ineffective at meeting multi-day reliability events** caused by extreme cold weather and very low hydro conditions

By 2035, **storage ELCCs increase a bit** due to higher loads and higher wind and solar generation shifting the nature of loss-of-load events

By 2045, with **2x load and 6x wind and solar** generation, ELCCs for both short and long-duration storage are much higher (High Load Scenario)

ELCCs come from E3's 96% GHG Reduction Scenario includes 28 GW wind and 13 GW solar by 2035, 63 GW wind and 62 GW solar by 2045